An Evaluation of Nantucket's Town Facilities

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An Evaluation of Nantucket's Town Facilities

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Abstract

The Town of Nantucket is confronted with the issue of maintaining and improving its municipal facilities in the face of growing demands, limited budgets, and a lack of centralized information. Per request of the Assistant Town Manager and Town Facilities Manager, we completed a baseline facilities assessment and compiled the information into a database. This entailed conducting site visits, stakeholder interviews, and community-wide surveys. We discovered that many facilities were not efficiently fulfilling their intended purposes, and thus we recommended structural repairs, the consolidation and relocation of several departments, and the continued use and development of the database to improve facility maintenance and management.

Acknowledgments

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We are appreciative of all of the town employees who gave their time to help us. We would like to thank Heidi Bauer, Diane O'Neil, Dave Fredericks, Rachel Chretien, Richard Ray, and Lauren Sinatra for offering their time to allow us to interview them. Additionally, we would like to thank the following people who gave us facility site tours:

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- Leah Cabral, Town Shellfish Biologist,
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would not have been possible. We appreciated all of your timely and valuable feedback on our progress. Thank you for constantly pushing us to go above and beyond.

Executive Summary

Like many other small towns, keeping Nantucket's town facilities up to date is an ongoing effort. As an island community, Nantucket is prone to many complications, such as exposure to harsh weather, and the high cost of utilizing off-island resources. Nantucket's small-town atmosphere attracts many visitors over the summer months, causing an extreme increase in population. With so many people, it is crucial that the Town's facilities well-maintained and well-equipped to handle the needs of town employees and the public they serve throughout the year.

An issue faced by Nantucket is a lack of centralized information about these facilities. With 38 municipal facilities, budgeting for capital improvements and maintenance expenditures without centralized facility information is very complicated. In the past, facility problems have generally been addressed only when noticed and reported by employees; many problems were left unaddressed. Deferred maintenance is an issue; problems can become much more costly and difficult to fix when left unattended, and can escalate into more severe damages.

Project Goal and Objectives

The goal of this project is to evaluate Nantucket's town facilities, organize information in a centralized database, and provide a basis and justification for future maintenance and space planning purposes. We identified the following four objectives to achieve this goal. We:

1. Collected information on town facilities through site visits and interviews with town officials and employees;
2. Formed a comprehensive database of facility information to assist with facility maintenance and management;
3. Determined town employee and public opinion about existing facility and space needs problems; and
4. Made recommendations that will help the town to effectively address structural and space needs in ways that best suit the needs of the entire community.

Methods

We first determined the preferences of our project sponsors and other stakeholders regarding database design and content through a series of interviews and discussions. Considering this feedback, we built a pilot database using data collected at our 20 South Water St. site visit. We tested our pilot database by presenting it to our project liaison, refined it, and then populated the database in full. Many stakeholders requested the addition of a

maintenance log, to be used by the Department of Public Works. The log provides a central location to track all maintenance and associated facilities costs. We designed the database to generate individual reports for each building that could be shared publicly on the Town website. Only selected employees will be able to enter and edit information within the primary database. We determined town employee and public opinion about facility and space needs problems through online surveys. Finally, based on our site visit findings, interviews, and surveys, we made a series of recommendations.

Findings

During our site visits, we found that there are several general problems experienced by multiple facilities. Some of these facilities lack proper ADA compliance, while others face challenges of having town functions spread across the island which results in inefficiencies. One of the largest issues expressed in interviews and survey responses was parking. One survey response noted that "the lack of proper parking for employees and the public makes work inefficient..." This is major problem is augmented by summer tourist traffic.

Upon completing our site visits, we categorized the facilities into four priority levels, as is illustrated in the table below. In general, facilities with the highest public usage or value to the town with the worst structural and/or space conditions were of greater priority.

