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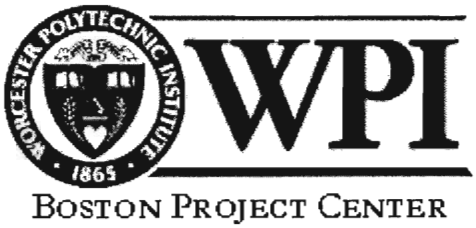

BOSTON PROJECT CENTER

Making Environmental Impact Reports Re-Usable for the City of Boston

An Interdisciplinary Qualifying Project
Submitted to the faculty of
Worcester Polytechnic Institute
in partial fulfillment of the requirements for the
Degree of Bachelor of Science

Submitted By:

Egas Gomes
Jeremy Griffin
Virgil Vaillancourt
Mary Wood

Sponsoring Agency:

City of Boston Environment Department

Submitted To:

Project Advisors:
Malcolm Ray
Hossein Hakim
Fabio Carrera

Project Liaisons:
Bryan Glasscock
Maura Zlody

Boston Environment Department
One City Hall Plaza
Boston, MA 02201

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Abstract

This project focused on the re-usability of project documents created by the review process for the City of Boston, the Commonwealth of Massachusetts, and the Unites States. By identifying the re-usable contents of the project documents and extracting the information into a newly created database, a datasheet and form was created for the Boston Environment Department to help enter, organize, store, and track multiple fields of information. With this sample department database, the project also proposes new ideas for inter-department relations, the project review process, project submission guidelines, and GIS mapping formats. This project's proposal results in long term benefits for the City of Boston by encouraging the concept of city knowledge to obtain a more efficient city review system with comprehensive data collection.

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Our on-site project liaison:

- Bryan Glasscock, Director of the Boston Environment Department
- Maura Zlody, Lead Project Reviewer for the Boston Environment Department

Our project advisors:

- Malcolm Ray, WPI
- Hossein Hakim, WPI
- Fabio Carrera, WPI

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1. Introduction

Before 1969, most cities were the result of piecemeal developments by individual property owners who were at liberty to construct without significant bounds. While this freedom was granted as a constitutional right, urban design and the environment were often left ignored. As a result of this ignorance, the National Environmental Protection Act (NEPA) was created which required the production of Environmental Impact Statements (EISs) to document how a proposed construction project would influence a city's environmental health. Since the enactment of NEPA, Environment Departments across the nation have processed and stored numerous EISs. However, while EISs contain extensive amounts of information they are only useful for single operative decisions and are thereafter of little value to city officials.

The city of Boston is no exception to this piecemeal approach. Boston's development into one of the world's foremost cities has been a long and involved process. Beginning as a one road township, Boston today encompasses forty-eight square miles and packs two hundred and sixty-nine high rise buildings into its diminutive radius[1], an extraordinary feat by any scale. Prior to the NEPA, Massachusetts's major landowners and developers were able to construct new projects without taking the environment into consideration. However, with the institution of NEPA in 1969 and the Massachusetts Environmental Protection Act (MEPA) in 1972, landowners and developers were forced to hire expert consultants to create Environmental Impact Reports (EIRs) which documented the possible impact of their proposed construction undertaking on the cities' human and environmental aspects. The state of Massachusetts reviewed a total of one hundred and nine EIR documents in 2004[2], while Boston alone has reviewed twenty-two EIRs in just the first two months of 2005[3]. However, Boston is just one example of a city that would benefit from an electronically based system which effectively manages the content of individual EIRs.

Boston of today is considered one of the most technologically advanced cities worldwide. Nevertheless, the Boston Environment Department (BED) reviews over one

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[1] Boston: Emporis Geography [Internet] [Updated 2004; cited 2005 February 2].
[2] *Environmental Monitor* [Internet] [Updated 2005; cited 2005 February 21].
[3] Boston Environment Department: *Environmental Monitor* [received 2005 February 17]

hundred hard copy EIRs annually, and several hundred more remain on file from previous years. These EIRs contains approximately five hundred pages of documentation detailing information such as the projected impacts on traffic, building shadows, and noise production. This information allows city officials to make educated decisions regarding an individual project's approval and also has the potential to be used in conjunction with other studies to predict the overall impact overtime of development in a designated area of Boston.

The BED is currently reviewing eighteen EIRs for the months of February and March of 2005. These EIRs contain an immense amount of information in the form of graphs, diagrams, and tables, along with numerous pages of explanation. Nonetheless, most of this information will not be utilized after the project's approval due to the fact that EIRs were submitted to the BED in paper form. An electronic system for filing specific information from within the EIRs would make the information re-usable. However, the BED has yet to develop a system to make the information from the EIRs accessible. Their effort to revamp the EIR review process is not unique. In the past, WPI projects have undertaken similarly formidable challenges by helping municipal departments manage environmental and historical assets using prototype information systems.

This project is designed to assist the Boston Environment Department and other governmental agencies in re-using documented information from EIRs by creating a database to document their individual content. Currently, these paper reports are shelved with no record of content, making it difficult for city officials to find the necessary information for successful urban maintenance and management. A standardized system will benefit not only city officials but also members of the private industry if the city decides to share regionally.

2. Background

The goal of this project is to make environmental impact reports submitted to the Boston Environment Department (BED) useful for more than just the review of a single proposed project. Past impact reports have accumulated on the shelves of the BED while their potential as a re-usable source of information has yet to be realized. This chapter provides insight into the origin of the required content contained in three divisions of impact statements: Federal, State and Municipal, which are handled by the BED. In addition, the role of environmental impact statements as an essential tool in the urban planning process at every level to ensure the safe and continued co-existence of humans and the environment will become apparent. Finally, the BED will begin to realize the potential of the completed/shelved impact statement as a resource to other governmental agencies and to the public for use in future construction activities.

2.1 The Love Canal Tragedy

One particular incident which clearly emphasizes the consequences of incomplete documentation and the importance of Environmental Impact Reports is the Love Canal Tragedy from Niagara Falls, NY. The cover story of the New York Times on August 1, 1978 read:

> NIAGARA FALLS, N.Y.--Twenty five years after the Hooker Chemical Company stopped using the Love Canal here as an industrial dump, 82 different compounds, 11 of them suspected carcinogens, have been percolating upward through the soil, their drum containers rotting and leaching their contents into the backyards and basements of 100 homes and a public school built on the banks of the canal.[4]

This environmental nightmare began in the 1920s, when William T. Love sold his partially dug trench to the Hooker Chemical Company to use as a dumping site for hazardous material. Properly protected, managed, and regulated landfills had proven to be effective means of waste disposal. This particular landfill, however, proved to be a ticking time bomb after it was used as a chemical dump and the public was not aware of its potential dangers.

[4] The Love Canal Tragedy [Internet]. [Updated 2005; cited 2005 February 15].

The Hooker Chemical Company used the trench as a chemical dump for more than two decades before covering the trench with dirt and selling the property to Niagara Falls Board of Education in 1953. The property deed included a mere warning about the content of the underground chemicals and a disclaimer for the liability of the Hooker Chemical Company[5]. Apparently the Board of Education was not aware of the site's potential dangers, building several homes and an elementary school on the perimeter of the site. It wasn't until 1978, when residents of the area discovered leaking chemicals in their homes and the terrible effects the chemicals were having on their lives. The trend of birth defects and miscarriages in the area, in addition to random burns children suffered just from playing outside in the contaminated air, told the residents that something was not right. Eventually, the effected homes were demolished and a clean up effort was launched to prevent any further damages. The Love Canal tragedy had shown how important proper documentation and disclosure is.

2.2 History of the NEPA

In the late 1960s, global concern arose regarding the adverse affects that new construction projects would have on the environment. Industrial buildings were emitting an immense amount of pollution, water was being contaminated, and highways were destroying scenic landscapes.[6] Prior to the implementation of the National Environmental Policy Act of 1969 (NEPA), project planning focused mainly on technical and economic factors and the environment was rarely considered. NEPA which became effective on January 1, 1970 required federal agencies to include the environment in the decision-making process for project planning.[7]

The main goal of the NEPA was to set a new standard for the decision-making process. The act did this by creating certain policies and requirements for federal agencies. The NEPA is divided into two titles. The first addresses a national environmental policy while the second sets up a Council of Environmental Quality (CEQ). Section 101 declares a national policy and sets six national goals for this

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[5] Learning from Love Canal [Internet]. [Updated 1998; cited 2005 February 20].
[6] Larry W. Canter, *Environmental Impact Assessment* (New York: McGraw-Hill, Inc., 1996), 1.
[7] IDEM

environmental policy concerning such issues as assuring "safe, healthful, productive, and aesthetically and culturally pleasing surroundings, utilizing the environment to its fullest extent without degradation, risk to health or safety, or other undesirable and unintended consequences, and attaining a balance between population and resource to promote high standards of living"[8]. Section 102 constitutes the procedural portion of the NEPA.[9]

Part A of Section 102 calls for federal agencies to use a systematic approach that integrates the use of natural and social sciences and the environmental design arts in decision making that would have an impact on the human environment, a process known as the Environmental Impact Assessment (EIA). Part B requires federal agencies to develop methods to cover the "unquantified environmental amenities" [10] in decision-making, along with the technical and economic factors. Part C requires federal agencies to prepare a detailed statement of environmental impacts called Environmental Impact Statements (EIS).

The final part of the NEPA, Title II, establishes the Council on Environmental Quality (CEQ) which is made up of three members who carry out the duties specified in NEPA. The CEQ issued regulations in 1978, with a few modifications in 1986, for the preparation of EIS. [11]

2.3 The National Review Process

The National Review Process starts with a proponent proposing a project. After the proposal it can be either categorically excluded or it will require an Environmental Assessment (EA). The EA is a preliminary study of the environmental impacts which determines if there is a need for an EIS. If an agency determines that an EIS is not necessary, the EA can be used to issue a finding of no significant impact (FONSI); however, if an EA determines that a project has a significant impact on the environment, an EIS must be created.[12]

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[8] The National Environmental Policy Act of 1969 [Internet]: [Cited February 8, 2005].
[9] Canter, *Environmental Impact Assessment*, 3-4.
[10] The National Environmental Policy Act of 1969 [Internet] and Leonard Ortolano, *Environmental Regulation and Impact Assessment* (New York: John Wiley & Sons, Inc., 1997) 315-20.
[11] IDEM
[12] Ortolano, *Environmental Regulation and Impact Assessment*, 318.

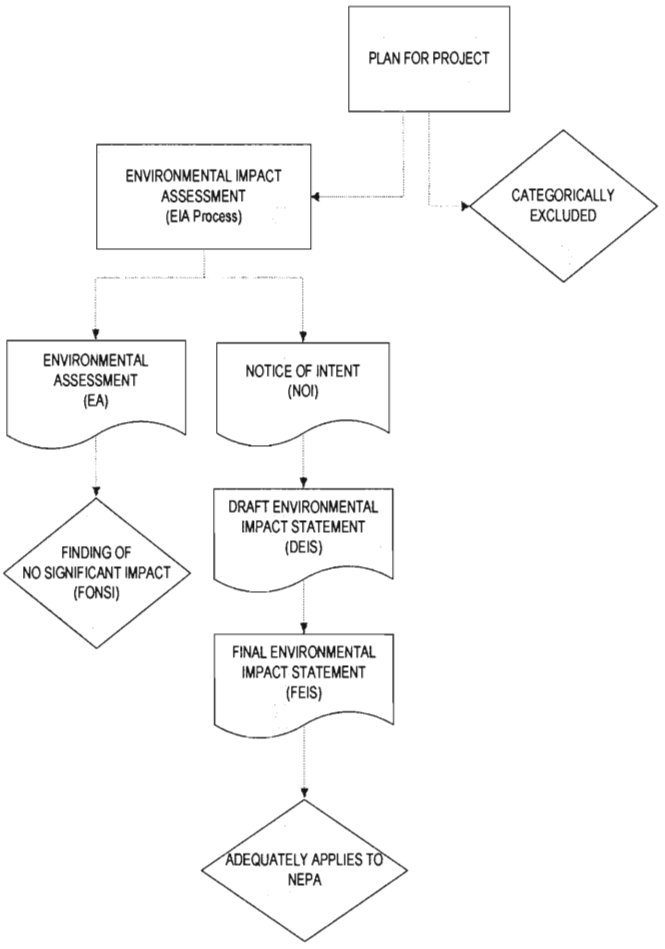

Figure 1: Flow Diagram of the NEPA Process

The review of an Environment Assessment will determine if an EIS is required. The deciding factor in determining if an EIS is necessary is the significance a project will have on its surrounding environment. There are several processes for deciding what is considered significant; one method involves determining thresholds of concern. If a project is predicted to exceed the threshold of concern, then an EIS is necessary. A second method to determine impact significance is placing proposed impacts of a project into certain categories such as:

(1) Beneficial or detrimental,
(2) Naturally reversible or irreversible,
(3) Repairable via management practices or irreparable,
(4) Short-term or long-term,
(5) Temporary or continuous,
(6) Occurring during the construction phase or the operational phase,
(7) Local, regional, national, or global,
(8) Accidental or planned (recognized beforehand),
(9) Direct (primary) or indirect (secondary) and
(10) Cumulative or single.
The definitions of these impacts are defined in the CEQ of 1987.[13]

Once an EIS is deemed necessary, a public Notice of Intent (NOI) that an EIS is to be prepared must be issued. As soon as the NOI is issued, scoping, which is used to

[13] Canter, *Environmental Impact Assessment*, 21.

define what information must be covered in the EIS, must be conducted. During the process, concerned parties are able to voice their opinions on what they believe should be included in the EIS. The point of scoping is to make sure "that real problems are identified early and properly studied; that issues that are of no concern do no consume time and effort; that the draft when first made public is balanced and thorough; and that delays occasioned by redoing an inadequate draft are avoided."[14]

After the scoping process, a draft EIS is prepared and executed in accordance with the rules and regulations set forth by the NEPA and CEQ and decided by the scoping process. The NEPA requires the EIS to include the following information:

i. Environmental impact of the proposed action,
ii. Any adverse environmental effects which cannot be avoided should the proposal be implemented,
iii. Alternatives to the proposed action,
iv. The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
v. Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.[15]

The draft is then circulated for review by any interested parties, which can include citizens, nongovernmental organizations and all levels of government organizations. Also, any member of the public can receive an EIS by request. A draft EIS is under review for a minimum of 45 days, which starts when the Environmental Protection Agency publishes its receipt of the draft in the Federal Register. During the review process public hearings may be held if the agency requires it by its own EIS guidelines.

After the review process, a final EIS is prepared taking into consideration the comments made during the review process. Then the EIS is once again circulated for review. A copy must be sent to anyone interested in the final copy. The final EIS is reviewed for a minimum of 30 days after which the lead agency can make its final decision on whether the proposed project must be furthered reviewed.[16]

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[14] "scoping guidance" issued by CEQ (1981) and Ortolano, *Environmental Regulations and Impact Assessment*, 319.
[15] The National Environmental Protection Act of 1969 [Internet]
[16] Ortolano, *Environmental Impact and Regulation Assessment*, 320.