LEVEL I - FACILITIES IN POOR CONDITION	LEVEL II - FACILITIES IN MODERATE CONDITION
• Planning and Land Use Services • 20 South Water St (Old Police Station) • Town Building • Fire Station • Town Pier	• Visitor Services • Children's Beach & Concession • DPW Sheds • DPW Garages • Harbormaster Building bathrooms
LEVEL III - FACILITIES IN GOOD CONDITION	LEVEL IV - NEWLY CONSTRUCTED, RECENTLY RENOVATED, OR UNDER-RENOVATION FACILITIES
• Natural Resources Building • DPW Administrative Building • Jetties Beach Concession • Madaket Fire Station • Finance Building • Female Lifeguard Housing	• Public Safety Facility • Community School • Shellfish Research Laboratory • Siasconset Fire Station • Male Lifeguard Housing

Our Town employee and public surveys yielded significant feedback on the locations of

municipal departments. The majority of respondents believe that some town functions (Assessor, Finance, Human Resources, Procurement Office, Registry of Deeds, Tax Collector, Town Administration, and Town Clerk) should stay in town for easy access. Other survey respondents believe that the Registry of Motor Vehicles should be moved out of the Town Building, as it contributes significantly to foot and car traffic in the downtown area.

Recommendations and Conclusions

Taking into consideration the results of our surveys, interviews, and personal observations, we developed a set of recommendations as to how we believe the town should proceed with its municipal facilities. We recommend that the suggestions for facilities in the Level I category be addressed within the next 3 years. The PLUS building is inadequate for hosting its current operations because of the extent and severity of its problems, many of which center around its aged shell structure. We strongly recommend considering a new building entirely. The facility at 20 South Water St under-used at present and the interior is in a deplorable condition for both employee and public use. This facility needs major interior renovation and redesign to better meet the needs of employees and the public whatever town function it ultimately serves. The Fire Station currently fails to meet the needs of emergency services. We recommend it be integrated into the Public Safety Facility at 4 Fairgrounds as it is already equipped to accommodate such an addition. Moving the department to a new, larger facility would solve the current office, living quarters, and storage space issues. The Town Building requires many relatively minor repairs and upgrades, although costs may be increased because lead paint and asbestos may need to be abated. We believe that the town would benefit from addressing the aforementioned facilities before the Town Building's, however. The Town Pier, including the main pier and floating docks, should be completely replaced with a new pier, as it would be very costly to repair the existing structure. We recommend that the Town considers a concrete-based structure, as it would largely avoid the major fire hazard and susceptibility to weather-related damages associated with a wooden construction.

The Level II facilities had less severe issues which we recommend be addressed in the next 3-5 years. Visitor Services needs more energy efficient, handicap accessible doors, as well as interior doors to increase privacy and control noise, better communal space, and a more

efficient heating system to prevent pipe freezing. The DPW needs more garage storage space for equipment and entirely new sheds. Unheated portable schoolhouses are currently being used as sheds and employee communal areas. The Children's Beach and Concession should install a new metal playground to avoid splinter hazards, as well as more adequate lighting and security cameras to discourage loitering. We recommend that the Harbormaster Building bathrooms be upgraded and/or rebuilt. These bathrooms are used by hundreds of people per day in the summer months, but are currently not aesthetically pleasing.

The facilities in the Level III section are in adequate condition for at least the next five years, but have minor issues that could be addressed relatively easily. The Natural Resources and Finance Buildings should be given more storage space. We also recommend that these buildings, as well as the Harbormaster Building, be updated with larger communal areas. We recommend minor changes to the other facilities in this category.

Several of the Level IV buildings are brand new and need only regular maintenance and repairs. Some facilities are undergoing major renovations to only specific parts of the facility; other facilities may require attention in the near future.

Relocation and Consolidation

The town functions listed above should be in one location for convenience as the functions of these departments overlap. Using the current Town Building for these departments will maintain the Town's presence in the heart of downtown. We recommend that the top floor of the facility at 20 South Water St. be used as meeting space. Visitor Services should be relocated as there is inadequate space for the public traffic received by the department; there is ample room on the ground floor of 20 South Water St. to house private offices for employees, as well as meeting and storage space that their current facility lacks.