2.4 The Massachusetts Review Process

Following the enactment of the NEPA, many states adopted their own equivalents of the act. Massachusetts' version of the NEPA, the Massachusetts Environmental Protection Act (MEPA), was developed in the early 1970s. The MEPA was created in order to provide state agencies and government decision makers with pertinent information regarding proposed projects and their likely effects on the environment. The MEPA jurisdiction applies to state agencies and private projects that call for state funding, state permits, or involve a transfer of state land. The project must undergo the MEPA review process if a proposed project falls within these guidelines and reaches predetermined thresholds which indicate potential harm on the environment, or is located within an area that is labeled as a critical environmental concern.

The first step in the MEPA review process is filing an Environmental Notification Form (ENF) with the Secretary of Environmental Affairs, which is filed when the proposed project surpasses thresholds determined in Section 11.03 of the MEPA. A few such thresholds are if the project directly alters 25 or more acres of land, construction of a new roadway two or more miles in length, or the widening of an existing roadway by one or more travel lanes for two or more miles.[17] In addition to filing the ENF with the Secretary, a copy of the first page of the ENF must be published on the first page in the *Environmental Monitor*, which contains the status of all projects under MEPA review. This publication is available to the public through on the internet on the Massachusetts webpage, <www.mass.gov/envir/MEPA/index.htm>. After the ENF is filed, it goes through a 20 day public review. At the end of this review period the Secretary of Environmental Affairs decides whether the project necessitates further MEPA review. If so, in order to conduct a complete review, an Environmental Impact Report (EIR) must be completed.

[17] MEPA Regulations Section 11.03 [Internet]: [Updated 2004, cited February 14, 2005].

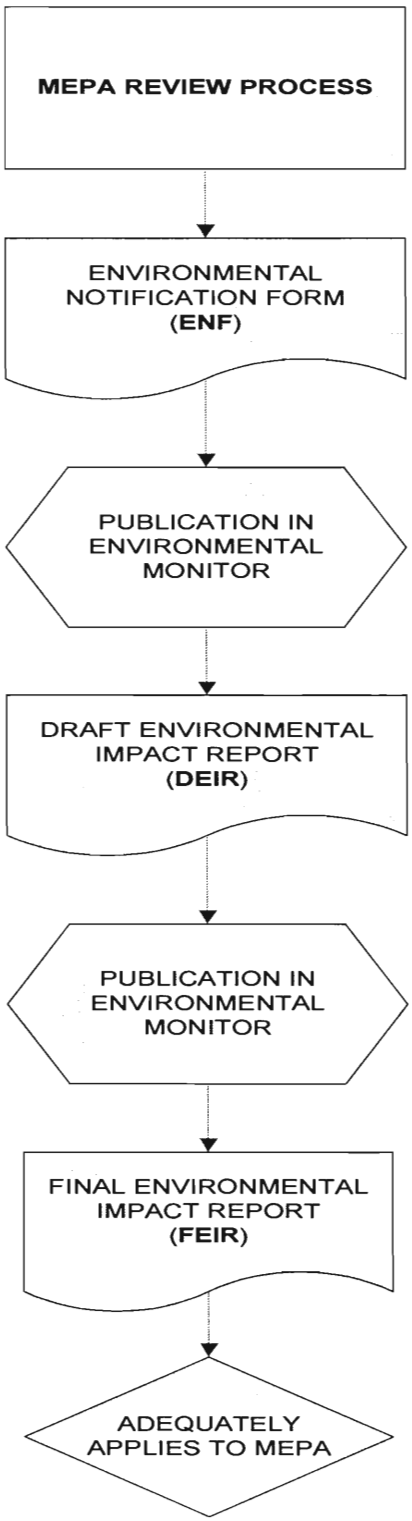

Figure 2: The MEPA Process

The Agency or person undertaking the project must first file a draft EIR and then a final EIR. The draft EIR must contain detailed information about the project's environmental impacts, proposed mitigation or resolutions for certain problem areas of the project, project alternatives and possible alternatives that the Secretary would like the project proponent to consider.[18] Once the draft EIR is completed, the draft enters a 30 day comment period with a notification that the draft has been released in the *Environmental Monitor*. The Secretary must then issue a certificate of whether the information contained in the EIR is sufficient in accordance with MEPA regulations within seven days after the 30 day review period is complete. If the secretary determines that the draft is adequate, a final EIR is prepared.[19]

The final EIR is prepared by responding to the Secretary's certificate regarding the draft; answering concerns raised in public comments, providing additional information or study as directed by the Secretary.[20] The final EIR also undergoes a 30 day comment period by the public and notification in the *Environmental Monitor* that the final EIR is available. The secretary must then decide if the final EIR is adequate within seven days after the 30 day comment period has ended. If the Secretary determines that the final EIR is adequate, the proponent is allowed to begin

[18] MEPA Regulations Section 11.06 [Internet]: [Updated 2004, cited February 10, 2005].
[19] MEPA Section 11.08 [Internet]: [Updated 2004, cited February 14, 2005].
[20] MEPA Section 11.07 [Internet]: [Updated 2004, cited February 15, 2005].

the project within their jurisdiction pending the issuance of any other required permits or licenses.[21]

2.5 The Construction and Review Boston's Central Artery

One example of a construction endeavor impacting its surroundings is the building and renovation of Boston's Central Artery. Much to the public's dismay, construction of a 1.5 mile "Highway in the Sky" through downtown Boston began in 1950.[22] The residents of Boston realized that downtown Boston faced a terrible traffic problem, however, they did not agree with the placement of the multilane highway through the heart of the city. Overall, the construction displaced more than 20,000 people and destroyed over 1,000 structures, and wiped out the West End neighborhood[23]. The highway was said to be ugly and it put up divisions between existing neighborhoods. The project was originally intended to link up with another highway, the Inner Belt, however, public opposition to the construction of the Inner Belt put an end to the plans. The Inner Belt was supposed to circle downtown Boston from the South End to the Back Bay, and then across the Charles River to connect Cambridge and Charlestown. The plan was for local traffic to use the elevated Central Artery while through traffic would use the Inner Belt. If there had been an environmental review process similar to the one in place today, the public would have had much more say in the construction of the highway and one must question whether the Artery would have been built in the same location.

Recently, it was deemed necessary to replace the old and deteriorating highway that was built in the fifties with a new system of roadways and tunnels. Unlike the original construction that began in 1950, according to the Massachusetts Turnpike Authority, "the Central Artery/Tunnel project is one of the most extensively reviewed public highway projects under federal and state environmental statutes and regulations. The reviews emphasize construction-period mitigation measures as well as permanent environmental improvements."[24]

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[21] MEPA Section 11.08 [Internet]: [Updated 2004, cited February 15, 2005].
[22] History of the Central Artery / Tunnel Project [Internet]. [Updated 2005; cited 2005 February 20].
[23] History of the Central Artery / Tunnel Project [Internet].
[24] Massachusetts Turnpike Authority: *Environmental* [Internet]. [Updated 2005; cited 2005 February 20].

In 1982, eight years before a shovel was even put in the ground, the review process began in an attempt to meet the standards set forth both the National Environment Policy Act and the Massachusetts Environmental Policy Act. To prove the intensity of the review process, it wasn't until 1985 before the first Final Environmental Impact Report was approved. Five years later, a supplemental Final Environmental Impact Report was approved for the South Boston Haul/Bypass Road. The overall certificate from the state Executive Office of Environmental Affairs (EOEA) was not issued until January 1991. The final 12 volume EIR was over 5,000 pages and weighed in at forty-four pounds[25]. These documents were reviewed by private agencies and people from the public who commented on each aspect in public hearings and in documentation for several years. As a result of the extensive review process, the citizens of the Boston community have seen the construction of a multi-billion dollar project that relived traffic issues including a tunnel from South Boston to Logan Airport while also addressing environmental and community concerns.

2.6 The Boston Review Process

When certain projects are proposed within the City of Boston, not only does the proponent have to follow relevant guidelines set forth by the NEPA and MEPA, but also by Article 80 in the Boston Zoning Code. Article 80 describes four different types in review: Small Project, Large Project, Planned Development Area (PDA), and Institutional Development Area Review. The Boston Redevelopment Authority (BRA) is responsible for these different types of review on the design of real estate developments and their effect on the surrounding community.

Small Project Review is necessary for projects that create at least 20,000 square feet of gross floor area or at least 15 dwelling units. This type of review begins by the proponent filing an application with the BRA. The BRA Urban Design Department then reviews the application and determines whether it is consistent with the Design, the Site Plan, or Comprehensive Sign Design components of Small Project Review. If the project requires site plan review, a copy of the application is sent to the Environment Department, which files comments to the BRA within 45 days, and the BRA must also

[25] Massachusetts Turnpike Authority: *Environmental* [Internet].

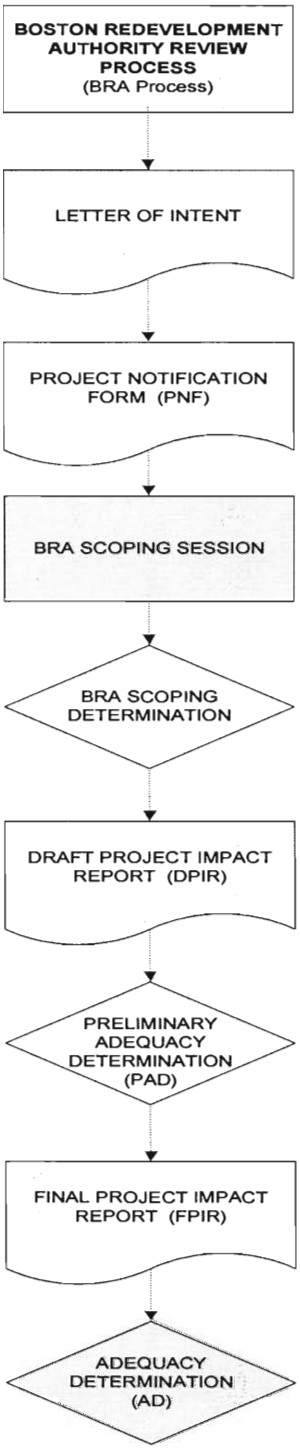

Figure 3: The BRA Approval Process

respond to Inspectional Services Department within 60 days after receiving the application.[26]

Large projects that create at least 50,000 square feet of gross floor area and projects near the Boston Harbor require Large Project Review. To begin the Large Project Review process, the proponent must file a letter of intent followed by a Project Notification Form (PNF). Next is a scoping session by the BRA, which could require transportation, environmental protection, urban design, historic resources, and infrastructure systems. The BRA must submit a Scoping Determination within 45 days after the PNF is filed.

The proponent must then prepare a Draft Project Impact Report (DPIR) in accordance to the BRA's Scoping Determination. The DPIR then undergoes a public comment period that lasts for 30 days. After the DPIR is published the BRA has 45 days to file a Preliminary Adequacy Determination (PAD), which indicates what impacts the proponent must continue to study.

A Final Project Impact Report (FPIR) is then filed in response to the PAD and notice of the FPIR is published. The FPIR also has a comment period of 30 days depending on the project size and location. After the comment period, the BRA board holds a hearing within 45 days. A vote is then held on whether or not to issue an Adequacy Determination. The BRA then issues the developer a Certification of Compliance for the proposed project which allows the developer to begin the proposed project.[27]

The third type of review required by Article 80 is the Planned Development Area (PDA) Review. A PDA is an overlay

[26] Article 80: Development Review and Approval. "Section 80-E". [Internet]. [Updated 2005; cited 2005 February 18].
[27] Article 80: [Internet]. "Section 80-B".

zoning district which may include development of a large building or a cluster of buildings on property that is at least one acre. Projects that undergo PDA Review must also undergo Large Project Review. A PDA cannot be established before a PDA Review is filed. Review begins with the proponent filing the proposed PDA Development Plan, which creates new zoning regulations for the land within the PDA, along with a "fact sheet describing each Proposed Project in the Development plan, or the development concept for the Master Plan, and a map or description of the area involved"[28] with the BRA. The BRA then publishes a notice of PDA Development Plan, starting a 45 day comment period. After the comment period the BRA Board has a public hearing within 60 days to vote on the Development Plan. The plan then goes to the Zoning Commission which holds a hearing to vote on the plan. If the Zoning Commission approves of the plan, it then goes to the Mayor for approval.[29]

The final type of review is Institutional Master Plan Review. This type of Review is required for Projects that require Institutional Master Plan Review also require Large Project Review. The review process for an Institutional Master Plan is similar to that of the Large Project Review.

2.7 The Green Building Task Force

After a building is constructed it takes large amounts of energy, resources, and money to maintain and operate the building. It is a known fact that buildings use one-third of all the energy consumed in the U.S. and two-thirds of the electricity.[30] Recently, Mayor Thomas Menino of Boston has been pushing for more buildings to be built using green building standards. Green building uses different methods to make buildings more energy and resource efficient. There are many different ways and materials used to build green, and some ways are better suited for different situations, and not all methods are appropriate for certain projects.

The U.S. Green Building Council created the Leadership in Energy and Environmental Design (LEED) to set a standard for building sustainable buildings. The LEED Green Building Rating System was created to:

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[28] Article 80: [Internet]. "Section 80-C5".
[29] Article 80: [Internet]. "Section 80-C".
[30] The U.S. Department of Energy: *Green Building Introduction* [Internet] [Updated 2004; cited 2005 April 20].

- define "green building" by establishing a common standard of measurement
- promote integrated, whole-building design practices
- recognize environmental leadership in the building industry
- stimulate green competition
- raise consumer awareness of green building benefits
- transform the building market [31]

2.8 Making EIRs Virtual

In the Boston Environment Department (BED), there is only one lead reviewer of the EIR document submissions, and if this person is unavailable for a long period of time, the BED will be in a great disadvantage towards the future assessment of EIRs. It would also affect them towards the accessibility of information from the past EIRs because this lead reviewer has knowledge from the previously reviewed EIRs, and knows exactly where to find what exists in the documents. For this reason alone, the need for a virtual form of an EIR is in demand. With such a form, the BED would be able to break down an EIR and organize the re-usable sections into a database where city officials could access useful information needed to assess any future projects within the related area. With such a database, city reviewers will be able to combine and compare tests from multiple projects. This additive effect of environment studies will allow city officials to view and analyze comprehensive ambient noise studies, air quality results, and traffic flows at specified intersections for specified regions of the city rather than a small area around a single project.

2.9 Related Boston Projects

For the past five years, the Boston Redevelopment Authority (BRA) has been working on a project called the "Pipeline." This project was developed to help the department keep track of a project's submission information and status, overall build status, and the overall specification information along with a variety of other topics. Along with a small scale model of the city, the BRA has this Pipeline database project that consists of seventy different fields that contain information on every submitted

[31] U.S. Green Building Council: *LEED.* [Internet] [Updated 2004; cited 2005 April 20].

project starting from the year 2000. Although not all these projects are built, the information from that project stays in the database for reasons related to similar project submission and development consulting.

Another part of the project that the BRA has not completed yet is a submission coversheet that will help extract this information from the developers while first submitting the project to the BRA department. This coversheet, or submission form, is the next step for the pipeline project and it will be created within the next year. The BRA wants to eventually make this coversheet a requirement to be submitted with the project document.