By relocating the RMV and courts to the 2-4 Fairgrounds complex, there would be more available waiting space for other departments, less hall traffic, and a quieter workspace in the Town Building, as well as less traffic and parking congestion in the downtown area. The holding areas at 20 South Water St could then be removed and the space repurposed. The Sheriff's office can be relocated to the Public Safety Facility to be near the court, holding area, and the police station. While the current Planning and Land Use Services Facility needs to be completely redone, the departments in that facility should remain at that location. It is conveniently

located away from the busy downtown area, and is close enough to the Public Safety facility to utilize its parking lot, and to allow for easy travel between the two facilities. The Fire Department should be relocated to 4 Fairgrounds as its current facility is not adequately sized to support its needed staff. The Public Safety Facility is already equipped to handle the addition and it would be convenient for the police and fire/rescue departments to be together.

The facility located at 37 Washington St (currently Finance Building) could be moved to the 2-4 Fairgrounds area and utilized as the RMV and/or courthouse. It could also be moved to the Natural Resources Department location to provide employees with more office and storage space. To resolve the parking issue in the downtown area, we suggest the construction of a parking garage, with designated employee parking, in the current lot behind the Finance Building. This location is in a low-population, easily accessible area. Should this suggestion be vetoed, we suggest a shuttle service for town employees from a lot outside of town.

The locations of the DPW facilities, Natural Resources Department (including the Shellfish Research Lab), Harbormaster Building, Community School, concessions, and housing are functional in their current locations. The DPW should be located near the landfill, the Harbormaster needs to be at the Town Pier, and the Natural Resources Department, specifically the Shellfish Research Lab, needs to located on the coast.

We also recommend that the town constantly update the database to accommodate for and describe recent upgrades and necessary repairs. We believe that this information should be made visible to the public by use of PDF's uploaded onto the town website, which should also be updated regularly. Consistently updating the database will better enable the town to perform preventative maintenance.

Since many of the facilities are not very energy efficient, we also recommend that the town looks into potential opportunities for alternative energy, as well as installing weatherproof doors and windows to block weather movement throughout buildings. Additionally, we believe that the only way for the approval of our recommended renovations is to involve the public as much as possible. Public forums and surveys can provide invaluable information, and from our survey, we found that Nantucket residents are passionate about the

future of their town and its facilities. In conclusion, we recommend that the town takes our findings further and conducts a more thorough space needs and planning assessment.

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Comparable Case Studies	SA	--	SA, AB, BC, GK
Public Involvement	SA	--	SA, AB, BC, GK
Data Collection & Analysis	SA	--	SA, AB, BC, GK
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Objective 3	BC	--	SA, AB, BC, GK
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Survey Paragraphs	AB	--	SA, AB, BC, GK
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Survey Responses	AB	--	SA, AB, BC, GK
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Level II	SA	--	SA, AB, BC, GK
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Space Needs Recommendations	BC	--	AB
Database Recommendations	AB	--	BC
Other Recommendations	AB, BC	--	BC
Appendices			
Appendix A	BC	--	--
Appendix B	BC	--	--
Appendix C	BC	--	--
Appendix D	BC	--	--
Appendix E	BC	--	--

Appendix F	--	--	BC
Appendix G	--	--	BC
Appendix H	SA	SA, AB, BC, GK	--
Appendix I	GK	--	--
Appendix J	BC	--	--
Appendix K	BC	--	--
Appendix L	SA, AB, BC, GK	--	--
Appendix M	AB	----	SA, AB, BC, GK
Appendix N	SA	AB	SA, AB, BC, GK
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Introduction

Federal, state, and local government agencies across the United States own and maintain an enormous number and variety of buildings and facilities, from office buildings and research laboratories to parks and monuments. Maintaining and managing these facilities presents a tremendous and ongoing effort. The issue of facility maintenance and management is particularly complicated in the state of Massachusetts, having 351 separate town governments, numerous historic buildings and aging infrastructure, and limited town and state budgets.