Also important to note is the fact that the Inspectional Services Department (ISD) for the city of Boston has invested in developing an online system that structures the streamline of permitting for incoming developers. The ISD is currently in the preliminary stages of creating such a system. Nancy Lowe, a representative of the ISD, has visited all permitting departments to discuss the practical position of certain departments so the online process can efficiently move a project through the system without letting a project slip through any existing loop holes. The purpose of this system is to structure a developer's process for permitting a project, and also to organize the permits which the ISD has provided or will provide. Another goal of this virtual system is to reduce the amount of visits a developer may take to the ISD. The eventual goal is to make it so a developer never has to visit the city hall, baring any unusual circumstances. The Environment Department's permitting process will be directly incorporated into this overall system.

2.10 City Knowledge

Currently, when a developer proposes a project, the project proposal can be taken to three different departments: Inspectional Services Department (ISD), Boston Redevelopment Authority (BRA), and the BED. Eventually, these three departments will review the same projects, and as a result, will obtain much of the same information. Although the departments extract the same information from the same projects, they do not share the information. In order to reduce this redundancy of information, a method called City Knowledge could be used.

Using City Knowledge to develop a new system increases communication and the amount of information shared between departments. There are several methods of sharing information including the bottom up, top down, and middle out strategies. These three methods all increase the flow of information between departments. Use of such systems in the City of Boston project permitting departments would help to increase the efficiency in the permitting process as a whole.

2.11 The Principle of E-Government

Government departments around the nation have begun using e-government to share information between departments and with the public through the internet. E-government is not only being used at the federal level, but also at state and municipal levels. In the spring of 2005, a WPI project group was faced with the task of implementing an e-government system at the municipal level for the city of Boston.

E-government consists of four major areas: (1) The establishment of a secure government intranet and central database for more efficient and cooperative interaction among governmental agencies; (2) web-based service delivery; (3) the application of e-commerce for more efficient government transaction activities, such as procurement and contracts; (4) digital democracy for more transparent accountability of government. The WPI project group dealt with implementing the first two aspects which are improving communication between departments and using the web to deliver information. This project is related to making information within EIRs reusable because both deal with

2.12 Related Work in Cambridge

The City of Cambridge recently received the help of a group of Worcester Polytechnic Institute students in creating an electronic database to store and analyze traffic data. Traffic management is essential for any city due to the constantly increasing number of vehicles on the roads. Cities around the world perform numerous traffic studies in an attempt to alleviate the growing traffic problems. In particular, the City of Cambridge created its own department, The Cambridge Traffic, Parking &

Transportation Department (CTPTD), to monitor the cities transportation and make changes to the infrastructure when necessary[32].

The City Council of Cambridge created an ordinance which required land developers to perform their own traffic studies in the areas surrounding their development. The traffic studies must include both before and after construction results in an attempt to demonstrate the individual impact the new development will have on the traffic in the community[33]. The CTPTD was responsible for keeping track of all studies and kept a hardcopy form of the reports on file. However, similar to the EIRs in the Environment Department of Boston, these reports were deemed unusable after their initial submission because of the wide variety of formats. The WPI project group faced the challenge of making the data that was included in these paper reports available in conjunction with other reports in an attempt to foresee and prevent traffic problems.

One can quickly notice the similarities between the Traffic Management in the City of Cambridge project and the EIR project of our team. A system which has the capability to combine data and studies, whether it is traffic or building impacts, proves to be an effective tool for the maintenance and planning of any city.

2.13 Summary

In the city of Boston, the project approval process is very important to the success and functionality of its future development. By following the national, state, and city guidelines for this process, the city continues to develop effectively without many costly faults. Due to the detailed information required for project review, an EIR is very dense and intimidating for an individual to review. Although a department must review an EIR for potential project mitigations, other individuals may review an EIR for future acquisitions of information. If departments are referring back to these documents, then this shows us that some information of an EIR can be re-used and simplified to fulfill other purposes. With this knowledge, the team will methodically show how an EIR can be transformed from a one time use document into a document of re-usability that can be accessed without difficulty.

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[32] Transportation Data Management in the City of Cambridge. [Boston IQP: 2004].
[33] IDEM

3. Methodology

The goal of this project is to develop an efficient system for the Environment Department of Boston to acquire re-usable knowledge from EIRs and to make the information readily accessible for municipal processes. The team will use existing data from current EIRs to help the Boston Environment Department develop a system to manage EIR content. A standardized format for future project documentation and organization will benefit city officials and members of the private industry.

Three main objectives were identified in order to achieve this projects' mission. They are as follows:

1. Identify what information within an EIR can be reused,
2. Extract information that is deemed reusable and
3. Demonstrate reusability.

The rest of this chapter is divided into the following sections:

- **Section 3.1** presents the city of Boston as our spatial limitation, and outlines the usage of the South Boston as a universal example.
- **Section 3.2** explains the different types of EIRs and the importance of the draft EIR.
- **Section 3.3** explains how a content analysis is performed on existing EIRs.
- **Section 3.4** describes the use of a spreadsheet and a cover page to organize EIR documents.
- **Section 3.5** describes how the team will identify which information within an EIR can be reused.
- **Section 3.6** illustrates how the overall system can be used effectively for city processes using South Boston.

3.1 Study Area

The area of study for our project focuses on the city of Boston, but it is also specific for one geographical area due to time limitations. For the extraction of EIR information and the design of a new format for project documentation and organization, the focus and research is from the most recent EIRs for the entire city of Boston. For demonstration purposes, the project focused on South Boston. Information from selected South Boston EIRs submitted over the past two years was extracted and the information stored in a database and several GIS map layers. The South Boston projects will be used to show the potential of re-usability. The data that is extracted from the South Boston's EIRs will be organized and reviewed to show its usefulness as a re-usable resource.

Figure 4: Map of Boston with an emphasis on the South Boston[34]

3.2 The Draft EIR

In the processes set forth by NEPA, MEPA, and Article 80 of the Boston Zoning Code, there are numerous documents that must be submitted for the review of a proposed project. The most complete and thorough documents are the Environmental Impact Reports (EIRs). A project typically has two varieties of these documents, the draft EIR and the final EIR. Projects vary with their impact complexity, making some EIRs have more studies and data than others. Due to their content, the team will be working mainly with the draft EIR, which is far more extensive than that of the final EIR. The draft EIR has more information because it contains all the primary research, while a final EIR only

[34] Boston Redevelopment Authority "Maps of Boston". [Internet]: [Updated 2005; cited 2005 February 15].

contains information in response to comments made by the BED, public, and other concerned parties. Therefore, the final EIR does not have all the initial studies and data that are important for the overall review of the project.

3.3 Content Analysis

Currently, the City of Boston has a loose set of standards for EIR submissions set forth by the Boston Zoning Code. As a result, individual consulting firms submit thick paper reports that are organized in their own styles. The pertinent data and studies are buried among many pages of diagrams and illustrations creating a document that is extremely difficult to follow and navigate through. In order to understand the substance of these reports, a content analysis was performed of a selected sample of EIRs.

Since the main goal of the project is to develop submission guidelines to help extract re-usable information from future EIRs, it is most appropriate to examine the EIRs that the Environment Department is currently reviewing. In the first three months of 2005, thirty-two documents have been submitted to the BED for review. Appendix C shows *Environmental Monitor* publications for these three months. The following figure shows the location of several of the projects that are currently under review.

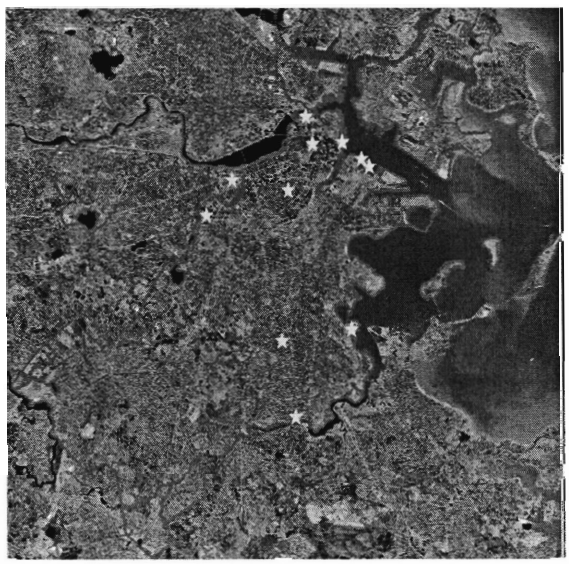

Figure 5: GIS Map of Boston showing locations of 11 documents submitted from January through March of 2005[35]

[35] Map Info Professional 7.8. [cited 2005 February 27].

As seen in Figure 5, these projects are from all areas across the city and make up a broad selection of EIRs ranging in project type, size, etc. In order to effectively perform an analysis of the individual content in these EIRs, a checklist form was used to identify and collect all possible impacts on aspects around the project site including the tests that were performed. This form is included in Appendix B. Evaluating the content of the existing EIRs will allow a physical inventory of the content in these reports to be performed, but also to get a sense of what information has the potential to be re-used.

Given the time constraints of the project, it would be impossible to demonstrate the effectiveness of a data system which managed the contents of the EIRs for the entire city of Boston. As a result, the focus will be on one of Boston's neighborhoods called South Boston. Figure 6 shows the layout of South Boston, a section of Boston which incorporates all aspects of the urban environment including residential, industrial, and commercial practices. Using South Boston as an example, the overall effectiveness of a geographical database using MapInfo will be demonstrated.

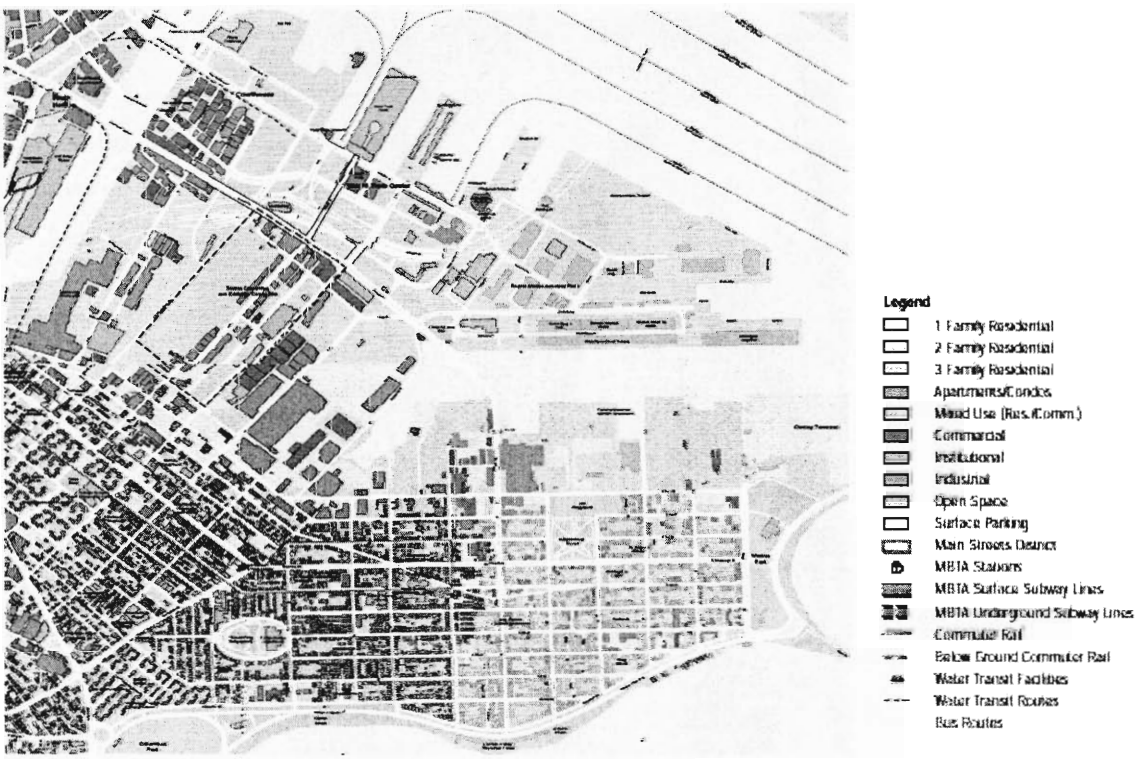

Figure 6: South Boston[36]

[36] The Boston Redevelopment Authority. "Boston Maps." [Internet]. [Updated 2005; cited 2005 February 20].

3.4 Organizing existing documents

The BED reviews several different types of documents including:

(1) Application for Small Project Review
(2) Application for Large Project Review
(3) Project Notification Form
(4) Draft EIR and PIR
(5) Final EIR and PIR
(6) Waterways Applications
(7) Supplemental Report
(8) Amendments to documents
(9) Notices of Project Change
(10) Notification of Planned Development Area
(11) Transit Commitment

Currently, the BED keeps a running list in Microsoft Word of all the documents that have been reviewed by their staff for the past five years. The list contains only a minute amount of information about the previous projects and has little significance to anyone other than the lead reviewer who maintains or uses it. The problem with this list is that only the lead reviewer can locate and track a project's progress with this list. Along with performing the initial "content analysis" of the EIRs, a better system for documentation of all reports and documents will be designed.

Once the information from the content analysis has been obtained, the project documents will then be coded into the Access database. Previously, the BED coded the documents by using simple numbers that described the number of the year and month of the projects submission, along with the project submission number for that month. For example, an assigned project number would be 05.02.5. The beginning of the number starts with 05, which represents the year of submission 2005. The second number 02 represents the month of submission, which would be February the second month of the year. Finally the last number of this code is 5, which says that it was the fifth document that was reviewed during that month. Due to the simplicity of this code, the team plans on creating a new coding system that consists of more integration with projects' information from the spreadsheet.

The new coding system for the BED will be passed down from the BRA due to the change in inter-department sharing over the past couple of weeks. The BED will begin to collaborate with specific BRA employees so the project ID numbers can be passed down from the separate databases so the two departments can be on the same page when project information is needed. The number is just a numerical value that at some point started at 1 and has worked its way into the thousands. The values for the currently

submitted EIRs will be assigned these numbers in the database and will be a key field for relationships between different tables in the database.

Also, following the spreadsheet completion is the creation of a coversheet that will help retrieve the necessary information from a project document. This coversheet will be designed using Microsoft Access. Once the form is created, it may be edited to satisfy its purpose and then saved to become permanent form. To accommodate the structure of the form, combo boxes were created to save space and allow options to be chosen from the field. Other areas were made larger to allow a certain amount of text to be written and sections were formed to organize the required sections for the developers and the BED employees. Once a developer turns in a Project Notification Form, the developer must also complete a coversheet form as well. Once the coversheet is turned in to the BED, whether online or hard copy, the information will be transferred to the database that has been created.

3.5 Determining what to Re-use

Determination of the re-usability of certain information contained in the EIR is another major objective of this project. In order to determine if the information that the team finds in the EIR is re-usable, interviews with the employees of the Environment Department will be conducted. After the employees are interviewed, their opinions will on the re-usability of EIR sections will be combined to determine if the information is in fact re-usable.

Along with the recommended re-usable EIR sections, a list of Environment Department processes that could potentially use these sections will be created. With this list of processes, the different types of information used by each process will be cross referenced. How frequently the EIR information can be re-used in these processes will be determined in order to estimate how beneficial the new system will be.

With the results of the previous research, the team can decide upon what process will be demonstrated for the re-usability of the EIR information. After the team decides on a process, we will trial all possibilities available for re-using EIR section information in the process and decide which will be the most effective in persuading our sponsor to believe that re-using the EIR information will be helpful.