The state of Massachusetts requires towns to conduct and file master plans (under MGL Ch. 41, Section 81D). These address a wide variety of topics, such as land use, housing, open space, and economic development. They also typically include a section on town facilities that may be based on inventories and assessments with varying levels of detail. More detailed town facility assessments tend to focus on one or two buildings that may be in urgent need of attention, whether involving a pressing need for maintenance, or a complete remodel. Comprehensive space needs assessments are not as common due to the sheer amount of data that needs to be collected, and many towns do not have the capability to perform such assessments due to limited staff and resources.

Nantucket is beginning its facility assessment and space needs planning process as a part of the town's master plan. The Nantucket Town Manager's Office has realized the need for this type of assessment as there is no centralized, comprehensive database that includes information on each town facility. This lack of central data is an issue, since community needs constantly change, populations vary seasonally, and facilities are often repurposed. Nantucket's facilities are facing increasing demands, but the budget and resources needed to meet these demands are limited. The 2009 Master Plan in Nantucket recognized these issues:

CH. 7: SERVICES AND FACILITIES

As a Town, it is often difficult to provide the services needed for a population that changes so dramatically between seasons; a seasonal workforce is necessary to provide the level of service that is expected. The challenge for the Town in future years will be to provide the level of services necessary to meet the needs and expectations of the year-round and seasonal residents, keeping within a relatively static budget.

(Office of the Town Manager, 2009)

A critical step in solving this problem is for Nantucket to maintain a comprehensive database for its municipal facilities, containing data on each structure, its energy use, space needs, etc. However, there is currently a lack of centralized facility-related information, and there is no one person or organization in charge of maintaining a database. Inventorying data and consolidating it into a database can help keep track of necessary improvements, identify gaps in existing information, justify project spending and prioritization, and increase public awareness of the current town facilities' conditions. Overall, the main goal of our project is to collect and organize information on the town's facilities so that they can effectively address space needs and capital planning, and have a tool to assist ongoing facility maintenance and management.

In order to develop the most useful, effective database for Nantucket's facilities, we considered database development and maintenance methods, data collection methods, and types of data to be collected. To create the foundation for the project, we analyzed existing research and background information and collected and organized available facility data. We identified and interviewed key contacts to gather opinions on what information should be included in the database. We surveyed municipal employees to gather opinions regarding building conditions and ideal locations for various departments. We also surveyed the general public to determine opinions about facility conditions and space needs. Once the necessary information for the database was identified, we collected missing information through site visits of these municipal facilities. This research approach took into consideration the opinions and needs of people who will use, maintain, and be affected by decisions made based on the database.

Gathering and organizing facility data into this database will provide Nantucket the convenience of having various town facility data organized into a central location that can be shared and accessed by multiple offices and employees. Facility managers and personnel will be able to better see what improvements will be financially beneficial and most urgent. The information collected will aid in making recommendations for the future improvements of the facilities. Overall, we hope that the information gathered here will help the town more easily justifying capital spending on its facilities, and improve the town facilities so that they are better equipped to meet the diverse needs of town employees and the public they serve.

Literature Review

Introduction

Municipal facilities enable town's employees to provide a variety of services to its citizens. In order for these facilities to serve their intended purposes to their maximum potential, they must be maintained in a timely, organized manner, and must be documented accordingly. Small town governments face challenges managing their facilities, in part due to limited personnel and slow turnaround for capital projects. In this section, we discuss the plans and protocols of Nantucket and other communities for maintaining and improving their facilities. Additionally, we discuss ways in which municipal facility issues are addressed in town master plans, as well as the importance of these master plans for town growth. We also assess several methods by which various facility data can be collected and analyzed. All of this is done while remembering the importance of the historical character of the Town of Nantucket: "the heart of the island is the old whaling town itself, overlooking the Great Harbor. The town of Nantucket has been miraculously preserved by the caprice of economic collapse and, in this century, the love and efforts of its inhabitants" (Lang, Stout, 1995).

Nantucket's Facilities

The municipal government of Nantucket has a range of facilities that it uses and maintains. These properties include town government offices, police and fire facilities, employee housing, sports fields, and a senior center. Currently, there is no consolidated database for information or history on these facilities because the offices and employees have different methods for the collection and organization of facility information. The most recent master plan was assembled in April 2009 by the Planning Board of Nantucket. This master plan consists of eight chapters with corresponding goals for each. Services and facilities are discussed in Chapter 7, and accordingly, Goal 7.1 is "to provide facilities for a municipal government that meets future needs" (Nantucket Master Plan, 2009).

For some time now, the Town of Nantucket has been faced with a variety of problems at its various facilities relating to a ranging from limited parking and meeting space to various

structural problems. Due to their historical nature, many of the buildings do not currently suit the needs of the town. Most of the 38 properties (Table 1) that the town government is responsible for managing are dispersed across the island (Figure 1), which poses barriers to efficient interdepartmental cooperation and may impair easy public access.

Property Name	Street Address
NANTUCKET POLICE STATION (OLD)	20 SOUTH WATER STREET
TOWN AND COUNTY BUILDING	16 BROAD ST
NANTUCKET FIRE DEPARTMENT MAIN BLDG	135 PLEASANT ST
NANTUCKET FIRE DEPARTMENT GARAGE	135 PLEASANT ST
MADAKET FIRE STATION	293 MADAKET ROAD
SCONSET FIRE STATION	10 WEST SANKATY RD
PUBLIC SAFETY FACILITY	4 FAIRGROUNDS RD
POLICE DEPARTMENT STORAGE GARAGE	56 LOW BEACH RD
POLICE DEPARTMENT HOUSING (SUMMER DORMS)	56 LOW BEACH RD
EMPLOYEE HOUSING	38 WEST CHESTER ST
EMPLOYEE HOUSING (LIFEGUARDS)	47 OKORWAW AVE
NATURAL RESOURCES DEPARTMENT	2 BATHING BEACH RD
FINANCE DEPARTMENT	37 WASHINGTON ST
HARBORMASTER BLDG (MARINE & COASTAL RESOURCES)	34 WASHINGTON ST
SHELLFISH LABORATORY	BRANT POINT
PLANNING OFFICE	2 FAIRGROUNDS RD
DEPARTMENT OF PUBLIC WORKS HEADQUARTERS	188 MAKAKET ROAD
NANTUCKET COMMUNITY SCHOOL & EARLY CHILDHOOD CENTER	32 FIRST WAY
SCONSET BATHROOMS	1 FOLGER COURT
DIONIS BEACH BATHROOMS	11 DIONIS BEACH ROAD
CHILDRENS BEACH GRANDSTAND/CONCESSION	5 HARBORVIEW WAY
TOM NEVERS SHEDS AND CONCESSIONS	126 TOM NEVERS RD
TOWN PIER	34 WASHINGTON ST WHARF
EMPLOYEE HOUSING (LIFEGUARDS)	130 WASHINGTON ST
VISITOR SERVICES	25 FEDERAL ST