With the re-usable sections determined from the interview process, further research must be conducted to establish a system for organizing or coding the differences in the EIR sections. The coding will describe the type of results explained in each re-usable EIR section by listing all possibilities feasible from different testing methods. Once the codes are developed, a manageable system for data entry can be used to easily transfer EIR information from paper form to the database.

In order to establish a database with re-usable EIR sections, a format must be developed to make the extraction of the sections transformable into the coded form used in the database. To decide what guidelines will be used for the EIR submission, interviews with the BED, Boston consulting agencies, and developers will be carried out. By doing so, the team wishes to generate ideas for universal guidelines which will be used with ease by all applicable individuals.

3.6 Demonstrate Feasibility

From the research performed on the Boston Environment Department processes, the team will develop ideas for which processes will use the extracted information from EIRs more often and efficiently. With this information, a demonstration can be produced to properly re-enact the re-usability process for the extracted information. The demonstration will start with the team's method for extracting the EIR information and transferring it to the newly developed database. This will show how our new EIR format helps transfer the EIR data to the database with ease. From the database, the team will show the accessibility of the information by demonstrating how it can be accessed from an employee's standpoint before supplementing it into a process. Finally, the team will show how the information is used in a chosen process, from the interviews, and how it can be affectively used in that process. The team also plans to show the regularity of the extracted information because that is a major factor for determining whether the project is a success or not.

4. Results

This section will present the overall results in a form that mirrors the methodology. The content analysis work will be discussed, followed by the use of a Microsoft Access database and coversheet form, and concluded with the importance of the Green Building Task Force and LEED checklist.

4.1 Content Analysis

A large amount of information is contained within most documents submitted to the BED. Unfortunately, each consultant agency that submits these documents has different methods for displaying this type of information. Depending on the type of project, each document may also contain some different types of information. In order to break down these project documents and identify relevant data, a content analysis was performed.

The content analysis was performed on thirty-two documents, all submitted since January 2005. The first thing that was realized before a document was even opened was that not all the documents submitted were EIRs. In fact, only four of the documents turned out to be actual EIRs. After briefly going through each individual document, several other issues were discovered. An example of these issues is that a project can change its name or address several times during the permitting process. One of the thirty-two projects being reviewed is now called City Lofts of Charlestown but it was formerly known as Little Neck Lofts. The fact that developers have the ability to change a project name during the review process makes the tracking process difficult for city departments.

Due to the predicted problems with air quality in areas known as South Boston, East Boston, and Downtown, parking freezes were launched to stabilize the number of parking spaces which reduced the air pollution and also encouraged the use of public transportation. The importance of the parking freeze was not appreciated until several EIRs had been received by the BED.

Historic resources in Boston can be categorized into three different types: individual Boston Landmark, within a Historic / Landmark District, and those on the National or State Register of Historic Places. A Boston Landmark is a historic site in the city of Boston. The Boston Landmarks Commission reviews development projects to

determine if the proposed project will impact surrounding resources. Historic resources may trigger MEPA review and would be included in the NEPA process.

Since the beginning of January 2005, the BED has put together a list of reviewed project documents. With this list, an idea for a datasheet was formed so the BED could properly document these projects along with storing and tracking the necessary project information. Once the required information from the project documents was listed, the information was extracted from the documents into the database. Each of the thirty-two project documents and the comment letters of these documents were examined to obtain the information needed for the spreadsheet. Some examples of information fields from the spreadsheet are a project's:

- Date of Submission,
- Address,
- Alternative Addresses,
- Alternative Names,
- Ward and Parcel Numbers,
- Existing/ Proposed Parking Spaces,
- If located in a Parking Freeze area,
- Neighborhood,
- Boundaries,
- Sustainability Commitments, and
- Historic District.

In addition to performing a content analysis on the thirty-two documents, a more in depth study was performed on two particular EIRs. The first document that was examined was the Final EIR for Pier 4, a mix-used project in South Boston[37]. This document was chosen based on its wide variety of project data and requirement for additional studies due to its location near the water. To ensure that all information within the EIR was obtained, each page of the Final EIR was examined and all existing sections were recorded in a Microsoft Excel spreadsheet. An EIR is broken up into four or five main section depending on the project type. The main sections include: Urban Design, Environment, Transportation, Infrastructure and Mitigations. Each large section includes many subsections containing a variety of environmental data collection studies.

[37] New England Development. Final Environmental Impact Report: Pier 4. South Boston, MA.

After the Final EIR for Pier 4 was examined, another large document named Hodge Boiler Works was studied. [38] When compared to the Pier 4 EIR, Hodge Boiler Works had practically the same or very similar contents. There were only a few sections that Hodge Boiler Works and Pier 4 did not have in common and the differences were because of the project locations (i.e., one project was on the water which requires more review contents, while the other is located in the downtown area and requires less contents on land location). In order to determine the most common contents of these project documents, a couple other smaller EIRs were examined and compared to the contents of Pier 4 and Hodge Boiler Works. After all this information was identified, it was then extracted into an Excel spreadsheet as seen below in Figure 7. The complete Excel spreadsheet is located in Appendix C.

EIR Checklist:	Yes	No
Urban Design		
Urban Design		
Architecture		
Building Massing		
Building Elevations		
Sustainable Design		
Planning Consistency		
Transportation		
Transportation Analysis Overview and Revisions		
Methodology		
Project Revisions		
Traffic Analysis Methodology		
Intersection Improvements		
Parking		
Parking Demand		
Peak Parking Generation Rates		
Shared Parking Demand		
Compliance with Local Regulations		
Public Transit Analysis		
Transit Network Capacity		
Publicly Committed Transit Capacity		
Transit Allocation		
Transit Demand and Capacity/Demand Comparison		
Additional Water Transportation Contribution for Transit Shortfall at Full Build		
Water Transportation Services: Basis and Rationale		
Proposed Additional Water Transportation Contribution		
Transportation Demand Management Program		
Institutional Framework		

Figure 7: EIR content checklist

It was discovered while analyzing the 32 documents that most projects do not begin by requesting a permit from the BED. In fact, most projects begin the project review process with the Boston Redevelopment Authority (BRA), under regulations set forth by Article 80 of the Boston Zoning Code. These projects start with a Letter of

[38] Epsilon Associates, Inc. Supplemental Information: Hodge Boiler Works. March 31, 2004.

Intent, which is the first document created during the review process. Not only does the Letter of Intent start with the BRA, but it never even passes through the BED.

One component of the content analysis was finding specific information to enter into the database that was developed. One of the fields within this database is for ward and parcel numbers. Entering the parcel number proved to be difficult since the number is not easy to find. One of the main reasons that these numbers are hard to find is because the assessing department is usually two years behind in terms of assigning parcel numbers to city properties. Some projects that are under review are on land that has never been developed, and therefore do not even have an assigned parcel number. Parcel numbers will continue to be a problem since there is no convenient way to obtain these numbers and the assessing department will always be behind.

While performing the content analysis, the importance of "building green" was also realized. As previously mentioned in the background section, the U.S. Green Building Council created the Leadership in Energy and Environmental Design (LEED) to set a standard for building sustainable buildings. Since Boston is pushing for more buildings to be built on sustainability terms, it was decided that a virtual form of the LEED checklist should be submitted along with the coversheet. Submitting the LEED checklist along with the coversheet will make it easier for the BED to keep track of which commitments a project has undertaken. This form will help the City of Boston become a leader in the field of Green Building.

4.2 Determining What to Re-Use

Once the content analysis on the thirty-two documents was completed, the results were evaluated even further to determine what contents could be re-used. The most re-usable information is information such as a project name, location, description, and commitments made by developers relating to a building's construction. This information is important to the BED because a project's information may change during the review process, causing the system to be inefficient due to the unannounced project modifications. Also, if commitments were made to the BED for environmental safety reasons, the BED wants to make sure that a developer fulfills these commitments so they can get approval for construction.

In addition to this concrete information, information that is easily quantifiable such as noise, traffic volume, and level of service can also be re-used. Most of this information is collected in numerical form, making it easy to store and re-use. Since this information is numerically quantifiable it can also be geographically linked.

There is some information within an EIR that it is not feasible for it to be re-used. Shadow analysis is one example of information that would be difficult to re-use. Shadow projection data are not collected in numerical form, which makes it hard to re-use. Shadow studies for one project are conducted four days throughout the year, and three times during those days. This limits the BED's knowledge of how a shadow will affect its surrounding environment since the studies are limited and do not provide much information on the shadow projections. Ideally, this type of information should be shown in a virtual form where the BED can view the project's shadow project path for any time of the year, giving the BED a more informed view of a shadow's impacts.

4.3 Microsoft Access Database

The BED needed to track projects more efficiently as they progressed through the review process. During this lengthy process, it is not uncommon for the project information, such as name and address, to change as was discovered during the content analysis. It is necessary for the BED to track any changes that occur in a project along with the ongoing LEED sustainability commitments that the developer makes to the department. The need to track and modify information over a long period of time suggests the use of a database.

Due to the current storage arrangement and accessibility, a database is needed to organize the reports and the data that is found in them. Only some information is useful for the BED and the review process they conduct. A datasheet was created with fields that relate to the re-usable information from the existing project documents. The necessary fields in the Access datasheet were chosen so that the datasheet's contents along with the database can be simple enough for anyone else in the department to understand and use. The data sheet provides a means for both entry of new data and retrieving existing data from the Access database.

Once the datasheet fields were chosen and finalized, a datasheet was created in Access using the table design function. After the database was configured and structured,

the field information from the first thirty-two project documents were extracted and entered into the datasheet. As shown below, not all the fields were filled in for each project document due to the fact that some of these documents contained a small amount of information in reference to the project. As previously mentioned in the Methodology section, the document that contains the most extensive environmental studies is generally the draft EIR.

Project Name	Date of Sub	Developer	Consultant Agency	Construction
125 B Street				
700 Harrison Avenue	12/16/2004	700 Harrison LLC & Mitchell Properties LLC	Epsilon Associates Incorporated	Expansion
950 Dorchester Avenue				
American Ice Company	12/21/2004	American Ice Corporation	Boardwalk Development LLC	New
Applebee's Family Restaurant	2/8/2005	Applebees Notheast Incorporated		Rennovation
Ashmont Transit Oriented Development	11/4/2005	Trinity Ashmont Limited Partnership	Epsilon Associates Incorporated	New
Boston Convention and Exhibition Center	11/5/1999		Epsilon Associates Incorporated	New
Boston State Hospital	2/23/2005		Daylor Consulting Group Incorporated	
Boston State Hospital	1/19/2005	Lena New Boston LLC & New Boston Development Partners LLC	Daylor Consulting Group Incorporated	Expansion
Central Artery / Tunnel Transit Commitments	9/2/2004			Other
City Lofts of Charlestown	2/22/2005	Cathartes Private Investments LLC	Epsilon Associates Incorporated	New
Fenway Park Improvements	1/31/2005			
Hodge Boiler Works	3/31/2004	Boiler Works LLC	Fort Point Associates Incorporated	Rennovation
International Cargo Center of New England	1/5/2005	Geo-Trans international Incorporated & Cargo Ventures LLC	ESS Group Incorporated	Expansion
Lovejoy Wharf	12/15/2004	North Washington Wharf LLC ; Beverly Wharf	Epsilon Associates Incorporated	Conversion

Figure 8: Example of Microsoft Access Datasheet and Query Result

Eventually this datasheet will include several hundred projects with all their field information in it. With this vast amount of information, searching for specific information will be a little tough and extremely time consuming, which is why queries can be formed to do the searching automatically. A query is a function in Access that can perform multiple searches as desired and will allow a selected amount of fields to be viewed instead of searching through every field created. Shown below in Figure 9 is an example of a query design where the wanted fields can be chosen to be viewed. The fields chosen for this example were: Project Name, Date of Submission, Developer, Consultant Agency, and the Construction Type of the project.

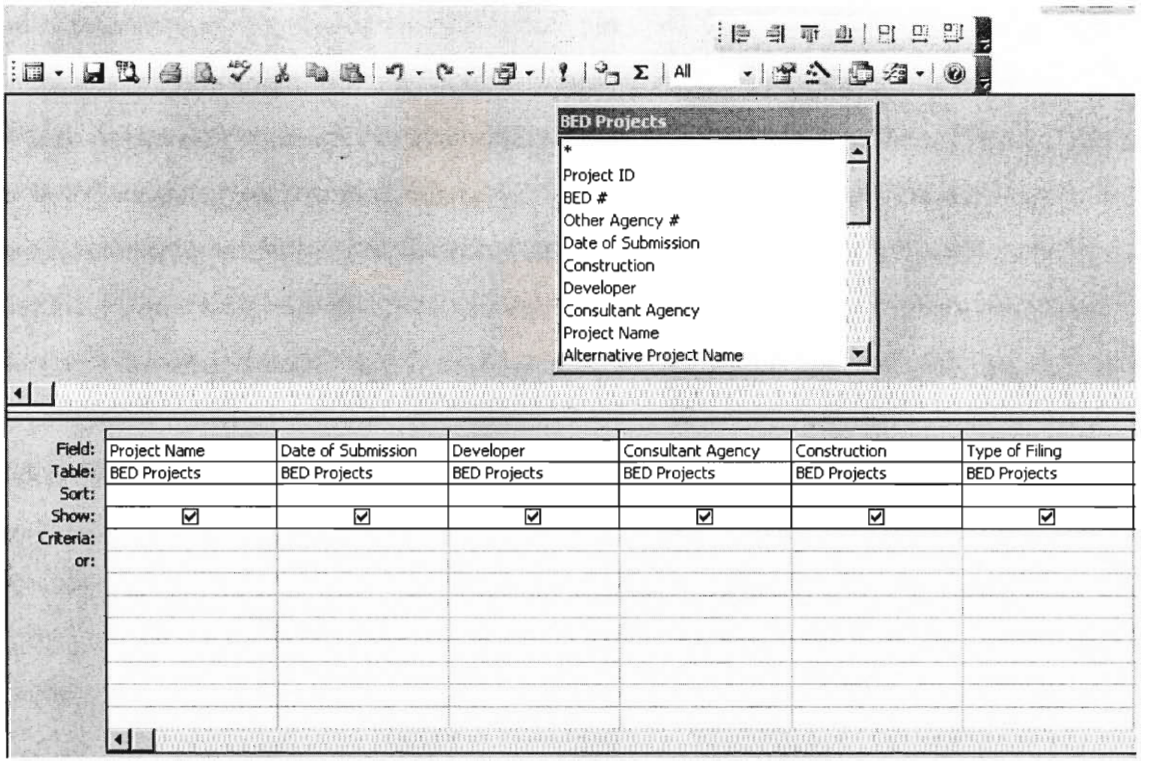

Figure 9: Query Design Function

After designing the query, the view can be changed to the datasheet view which will display the requested fields of information. If Figure 8 is compared to Figure 9, then you can see how the query design gets manipulated into the datasheet view allowing one to view the necessary data fields. The query function is just an example of possible manipulations performed by the Access program. Many of the functions are useful and can be used when the Access program is familiar enough to the users.

4.4 BED Coversheet Form

After all of the information from the documents was entered into the database, a form was designed from the datasheet so that the information from each project could be viewed separately from all the other projects. The form also gives the information an organized format so a viewer can examine the pertinent information in sections that group similar fields together. The form is divided into three main parts that detail the specifics of a project. The first section, Figure 10, gives a project's name and location in the city. As mentioned in the methodology, a field was created for an alternative project name in the datasheet and is also on the form or coversheet. This field along with some

others helps resolve the few problems that the BED was having with project tracking in the past. Also in this section is the type of construction that is required for the project, the neighborhood it is located in, and the parcel number for the land it's being built on.