Table 1: Municipal Facilities List

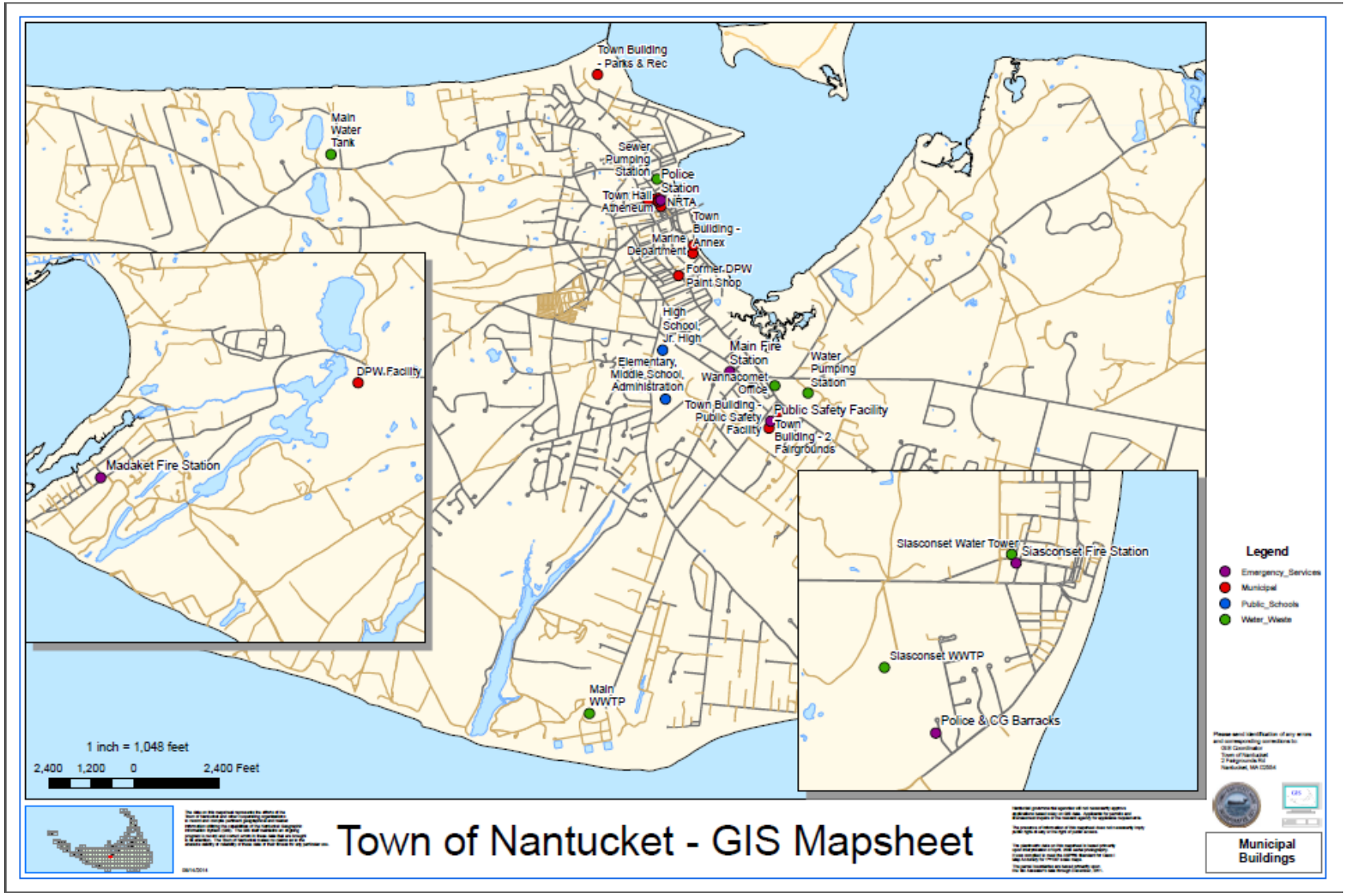


Figure 1: Municipal Facilities Locations

Some of the many issues that the town faces concerning its facilities are parking, energy consumption, adequate office space, poor insulation, and outdated equipment. Of these, one of the most prevalent issues is parking. Finding parking in the center of town is very difficult in the summer, and causes problems for town employees and visitors. Moving the town offices outside the core district is a potential solution that the Town Manager's Office has looked at to alleviate parking demands. However, Nantucket Bylaw 46-4 requires the town government to keep town offices located in the core town district for convenience to the public unless voted otherwise at the annual Town Meeting ("Acquisition of Land for Town Offices," 1997). Also, like most other United States towns, Nantucket is concerned about the energy usage within its facilities. Nantucket residents pay surcharges for their energy to overcome the logistics of supplying electricity and fuels to the island (Department of the Town Manager, 2014). Some of the historical buildings do not have up-to-date heating systems or insulation methods. Some parties in the town government have been pushing for the consolidation of town offices and resources so that they can improve delivery of services and reduce expenses by sharing space and resources.

Recognizing that the town needed to address these facility issues, in 2007, Town Manager Libby Gibson hired the Maguire Group out of Providence, Rhode Island, to conduct a municipal building evaluation because "the facilities [were] … overtaxed and the distribution of departments [was] not coherently grouped" (Maguire Group, 2007) . The town wanted to know how feasible consolidation or expansion would be for the facilities, while accounting for anticipated growth by analyzing the current and projected growth and square footage needed for each department.

The report evaluates eight (8) buildings that were in use as government offices at the time: Town Hall, 37 Washington Street, 1 Chestnut St, 22 Federal Street, Visitors Center, Marine Building, Electric Company Building, and the Police Station. The report is now outdated and there have been a changes made since 2007 in the structure and distribution of town functions. For example, the police station which was at 20 South Water Street at the time is now only being used as the sheriff's office and administration, as well as holding cells for the town

courthouse. At the time of publication, there were plans to move the police to a Public Safety Facility at 2 Fairgrounds Rd (which did happen in 2010). Additionally, 22 Federal St, more commonly known as the Mooney Building, is now no longer owned by the town. Various departments have been relocated since 2007, such as the PLUS, Health Department, and Energy Office.

The Maguire Group evaluated the current use and utilization rate of each town building. Based on the projected number of employees, square footage, and the needs of each department, the report gave a series of recommendations from which the town could base a plan of action. The report concluded by creating groups of departments that should be in close proximity to each other. For example, Group II consisted of Assessing, Collector/Treasurer, and the Registry of Deeds. The Maguire Group then gave four recommendations for the buildings that these groups should be situated in, by tabulating the number of projected square footage needed for each (Maguire Group, 2007). The Town did follow through with a few of the options set forth by the report, but did not execute any of the options in full. For example, Options A and D recommended in part that the Mooney Building be vacated and sold, which was done in 2014. However, the remaining recommendations that would complete Options A and D have not been done by the town at this time.

Another method the town took to make reasonable changes for the municipal facilities was a Board of Selectmen (BOS) created Space Needs Work Group to "evaluate municipal facilities and present recommendations to the Board of Selectmen…" (Office of the Town Manager, 2014). In 2014, the BOS created the following goals for space planning:

- Develop a long-term maintenance plan for all public property (i.e., real estate, including easements and public access) and facilities (excluding schools, airport, and water; these facilities are out of the scope of the space needs assessment of our project) and
- Develop a prioritized plan for municipal space needs, including how additional space would benefit the Town and connect to a long-term Capital Plan.

The Space Needs Work Group tasks were as follows:

1. *Review long-term space needs of town departments which are currently located at: 16 Broad Street, 22 Federal Street, 37 Washington Street, 2 Fairgrounds Road, and others as needed,*
2. *Review feasibility of downtown as opposed to out-of-town locations,*
3. *Evaluate any and all feasible municipal office space locations,*
4. *Review options and associated costs of new or renovated space, and*
5. *Develop and recommend a public process or outreach program for projects to be proposed to voters* (Nantucket Town Administration, 2012).

The major reason behind the Long-Term Municipal Space Needs Plan is that some town departments are spread between different buildings and the administration is looking into how to make the offices more time and space efficient. In 2012, a 13 person committee was assembled and produced the Preliminary Long-Term Municipal Space Needs Plan Outline the following year. The committee disbanded subsequently, however, and no further action was taken to reform. A smaller committee was established for the sole purpose of discussing the 20 South Water Street facility, which the Town Manager's office is hoping to put back to use on a regular basis soon (Tivnan, 2014).