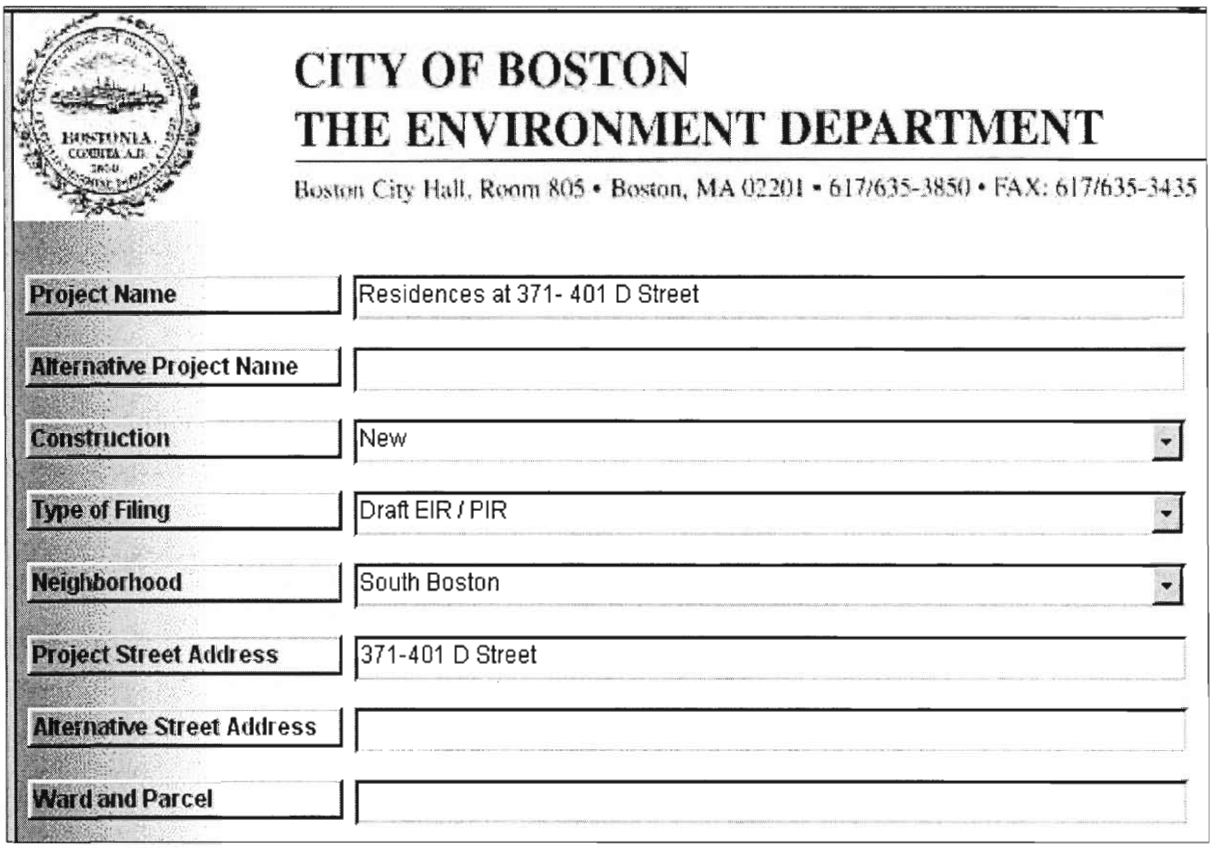

Figure 10: Part I of the BED coversheet form

The second section, Figure 11, of the coversheet form gives the project's consultant agency, its type of use, along with some details for when a project is a mixed use area. Mixed use means the project contains more than one type of use, such as residential and commercial. Also in the section are the parking freeze locations and permit numbers, the historic resource field, and the waterways/wetlands field. With these last fields, the BED can automatically determine some of the necessary permits required for the project's construction.

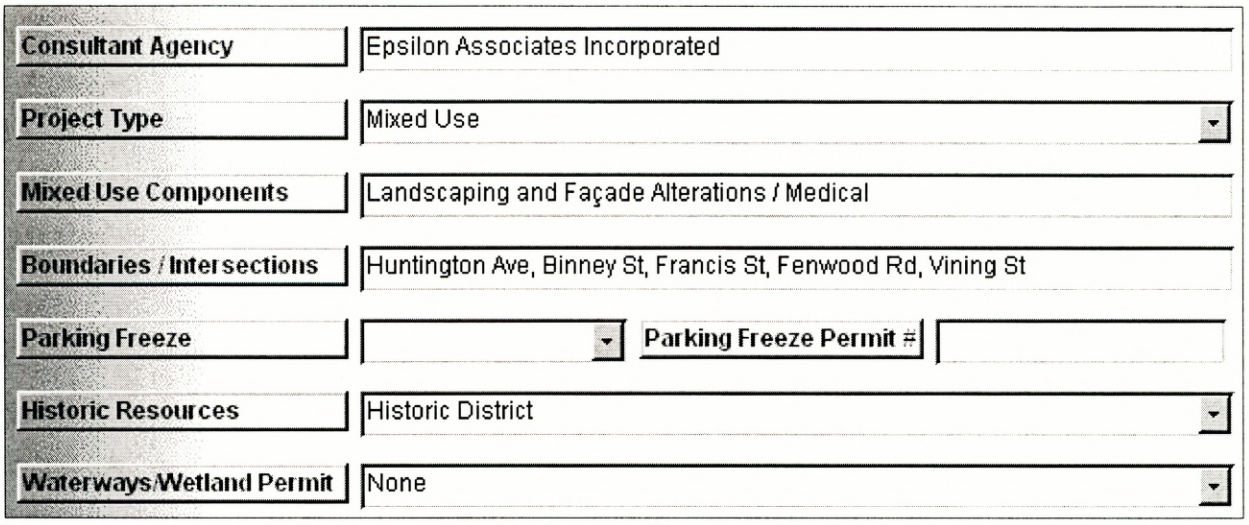

Figure 11: Part II of the BED coversheet form

The last section, Figure 12, of this coversheet form provides a tracking ID number assigned by the BED and several other fields that are necessary for BED tracking purposes. The main field in this section, along with the BED ID number, is the sustainability commitments which are part of the new Green Building Task Force launched by Mayor Menino which will be discussed in the following section. The entire one-page form can be seen in Appendix D.

Figure 12: Part III of the BED coversheet form

While designing the form with certain specialties like drop down boxes and fields that can contain several pages of texts, adjustments were made to fulfill these options in which make the information being entered more standardized. In order to create drop down boxes in the Access program tables were created to contain the different types of data in the drop down boxes. For example, when making the drop down box for the

Project Use field, a table was created to hold the different types of uses in a data. Then when the drop down box is inserted into the form, the source of the box will be described as the table containing the type of uses listing. In order to make a field capable of containing pages of text, the field must be designed for this option in the design view of the datasheet or form. When choosing the field design in the design view, choose the memo option from the combo box and that will allow the field to be viewed as a large text field in the table and from view.

Also created in the database was an additional form to represent the sustainability commitments that have become an important part in Boston's development. The "sustainability commitments" are determined by a Leadership in Energy and Environmental Design (LEED) standard which was created to set a standard for building sustainability. The LEED checklist can be seen in Figure 13 below. It is designed to promote Green Building commitments to new developers in the City of Boston

4.5 The Green Building Task Force

Green Building commitments propose ways to make buildings more energy and resource efficient. Some examples of efficiencies are: energy saving appliances, storm water management, and use of local materials and products. There are many different ways to gain green building certification. Projects vary considerably and, therefore, some methods are better suited for different situations and not all are appropriate for every project.

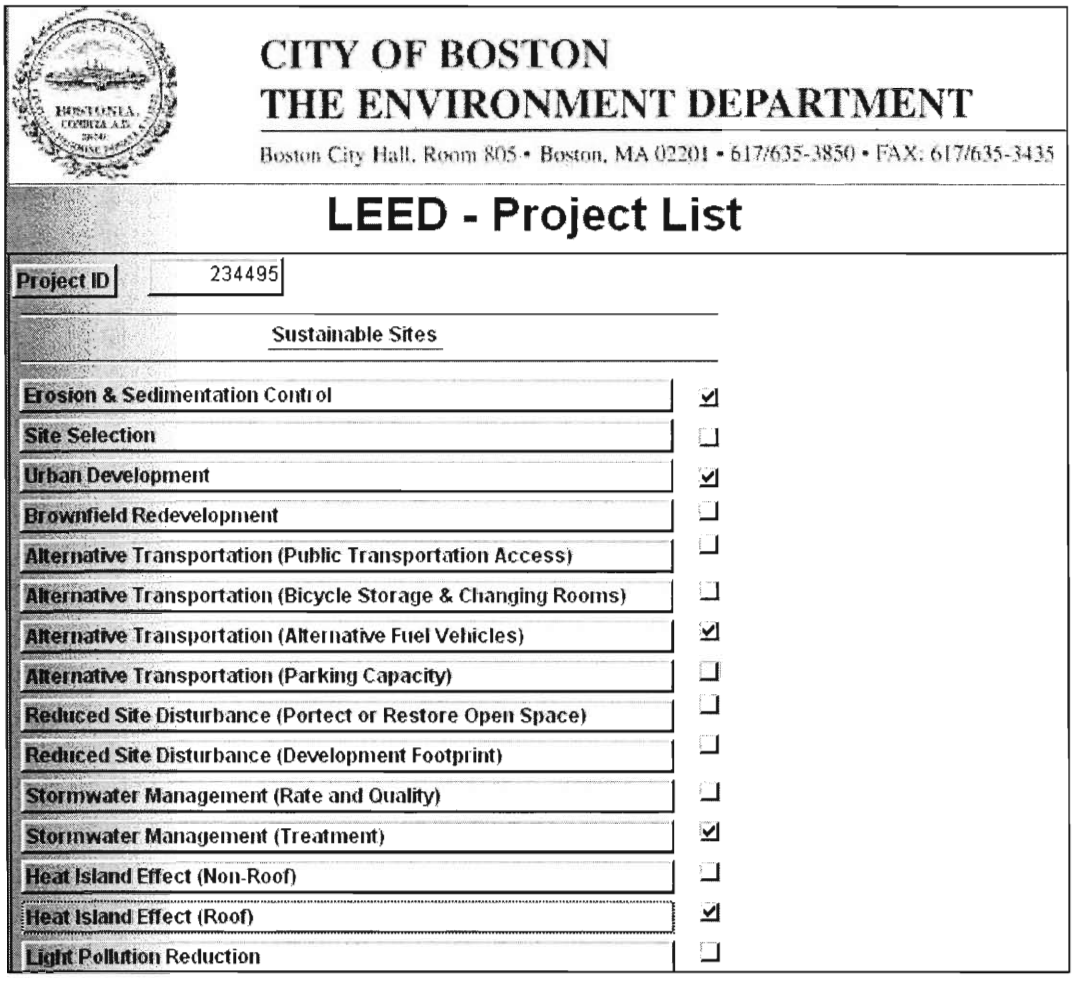

Figure 13: The LEED checklist form

This LEED checklist was put into check box form using Microsoft Access as can be seen in Figure 13. The form is designed to operate with a point system as it currently does in its hard copy form. Submitting this virtual form along with the coversheet as mentioned above will force developers to adhere to at least some, if not all, of the sustainability commitments. By checking off a variety of commitments from the checklist, a developer or project will acquire points. To get certified, a developer must collect at least 26 points from the LEED checklist. When a developer acquires even more points than the required twenty-six points for certification, than other certification levels such as silver, gold, or platinum are awarded, depending on the amount of points. Incentives for adhering to these LEED standards not only include recognition from the mayor, but also long term cost benefits and a quick environmental review process. The complete form of this checklist with all fields can be found in Appendix E.

5. Analysis

5.1 Example of Re-Usability in South Boston

The South Boston waterfront is a unique neighborhood in the sense that it is rapidly developing with several mixed use projects. As can be seen in Figure 14, the South Boston waterfront is currently underdeveloped with large surface parking lots occupying much of the area.

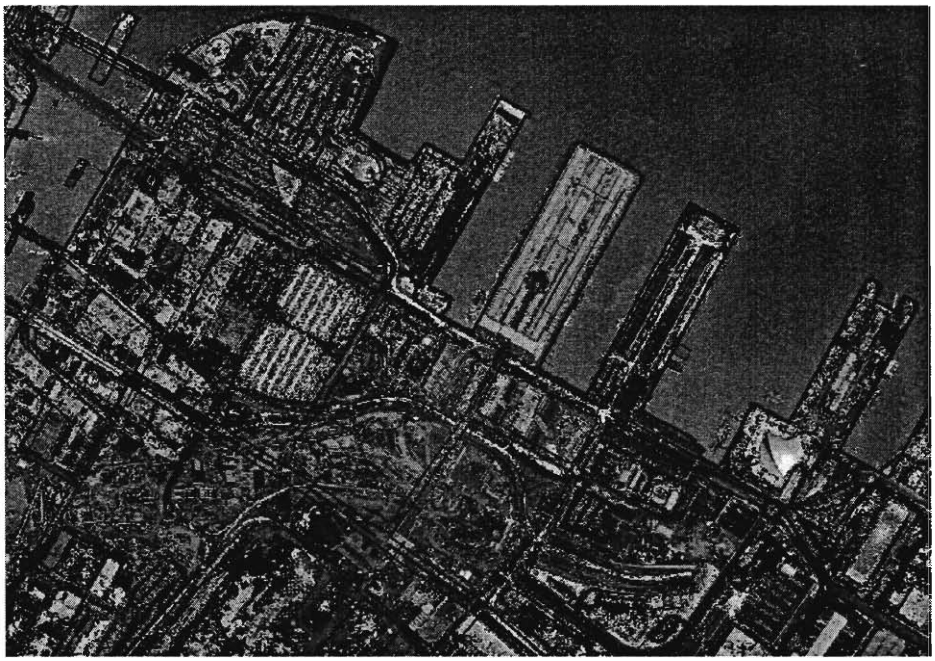

Figure 14: GIS map of the South Boston waterfront[39]

Many proposed projects for the South Boston neighborhood have been recently reviewed by the city. To demonstrate the concept of environmental impact study re-usability, five specific projects were chosen from the South Boston area: The Boston Convention and Exhibition Center, The Residences at 371-401 D Street, Parcel F-1, the Fan Pier Development, and finally the project on Pier 4. Massive Environmental Impact Reports were created and submitted to the BED and BRA for comments and approval respectively. Each of these projects has undergone extensive review by city departments in order to access their combined impacts on the Boston environment.

[39] Map Info Professional 7.8. [cited 2005 April 10].

Of the information contained in the aforementioned studies, it was evident that while all the information in the document was useful as observable data, very little of the contained materials would be suitable for a computerized tracking system and database, which are essential characteristics of a "re-usable" asset. The problematic issue that arose was the lack of numerical or "coded" data; for example site boundaries were portrayed merely by their written names and were mixed in to the remainder of the document. After an in depth analysis of these documents, it was determined that sound pressure levels measured in decibels (dB), intersection traffic volume, intersection level of surface ratings, and pedestrian volumes were re-usable assets which had the potential to be incorporated into a new system. These specific studies were added to the GIS program MapInfo, in order to create a visual representation of each project simultaneously and with geographical accuracy. With the simple click of a button, one can easily compare concurrent projects by activating the various map layers. However, consultants regularly utilize various systems to generate GIS map layers. In order to create a comprehensive database with the potential for re-usability, consultants need to unify their GIS data submissions.

Many flaws with the current method for obtaining these environment studies were observed and proved to not be cost effective or efficient. Specifically, multiple studies were carried out at the same location for different projects, while some areas were not studied at all. As seen in Figure 15, the Fan Pier and Pier 4 projects have overlapping dots while some areas around the project have no dots at all. To complicate the issue further, the locations chosen for study by consultants lacked consistency. A range of two to five sites was studied for the noise impacts from the proposed projects, with locations sometimes quite far from the development. As can be

Figure 15: Location of Noise Receptors from Environmental Impact Studies in South Boston

seen in Figure 15, the noise receptor (represented by the colored dot) locations had no patterned or required placement. With no standards to collaborate data from concurrent projects, it is merely impossible to re-use any information. Therefore, the initial step that the City of Boston must make is to set regulations for the location of the various required environmental impact studies.

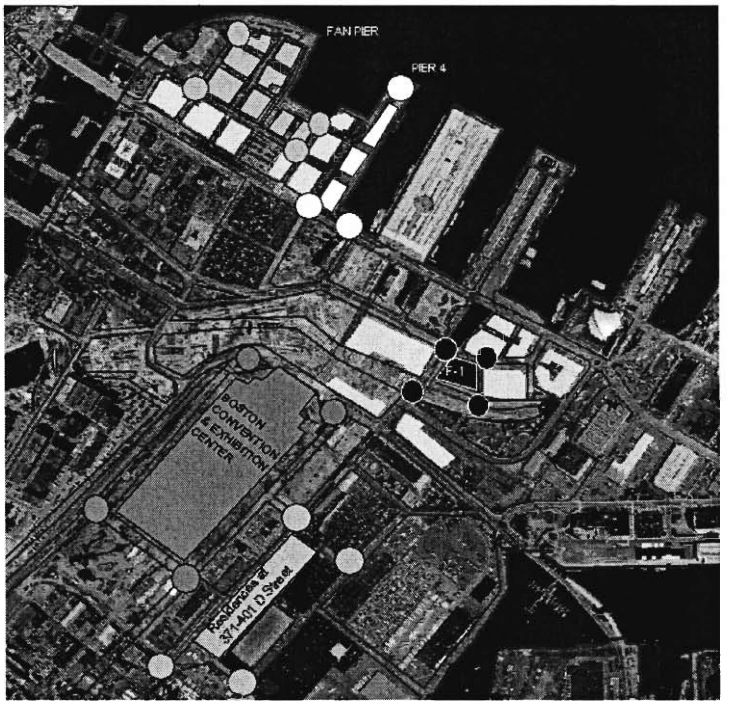

Figure 16: Proposed location of noise receptors

A coordinated grid of noise, air quality, and traffic volume measurements taken at the four intersections surrounding a project site (for single block developments), or at every existing intersection (for multiple block developments) will prove to be beneficial for several reasons. Figure 16 shows the placement of the proposed required study locations. Just from the five projects, one can already notice how a grid of studies will form across the South Boston neighborhood. If such standards were implemented throughout the entire city, a comprehensive layout of studies will form in a database that could be accessed and utilized by all city departments.

The example above is for demonstration purposes and solely concentrates on noise studies. One can easily notice that the same method can be used for other environmental impact studies including air quality measurements, traffic volume, and wind analysis.

5.2 Consultant Feedback

In order to compliment and verify our findings and research, the leading consultants in the Boston area were contacted and asked to complete a short questionnaire. This questionnaire was designed to determine if there existed any detrimental effects of this project's proposals that may have been overlooked. Although

minimal feedback was received, the reviewed environmental impact reports show that these consultants have the program capabilities to submit the exact data that is presented in hard copy form on a compact disc or via email. This will allow for easy uploading into an extensive database linked to GIS with the several benefits that have been outlined throughout this report.

6. Recommendations

The following section will detail the suggested proposals have that been created to make the City of Boston project review process more efficient. The concept of City Knowledge and inter-department sharing can be utilized with the simple use of a Microsoft Access Form similar to the one discussed in the previous section. The final proposal suggests that eventually all environmental impact studies be submitted in digital form, allowing for easy manipulation and re-usability.

6.1 Inter-Department Coversheet Form

Due to wide range of state and federal legislation created to regulate development, a construction project can enter into the City of Boston's databases through three departments: the Boston Redevelopment Authority (BRA), Inspectional Services Department (ISD), and finally the Boston Environment Department (BED). Each individual department has its own method for keeping track of the projects which they review and as previously mentioned there is very little collaboration between departments.

The ideal situation would be for the City of Boston to utilize a single all-inclusive form to consistently initiate the tracking of proposed projects in a database suitable for all municipal departments. This form will be similar to the one developed for the BED, however, this generic form will accommodate for all the project data deemed imperative collect and track by individual city departments. Currently, there is no pre-determined method of collaboration or sharing between municipal departments for project review. Collaboration of city departments to date consists of oral communication of department personnel. There is tremendous potential for the BRA, ISD and BED to share a database of preliminary project information, and its application would further streamline the city of Boston's review processes.

6.2 Submitting Virtual Data

To avoid the problem of project data and information being recalled solely by the institutional memory of planners and project reviewers, in the future, it is suggested that consultants submit the environmental impact studies in digital form along with the hard copy report. This will allow for municipal officials to create a virtual Boston and view the impacts of a construction project in a three dimensional environment. For example, the Boston Environmental Department, if given an AutoCad version of a building exterior profile, could load the file into a pre-designed virtual layout of the City of Boston. Currently, the Boston Redevelopment Authority utilizes an oversized wooden model of the city for this purpose. In addition, the BED may like to utilize a shadow projection program to view shadow impacts of a proposed buildings profile. The submission of electronic data is not just beneficial to the City of Boston's municipal departments. If the database were made available to the public, consultants, developers, and landowners alike would reap the benefits.

6.3 Creating a Geographical Link

Complimenting the proposal of a "coordinated grid study area" outlined in section five of this document, is the theory that coding each intersection of the City of Boston's transportation grid will allow for continuous tracking and easy data basing of new data received from environmental impact reports. Currently, the impacts of proposed project are not directly linked, and the physical attributes are detached from the construction projects surrounding environment. Creating unique codes for street intersections will serve as the glue to bind a construction projects attributes and all proposed conditions with the existing conditions in its geographical vicinity. As of now, written street names and numbers are utilized to set a project into its geographical location. Ward and parcel numbers also serve to carry out this purpose, however both methods are detrimental as a permanent coding system; they are ever changing features of construction endeavors.

Although ward outlines of the city of Boston will not change significantly, parcel outlines are continuously changing. Land parcels are regularly split to accommodate for additional development, are often sold and the current configuration changed, or they may be acquired by the government for public usages, etc. For these reasons, the

utilization of the parcel ID number as a means to link a projects impact on its geographical location is impractical.

Street names in comparison are much more permanent in nature, yet still there are significant detriments associated with utilizing the written names of intersecting streets. For the most part, human error is the major downfall of a system of this nature. Spelling of the English language often falls into two categories, subjective or time consuming. Unless rigorous effort is used to verify the correct spelling of street address, names will continuously be misspelled and these simple errors could nullify the benefits of the system being proposed.

The coding system our team envisions to be the most practical would be one in which all streets in the City of Boston could be identified by a corresponding numerical number. With more then 4000 streets in the city of Boston, this would prove to be unfeasible at first glance as the numerical combinations of the two or more streets comprising an "intersection" in the traditional sense, would create an intersection code of more then eight digits. One would then find themselves in the position described in the previous paragraph were human error during data input could become a problematic issue for the proper operation of the database.

6.4 The Intersection Identification Code

Conveniently, the City of Boston is divided into twenty-two distinct neighborhoods, allowing for a unique foundation for intersection codes. Boston's four thousand streets are dispersed over the entire city and all twenty-two neighborhoods, such approximately 180 streets are located in each. This fact provides the first two characters of the intersection ID code; each of the twenty-two neighborhoods is given a corresponding two letter identifier (i.e., South Boston = SB). Next each street in the neighborhood is given a unique number of 1 through 180 (This process could be done randomly, alphabetically, etc.). The final intersection ID would be comprised of a neighborhood identifier and two street identifiers separated by a hyphen:

SB179-180: *This would be the worse case scenario.*

Figure 17 shows an example in South Boston with the intersection codes for the two projects Fan Pier and Pier 4.

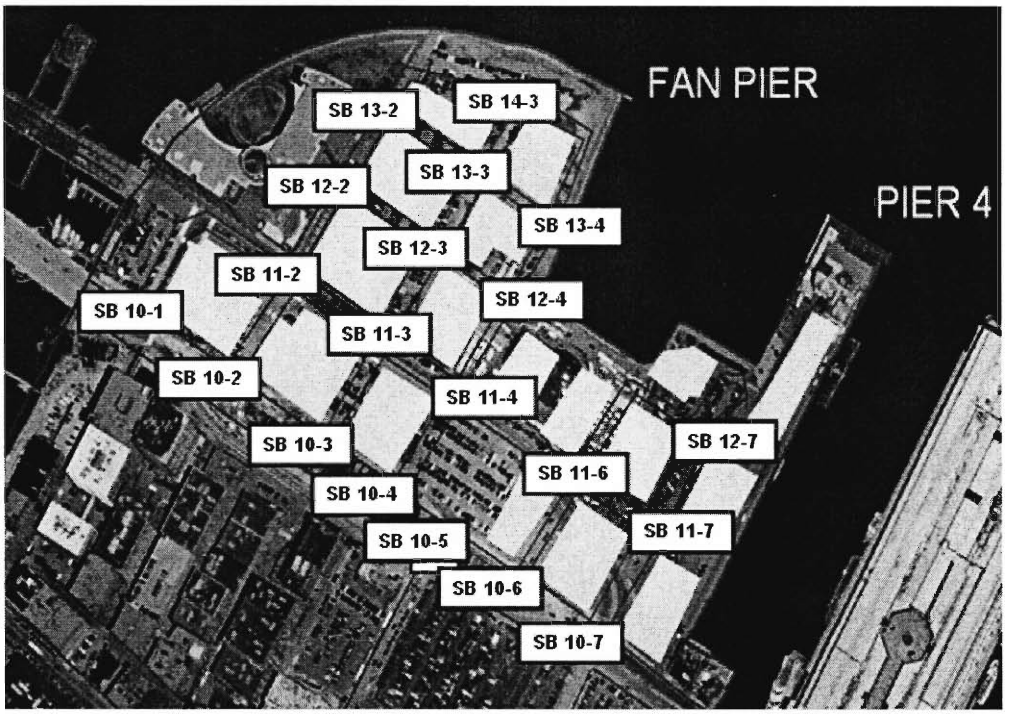

Figure 17: Intersection Codes in South Boston[40]

6.5 Project Review in the Future

The eventual goal for when a consultant submits a project proposal is for him or her to complete a short access data form which would contain the re-usable aspects that were determined previously in this document. The form used will allow for the unified submission of data to a computerized database, and would eliminate the hassle of standardizing the paper submissions of numerous environmental consultants. In addition this form would contain the intersection identification number mentioned previously, in order to bind the construction endeavors impacts to a geographical location, and also allow the data to be coded into GIS map layers.

[40] Map Info Professional 7.8. [cited 2005 April 12].

The subsequent section will provide further insight to how such a system will benefit the City of Boston. The following issues will be discussed:

- Redundant studies can be avoided,
- Allow for the city to monitor and check the accuracy existing measurements compared to previously proposed levels of noise, air pollution, and traffic volume and
- Allow for comprehensive studies throughout the City of Boston, saving money and time, to allow municipal authorities to make educated decision for future development.

6.5.1 Avoiding Redundancy

Although the South Boston waterfront neighborhood represents a good example to demonstrate the concept of re-usability due to the fact that the projects are recent, it also has its drawbacks because of the lack of uniformity in the street layout. To best understand the ideas the team is presenting, it is better to look at the ideal situation; when a project is in a neighborhood that is divided into blocks. For this reason, two projects in the southern waterfront of the South Boston neighborhood will be analyzed. As can be seen in Figure 18 below, the streets are laid out in a grid formation.

Figure 18: South Boston[41]

[41] Map Info Professional 7.8. [cited 2005 April 12].

By looking at two projects from the area highlighted by the red rectangle in Figure 18 above, one will clearly see the benefits of such a proposed system. Figure 19 shows a close image of the two projects.

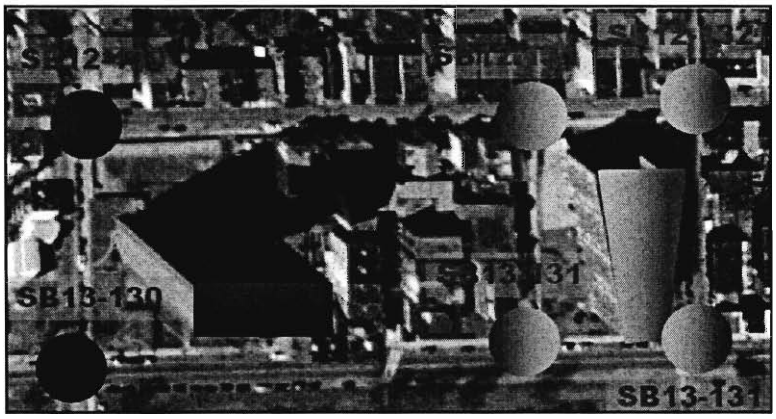

Figure 19: The ideal situation of re-usability[42]

The only building details which are important for this demonstration is the fact that the building highlighted in blue was built one year before the green building on the right. By the new regulations set forth by the City of Boston, the proponent was required to perform its environmental impact studies at a minimum of the four intersections immediately surrounding the project property. One year later, when the green building was being planned, the same studies had to be performed at its four surrounding intersections. One will notice that the two properties share the middle two intersections, therefore the dots are a blend of the two colors representing the respective projects. In such a case, city officials must decide whether the studies shall be repeated or if studies can be performed elsewhere in the city.

As previously mentioned, environmental impact studies must state the no-build conditions and then predict the impacts the structure will have. Therefore, the expected values of noise levels, air quality, and traffic volume at the two shared intersections of the blue building should be exactly the same as the no build conditions of the green building. In this case, there would be no reason to repeat the studies, and the time and money could be focused on other efforts. City officials have the authority to decide whether the

[42] Map Info Professional 7.8. [cited 2005 April 12].

studies shall be repeated to check the accuracy of the consultants or to study other intersections in an attempt to complete a citywide grid of data.

6.5.2 Monitoring Consultants

Projected numbers should match up with the existing levels of future projects in the area. City departments and officials will have the ability to use this knowledge against consultants if they choose to have periodic studies repeated. It is not denied that manipulation of data occurs in EIRs so a project can be approved for permitting. For example, the Pier 4 development mentioned in sections above only has three noise receptor locations while not taking in consideration the other areas around its project site. If such studies are incompatible, then consultants could be punished by performing other studies elsewhere in the city. Consultants will be forced to give correct data because data can be easily checked. The overall information coming into the city's database will be accurate and eventually a complete grid will be formed as previously discussed.

6.5.3 Comprehensive Analysis

Eventually the aggregate affect from the individual projects will allow for the formation of a citywide grid of environmental impact studies. This will avoid the need for city sponsored comprehensive studies. A database system which combines the impacts of individual projects will allow for city officials to eventually view the entire city on a GIS program. This will not only be a more efficient tool for analyzing the city, but it will also save the City of Boston a great deal of time and effort. Instead of hiring consultants or interns to perform these studies, the city will be using data from Environmental Impact Reports for free. Eventually, these studies will be submitted in a digital form that can easily be uploaded into a virtual model of the city. This same program will have the AutoCad version of the proposed structure and will allow for city officials to view any part of the city in its three dimensional form. This will allow for comprehensive analysis of all environmental impacts, including shadow, wind, air quality, traffic volumes, and noise.

7. Conclusion

This project served to re-juvenate the project review process for the Boston Environment Department, and could eventually re-form the review process for entire City of Boston and similar cities nationwide. It is evident that the recommended changes that have been outlined in this report will take a great deal of cooperation between city officials, consultants, and developers alike. However, a streamlined system such as is proposed in this document would be a phenomenal asset. The benefits of a method to re-use the wealth of free data contained within environmental impact reports and other project review documents will far outweigh the minute effort that may be necessary for its implementation. This project has shown that often even the smallest amount of information can be re-used by the municipal departments tasked to perform the review of construction ventures' proposed impact on it surroundings. Based upon research performed during this study, it was found that the information in all project documents has some potential for re-usability; however some data is more readily adapted into a database system.

The proposed action of amending Article 80 of the Boston Zoning Code to require the submission of digital data sets with the proper intersection coding serves as the foundation for a system of re-usability. By entering this information into forms linking to a city department shared database or having it virtually submitted by consultants, the city will have easy access to a wide variety of data. GIS mapping will prove to be the glue that holds all individual project studies together into a comprehensive and universally accessible system. As a result, the overall review process will become more efficient and allow for the information included within project documents to be re-used by a variety of city departments.

8. References

Article 80: Development Review and Approval. "Section 80-E". [Internet]. [Updated 2005; cited 2005 February 18]. <http://www.cityofboston.gov/bra/pdf/ZoningCode/Article80.pdf>.

Boston: Emporis Geography [Internet] [Updated 2004; cited 2005 February 2]. <http://www.emporis.com/en/wm/ci/?id=101045>

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Boston Redevelopment Authority "Maps of Boston". [Internet]: [Updated 2005; cited 2005 February 15]. <http://www.ci.boston.ma.us/bra/pdf/maps/tremontstreet.pdf>

Environmental Monitor [Internet] [Updated 2005; cited 2005 February 21]. <http://www.mass.gov/envir/mepa/thirdlevelpages/monitorarchives/archivespage.htm>

History of the Central Artery / Tunnel Project [Internet]. [Updated 2005; cited 2005 February 20]. <http://www.masspike.com/bigdig/background/history.html>.

Larry W. Canter, *Environmental Impact Assessment* (New York: McGraw-Hill, Inc., 1996), 1.

Learning from Love Canal [Internet]. [Updated 1998; cited 2005 February 20]. <http://arts.envirolink.org/arts_and_activism/LoisGibbs.html>.

Map Info Professional 7.8. [cited 2005 February 27].

Massachusetts Turnpike Authority: *Environmental* [Internet]. [Updated 2005; cited 2005 February 20]. <http://www.masspike.com/bigdig/background/environmental.html>.

MEPA Regulations Section 11.06 [Internet]: [Updated 2004, cited February 10, 2005]. <http://www.mass.gov/envir/mepa/thirdlevelpages/meparegulations/301cmr1107.htm>.

The Love Canal Tragedy [Internet]. [Updated 2005; cited 2005 February 15]. <http://www.epa.gov/history/topics/lovecanal/01.htm>.

The National Environmental Policy Act of 1969 [Internet]: [Cited February 8, 2005]. <http://ceq.eh.doe.gov/nepa/regs/nepa/nepaeqia.htm>.

The National Environmental Policy Act of 1969 [Internet] and Leonard Ortolano, *Environmental Regulation and Impact Assessment* (New York: John Wiley & Sons, Inc., 1997) 315-20.

The U.S. Department of Energy: *Green Building Introduction* [Internet]: [Updated 2004; cited 2005 April 20]. <http://www.sustainable.doe.gov/buildings/gbintro.shtml>

Transportation Data Management in the City of Cambridge. [Boston IQP: 2004]. Colleen Shaver, Josh West, Kimberly Johnstone, and Matthew Gage.

U.S. Green Building Council: *LEED*. [Internet] [Updated 2004; cited 2005 April 20]. <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

Appendix A: Bibliography

Books

Levy, John M. Contemporary Urban Planning. New Jersey: Prentice-Hall, 1997.

This book includes a brief description of the requirement for environmental impact statements and the National Environmental Protection Act (NEPA) process. This information is useful because it provides a background on the overall picture.

Cheremisnoff, Paul, Morresi, Angelo. Environmental Assessement & Impact Statement Handbook. Ann Arbor, MI: Ann Arbor Science, 1980.

This book is useful because it is written by people who are all involved in the EIS process. The book gives information about all the different aspects involved in an EIR.

Lawrence, David. Environmental Impact Assessment. Hoboken, NJ: Wiley-Interscience, 2003.

This book focuses primarily on Environmental Impact Assessment. The book covers the many aspects of the EIA process and its many problems. It will be useful in helping to determine what is inefficient about EIRs and their documentation.

Canter, Larry W. Environmental Impact Assessment. New York : McGraw-Hill, c1996.

This book gives a vast amount of Info about Environmental Impact Reports and how they are developed to provide a detailed description of the impacts of issue for a project site.

Bregman, Jacob I., and Kenneth M. Mackenthun. Environmental Impact Statements. Florida: Lewis Publishers, 1992.

This book discusses the required environmental impact statements under the 1969 National Environmental Policy Act.

Ortolano, Leonard. Environmental Regulation and Impact Assessment. New York: John Wiley & Sons, 1997.

This book shows how environmental management takes place around the world. It also provides case studies to demonstrate how planning methods are actually used in real situations.

McEvoy, James III and Thomas Dietz. Handbook for Environmental Planning. New York: John Wiley & Sons, Inc., 1977.

This handbook services as a great reference to answer question that our team have regarding the EIR process.

Ashmun, Candace M. Municipal Land Use. New Jersey: The Association of New Jersey Environmental Commissions, 1975.

This book provides a checklist for EIR submissions. It is highly beneficial, as it allows one to see the composition of an EIR with needing to review hundreds of pages of documentation.

Kennedy, Lawrence W. Planning the city upon a hill: Boston since 1630. Massachusetts: Amherst : University of Massachusetts Press, c1992

From what the title states, this book gives an overview on how the city of Boston was planned and designed since 1630. It will give us a great amount of info on the history of Boston's design and project approval process and give us an idea on when maybe the Environmental Impact Reports came into importance to the city's development.

Clair, Wm. H. Urban Planning Guide. New York: Headquarters of the Society, 1970.

This handbook is a great reference to answer questions that our group has regarding urban planning, and issues involving the urban planning process.

Websites

Boston Redevelopment Authority. <http://www.cityofboston.gov/bra/DevProjects.asp?action=ViewStatus&StatusID=5> (2005)

This website allows the public to view the current projects that are in progress, waiting for approval, or being reviewed by the city of Boston. The site lets are group collect some facts about Boston's current project status.

City of Boston. <http://www.cityofboston.gov/isd/BOA/newconstruction.asp> (2005)

This website gives detailed info on the approval process for the city of Boston and describes the chronological steps that take place for an application to go through and be approved. This will help us understand what takes place behind city projects and what initiatives that developers take to expand their companies.

EIR Information <http://www.ceaa-acee.gc.ca/010/0001/0001/0023/eis-draft_e.htm#1a >

This site gives background information on EIRs and discusses the purpose for EIR guidelines.

Impact Advisory Groups in the city of Boston
<http://www.cityofboston.gov/bra/econdev/Impact%20Advisory%20Groups.htm>

This website is very useful because it gives a direct insight into the approval process in the City of Boston. It discusses the impact advisory groups and their role in the process.

Massachusetts Environmental Policy Act. <http://www.mass.gov/envir/mepa> (2004).

This site provides detailed information as to the necessity of EIRs, the manner of submission, and the review process of EIR documents. This site allowed me to gain insight on where to direct further research.

Massachusetts General Law. <http://www.mass.gov/legis/laws/mgl> (2004).

This site was extremely useful to pinpoint the legal issues behind the EIR submission. It details what is required by law to be performed by city departments.

Journals

Orr, Patricia. "Federal Environmental Impact Statements as an Important Source of Information." Government Information Quarterly. 12 no 2 (1995): 199-212.

This journal examines background and characteristics of environmental impact statements. It discusses how it complies with the NEPA Policy Act of 1969.

Other

Daylor Consulting Group, Inc. Draft project Impact Report: 99 Tremont Street Residences. Braintree, MA. April 22, 2003.

This methodological source will help determine what information has the potential to be re-used. The document is an actual EIR that has been submitted to the city of Boston Redevelopment Authority. By looking through such reports, the group will be able to sift out what can be labeled as "junk" and what can be re-used.

"A Citizen's Guide to Development Review under Article 80 of the Boston Zoning Code." Boston Redevelopment Authority. Boston, MA. February 2004.

This document offers a brief review of the context of Article 80 of the Boston Zoning Code.

Appendix B: Environmental Monitor

This section displays the documents on the Environmental Monitor that the BED will need to write comment letters for throughout the months of February, March, and April.

BED comment letters for **February, March and April**- current as of 2/16/05. **NOT**
Next Environmental Monitor due out 2/23/05.
If you have questions, call Maura at 617-635-4421.
Page 1/2

CHANGES SINCE PRIOR LIST/INFORMATIONAL NOTES
1. **Addition of** Nashua Street Residences Final Environmental Impact Report.

FEBRUARY

Haney	International Cargo Center of New England-PNF-due 2/22/05 *A BRA Scoping Session will be held on Friday, 2/4/05 at 9:00 a.m. in the BRA Board Room.* South Boston
Campisano	Olmsted Green/Boston State-PNF-due 2/22/05 *A BRA Scoping Session will be held on Friday, 1/28/05, at 10:00 a.m. in the BRA Board Room.* Mattapan
Faria	The Gatehouse Project, 1134-1149 Washington Street & 83 Berkeley Street-Application for Small Project Review-due 2/22/05
McGowan	Fenway Park Improvements-Application for Small Project Review-due 2/22/05
12644 Gage	Brigham & Women's 70 Francis Street/Brigham Green Enhancement and Parking-FEIR-due 2/25/05 LMA

MARCH

W05-1218 Lynch	New England Aquarium-Waterways License Amendment Application-due 3/4/05 Downtown
Craig	Suffolk University-First Amendment to IMP-due 3/7/05 Government Center
W05-1206N Lynch	NSTAR K Street Electrical Substation Improvements Waterway License Application-due 3/11/05 *A Public Hearing will be held at the DEP offices, 2nd Floor of 1 Winter Street on Wednesday, 3/16/05, at 4:00 p.m.* South Boston
12644 Bourre	The Residences at Pier 5-DEIR/DPIR-due to MEPA- due 3/11/05 Charlestown
12565 Bourre	Urban Ring Phase II-DEIR-due 3/18/05 Various
Campisano	Basilica Court-PNF-due 3/23/05 *A BRA Scoping Session will be held on Thursday, 2/10/05, at 3:00 p.m. in the BRA Board Room.* Mission Hill
13253 Gage	Nashua Street Residences-FEIR-due 3/25/05

APRIL

Gribaudo — The Residences at Pier 5-DEIR/DPIR-due to BRA 4/22/05
A BRA Agency Review Meeting will be held on Tuesday, 2/22/05, at 10:00 a.m. in Room 933.
Charlestown

PENDING

W-?????-N — Pier 4-Consolidated Written Determination-due **?????**
Lynch — *A Public Hearing will be held on* **?????????**
South Boston

BED comment letters for **February, March and April**- current as of 2/23/05.
Next Environmental Monitor due out 3/9/05.
If you have questions, call Maura at 617-635-4421.
Page 1/2

CHANGES SINCE PRIOR LIST/INFORMATIONAL NOTES

1. **Addition of** Nashua Street Residences Final Environmental Impact Report.
2. **Addition of** Applebee's Family Restaurant, 381 Chestnut Hill Ave. Application for Small Project Review.
3. **Addition of** Phase I Muddy River Floor Control, Water Quality and Habitat Enhancement, and Historic Preservation Project Supplemental Final Environmental Impact Report.
4. **Addition of** City Lofts Notice of Project Change. ***Please note that this project was known as Little Neck Lofts when the DPIR was filed in November 2001.***
5. **Addition of** Dudley Village Project Notification Form and BRA Scoping Session.
6. **Addition of** Logan Airport North Service Area Economy Parking Consolidation Project Expanded Environmental Notification Form.
7. **Addition of** Maintenance and Remedial Dredging and Old Colony Yacht Club Environmental Notification Form.

FEBRUARY

12644 Gage	Brigham & Women's 70 Francis Street/Brigham Green Enhancement and Parking-FEIR-due 2/25/05 LMA

MARCH

W05-1218 Lynch	New England Aquarium-Waterways License Amendment Application-due 3/4/05 Downtown
Craig	Suffolk University-First Amendment to IMP-due 3/7/05 Government Center
W05-1206N Lynch	NSTAR K Street Electrical Substation Improvements-Waterway License Application-due 3/11/05 *A Public Hearing will be held at the DEP offices, 2nd Floor of 1 Winter Street on Wednesday, 3/16/05, at 4:00 p.m.* South Boston
12644 Bourre	The Residences at Pier 5-DEIR/DPIR-due to MEPA- due 3/11/05 Charlestown
Sinclair	Applebee's Family Restaurant, 381 Chestnut Hill Ave.-Application for Small Project Review-due 3/14/05 Brighton
13455 Bourre	Maintenance and Remedial Dredging and Old Colony Yacht Club-ENF-due 3/15/05 Dorchester
12565 Bourre	Urban Ring Phase II-DEIR-due 3/18/05 Various
Campisano	City Lofts-NPC-due 3/21/05 Charlestown
Campisano	Basilica Court-PNF-due 3/23/05 *A BRA Scoping Session will be held on Thursday, 2/10/05, at 3:00 p.m. in the BRA Board Room.* Mission Hill

McGowan — Dudley Village-PNF-due 3/23/05
A BRA Scoping Session will be held on Friday, 3/4/05, at 9:00 a.m. in the BRA Board Room.
Roxbury

11865 Bourre — Phase I Muddy River Floor Control, Water Quality and Habitat Enhancement, and Historic Preservation Project-SFEIR-due 3/25/05
Fenway, Audubon Circle

13253 Gage — Nashua Street Residences-FEIR-due 3/25/05
North Station

APRIL

Gribaudo — The Residences at Pier 5-DEIR/DPIR-due to BRA 4/22/05
A BRA Agency Review Meeting will be held on Tuesday, 2/22/05, at 10:00 a.m. in Room 933.
Charlestown

13456 Canaday — Logan Airport North Service Area Economy Parking Consolidation Project-Expanded ENF-due 4/23/05
East Boston

PENDING

W-?????-N Lynch — Pier 4-Consolidated Written Determination-due **?????**
A Public Hearing will be held on **?????????**
South Boston

Appendix C: EIR Content Checklist

This checklist contains all the possible contents that would exist in an EIR document. This form was used during the content analysis to identify what contents were most common in the EIRs and what could be re-used from those results.

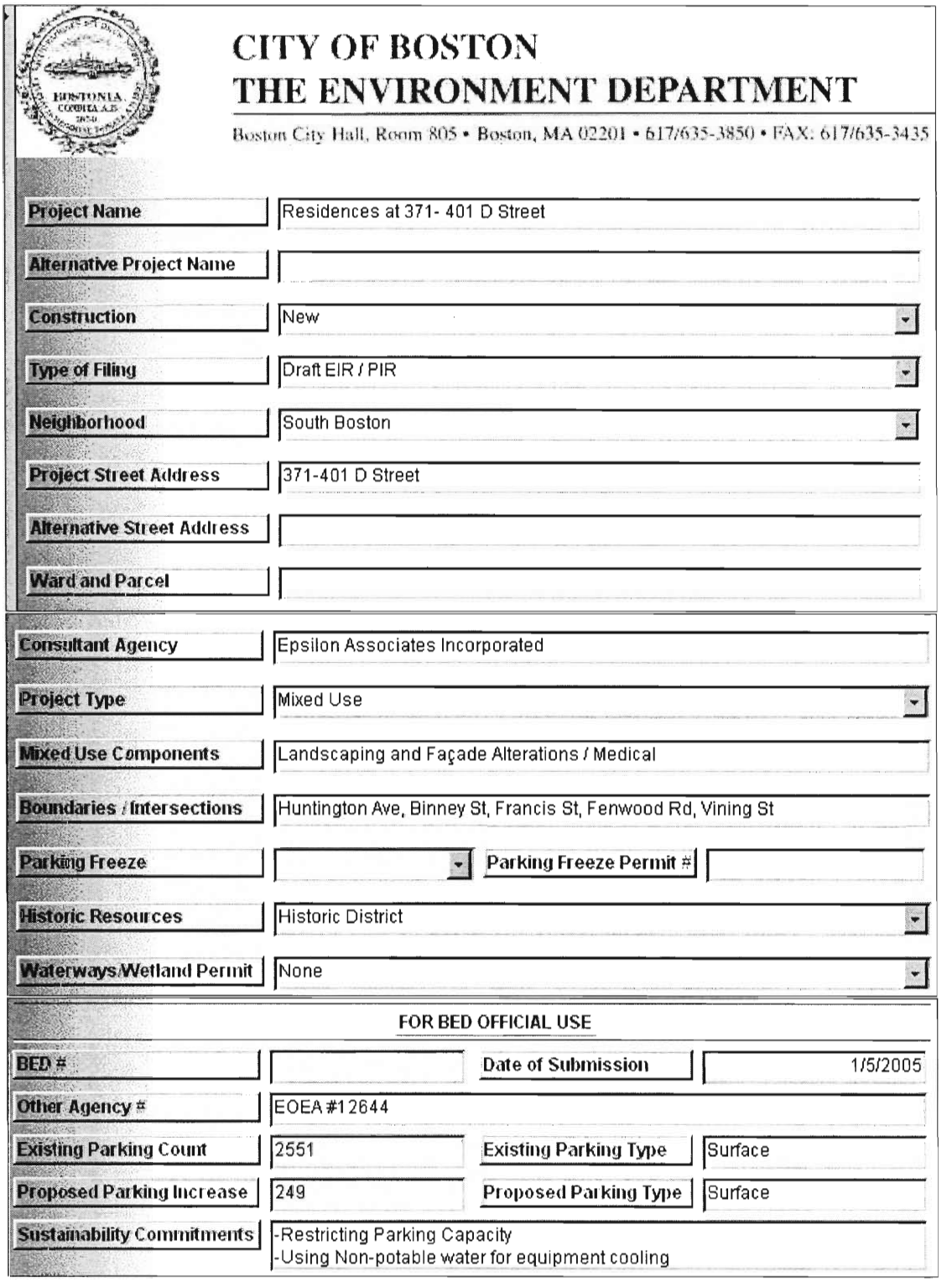
EIR Checklist:	Yes	No
Urban Design		
Urban Design		
Architecture		
Building Massing		
Building Elevations		
Sustainable Design		
Planning Consistency		
Transportation		
Transportation Analysis Overview and Revisions		
Methodology		
Project Revisions		
Traffic Analysis Methodology		
Intersection Improvements		
Parking		
Parking Demand		
Peak Parking Generation Rates		
Shared Parking Demand		
Compliance with Local Regulations		
Public Transit Analysis		
Transit Network Capacity		
Publicly Committed Transit Capacity		
Transit Allocation		
Transit Demand and Capacity/Demand Comparison		
Additional Water Transportation Contribution for Transit Shortfall at Full Build		
Water Transportation Services: Basis and Rationale		
Proposed Additional Water Transportation Contribution		
Transportation Demand Management Program		
Institutional Framework		
TDM Measures		
Project Transportation Coordinator		
Seaport Transportation Management Association		
Coordination with MassRides		
Residential/Hotel TDM Programs		
Office/Employer TDM Programs		
Retail TDM Programs		
Bicycle and Pedestrian Programs		
Service and Loading Access		
Tidelands		
Overview and Project Revisions		
Consolidated Written Determination Application		
License Term Request		
Maintenance and Management Plan		
Shadow and Wind Analyses		
Project Phasing and Public Benefits		
Offsets		
Water Transportation Contributions		
Water Transportation Cash Contributions		
Summary of Total Water Transportation Contribution		
Additional Water Transportation Contribution for Transit Mitigation		
Public Realm		
Ground Floor Facilities of Public Accomodation		
Stabilization and Reconstruction of Pier/Shoreline		
Dredging		
Navigational Fairways		
Environment		
Wind Analysis		

EIR Checklist:						Yes	No
			Pedestrian Wind Comfort Criteria				
			Wind Analysis				
			Methodology				
			Pedestrian-Level Wind Assessment				
				Existing (NO BUILD) Condition			
				Build Condition			
				Future Build Condition			
		Shadow					
			Methodology				
			Anaysis Results				
				Vernal Equinox			
				Summer Solstice			
				Autumnal Equinox			
				Winter Solstice			
			Net New Shadow (NNS)				
		Air Quality					
			Summary of Air Quality Impacts				
			Vehicle Miles Traveled Comparison - Build/No Build				
			Peak Carbon Monoxide Concentration				
			Microscale Air Quality Analysis				
		Noise Impacts					
			Noise Impacts from Generators, Deliveries, and Trash Pick-Up				
			Overhead Flight Noise				
		Wetlands					
			Wetlands Overview and Project Clarifications				
			Dredging				
			Stabilization and Reconstruction of Pier/Shoreline				
			Massachusetts Stormwater Management Policy				
		Water Quallity					
			Water Quality Overview and Project Clarifications				
			Stormwater Maintenance and Management Plan				
				Existing Conditions			
				Proposed Conditions			
				Maintenance and Operation Program: Construction			
				Maintenance and Operation Program: Post-Construction			
		Construction Impacts					
			Construction Overview				
			Construction Period Air Quality				
			Noise				
			Traffic				
			Stormwater				
		FAA Airspace					
			Historic and Archaeological Resources				
	Infrastructure						
		Project Overview and Summary Revisions					
		Stormwater Drainage System					
			Existing System				
			Proposed System				
			Maintenance and Operation Program: Construction				
			Maintenance and Operation Program: Post-Construction				
		Sanitary Sewer System					
			Existing System				
			Proposed System				
		Proposed Utility Connections					
	Mitigation						
		Introduction and Draft Section 61 Findings					
		Urban Design in Open Space					
		Transportation					
			Instersection Operations				
			Transportation Demand Management				

EIR Checklist:		Yes	No
	Tidelands		
	Wind		
	Shadow		
	Air Quality		
	Noise		
	Wetlands		
	Water Quality		
	Construction Impacts		
	Construction Impacts: Air Quality		
	Construction Impacts: Noise		
	Sustainable Design Initiatives		
	Historical and Archaeological Resources		
	Infrastructure		

Appendix D: BED Project Entry Coversheet

This data sheet provides a means for both entry of new data and retrieving existing data from the Access database.



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Project Name	Residences at 371- 401 D Street
Alternative Project Name	
Construction	New
Type of Filing	Draft EIR / PIR
Neighborhood	South Boston
Project Street Address	371-401 D Street
Alternative Street Address	
Ward and Parcel	
Consultant Agency	Epsilon Associates Incorporated
Project Type	Mixed Use
Mixed Use Components	Landscaping and Façade Alterations / Medical
Boundaries / Intersections	Huntington Ave, Binney St, Francis St, Fenwood Rd, Vining St
Parking Freeze	Parking Freeze Permit #
Historic Resources	Historic District
Waterways/Wetland Permit	None

FOR BED OFFICIAL USE

BED #		Date of Submission	1/5/2005
Other Agency #	EOEA #12644		
Existing Parking Count	2551	Existing Parking Type	Surface
Proposed Parking Increase	249	Proposed Parking Type	Surface
Sustainability Commitments	-Restricting Parking Capacity -Using Non-potable water for equipment cooling		

Appendix E: LEED Checklist

This Leadership in Energy and Environmental Design checklist was made virtual using the Access database created for the BED. This checklist is now the basis for Green Building commitments made by the future developers in the City of Boston.

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LEED - Project List

Project ID: 234495

Sustainable Sites

Erosion & Sedimentation Control	☑
Site Selection	☐
Urban Development	☑
Brownfield Redevelopment	☐
Alternative Transportation (Public Transportation Access)	☐
Alternative Transportation (Bicycle Storage & Changing Rooms)	☐
Alternative Transportation (Alternative Fuel Vehicles)	☑
Alternative Transportation (Parking Capacity)	☐
Reduced Site Disturbance (Portect or Restore Open Space)	☐
Reduced Site Disturbance (Development Footprint)	☐
Stormwater Management (Rate and Quality)	☐
Stormwater Management (Treatment)	☑
Heat Island Effect (Non-Roof)	☐
Heat Island Effect (Roof)	☑
Light Pollution Reduction	☐

Water Efficiency

Water Efficienct Landscaping (Reduce by 50%)	☑
Water Efficienct Landscaping (No Potable Use or No Irrigation)	☐
Innovative Wastewater Technologies	☐
Water Use Reduction (20% Reduction)	☐
Water Use Reduction (30% Reduction)	☐

Energy & Atmosphere

Fundamental Building Systems Commissioning (Required)	☐
Minimum Energy Performance (Required)	☐
CFC Reduction in HVACR Equipment (Required)	☐
Optimize Energy Performance (1-10)	0
Renewable Energy (5%)	☐
Renewable Energy (10%)	☐
Renewable Energy (20%)	☐
Additional Commissioning	☐
Ozone Depletion	☐
Measurement & Verification	☐
Green Power	☑

Materials & Resources

Storage & Collection of Recyclables (Required)	☐
Building Reuse (Maintain 75% of Existing Shell)	☐
Building Reuse (Maintain 100% of Shell)	☐
Building Reuse (Maintain 100% Shell & 50% Non-Shell)	☐
Construction Waste Management (Divert 50%)	☐
Construction Waste Management (Divert 75%)	☐
Resource Reuse (Specify 5%)	☐
Resource Reuse (Specify 10%)	☑
Recycled Content (Specify 5% (pc + 1/2 pi))	☐
Recycled Content (Specify 10% (pc + 1/2 pi))	☐
Local/Regional Materials (20% Manufactured Locally)	☐
Local/Regional Materials (of 20% in MRc51,50% Harvested Locally)	☐
Rapidly Renewable Materials	☐
Certified Wood	☐

Indoor Environmental Quality

Minimum IAQ Performance (Required)	☐
Environmental Tobacco Smoke (ETS) Control (Required)	☐
Carbin Dioxide (CO2) Monitoring	☐
Ventilation Effectiveness	☐
Construction IAQ Management Plan (During Construction)	☑
Construction IAQ Management Plan (Before Occupancy)	☐
Low-Emitting Materials (Adhesive & Sealants)	☐
Low-Emitting Materials (Paints)	☐
Low-Emitting Materials (Carpets)	☐
Low-Emitting Materials (Composite Wood)	☐
Indoor Chemical & Pollutant Source Control	☐
Controllability of Systems (Perimeter)	☐
Controllability of Systems (Non-Perimeter)	☐
Thermal Comfort (Comply with ASHRAE 55-1992)	☐
Thermal Comfort (Permanent Monitoring Systems)	☐
Daylight & Views (Daylight 75% of Spaces)	☐
Controllability of Systems (Non-Perimeter)	☐
Thermal Comfort (Comply with ASHRAE 55-1992)	☐
Thermal Comfort (Permanent Monitoring Systems)	☐
Daylight & Views (Daylight 75% of Spaces)	☐
Daylight & Views (Views for 90% of Spaces)	☐

Innovation & Design Process

Innovation in Design 1	☑
Innovation in Design 2	☐
Innovation in Design 3	☐
Innovation in Design 4	☐
LEED Accredited Professional	☐

Project Totals

Certified ☐ Silver ☐ Gold ☑ Platinum ☐

Appendix F: Consultant Questionnaire Email

In order to compliment and verify our findings and research, the leading consultants in the Boston area were contacted and asked to complete a short questionnaire. This questionnaire was designed to determine if there existed any detrimental effects of our proposals that we may have overlooked

Dear ESS Group,

My name is Egas Gomes; I am a senior at the Worcester Polytechnic Institute (WPI) in Worcester, MA. Three other WPI students and I are currently working with the city of Boston's environment department to determine ways to re-utilize information contained in the documents produced by environmental/project review processes.

One of the suggestions from our project advisor (Prof. Fabio Carrera, PH. D., of the WPI) was that we ask consultants and/or developers to include electronic data (GIS layers, etc.) in their PIR/EIR submissions to city departments. Our team has identified your agency to be a leader in project consulting for the Boston area, via our research. Our question to you is whether or not this request would be feasible in the eyes of consultants/developers. If not, it would be great for our research if you could explain a little on why it would not be.

In addition, our team has determined that it would be extremely useful to those in the industry as well as to city departments, to create a database of project information that could be searched via the internet by criteria such as: required licenses, neighborhood, usage, etc. However, Boston's city departments lack the manpower to update such a database on a daily basis. Our project team has created a coversheet which contains the basic physical and legal attributes of a project, and would be asked to be submitted along with review documents, thereby allowing city departments to keep a database of this sort updated. In the future, we hope to see even this formality eliminated, and for consultants/developers to be able to submit this data in an "access data page" form, which would automatically update the database. Again, we ask whether or not this request would be feasible in the eyes of consultants/developers. If not, it would greatly help our project to understand the hindrances behind a request of this nature.

I thank you for your time, and hope to hear from you soon. If you would be interested in seeing a final presentation and proposal to this project, please e-mail our project team at EIR05@wpi.edu.

Sincerely,
Egas M. Gomes
Worcester Polytechnic Institute
EIR Project Team 2005