The Preliminary Long-Term Municipal Space Needs Plan Outline divides facilities that require attention into two categories. The first and most pressing category is titled "Buildings that need to be replaced, relocated, improved or expanded within next 2-5 years (because of structural, physical, or other maintenance issues; or space inadequacy)" and comprises eight municipal facilities. The second category of facilities in the Preliminary Outline is "Other municipal buildings that will need space improvements in the next 5-6 years" which contains four facilities. The physical condition of some of the town facilities creates a poor working environment for employees and may inhibit the delivery of services to the public. Future deterioration of the facilities may even pose physical risks (*Preliminary Long-term Municipal Space Needs Plan Outline*, 2013). The outline emphasizes the financial consequences of years of deferred maintenance: the town can either continue to spend money to heat and cool energy-

inefficient buildings and make increasingly large repairs in an ad hoc fashion, or they can include major renovations and expansions in their budget. A graphic summary of the preliminary evaluation of physical condition of several major town facilities as described in the *Preliminary Long-term Municipal Space Needs Plan Outline* is below.

Facility	Poor Physical Condition	In Need of Renovations	Not Up to Current Regulatory Codes	Inadequate Size / Poor Layout	Energy Inefficient
Our Island Home	●	●	●		
Fire Station at 131 Pleasant St		●	●	●	
PLUS at 2 Fairgrounds Road	●	●		●	●
20 South Water Street (Old Police Station)	●		●		●
Marine Department		●			
Nantucket Elementary & Middle Schools		●		●	
Brant Point Boat House	●	●	●	●	
Community School				●	

Table 2: Summary of Preliminary Long-Term Municipal Space Needs Outline

On Nantucket, the Historic District Commission (HDC) plays a key role regarding the use of all buildings, including municipal buildings, across the island, but especially in the historic core of downtown. The HDC was formed in 1955 to preserve historic assets on the island, including buildings, places, and districts. The HDC today reviews all exterior structural changes and new construction on the island. This group "…effectively maintains the charm and essence of Nantucket by setting the standards for building" (Butler, 1996). The HDC has a considerable role to play with regard to the nature of new or refurbished structures in the historic core of town. Therefore, they might dismiss a proposal for alternative energy solely because it would

not fit the historical aesthetic of the quaint and charming town. Alternative energy can be a delicate topic on the island, as the residents and HDC want to keep the feel of the whaling community it once was. The HDC has a critical input when moving forward with most of the municipal facilities, as the majority are historical buildings, and will be a major factor to consider when making recommendations for the future. In 1995 the HDC produced a guide entitled *Building with Nantucket in Mind*

> To preserve the integrity of the historic buildings that physically express the history of the island; to encourage faithful maintenance and accurate restorations of historic structures; to ensure that all additions to or alterations of historic buildings are compatible with the original building.
>
> (Lang, Stout, 1995)

The HDC's strong presence and strict regulations maintain the character of the island, and may substantially impact the way in which town facilities are maintained, restored, and repurposed.

Throughout the first year that the Space Needs Work Group was in place, the Planning and Land Use Services collective department was created by relocating and consolidating several town offices from their previous facilities into one facility at 2 Fairgrounds Road. This consolidation improved communication between departments, allowed greater sharing of staff and resources, and improved public access by providing one-stop 'shopping' (especially for contractors) and easier parking (Tivnan, 2014). Since this consolidation was such an improvement, it may be a possibility for similar relocation and consolidation of other office functions that might improve services and could also reduce facility maintenance and operational issues.

In the summer of 2012, the Town submitted an application for the Community Preservation Committee (CPC) to help alleviate the costs of renovation and expansion at the 20 South Water Street municipal facility (which at the time held both the fire and police departments). This facility did not qualify to continue through the application process but members of the Historical District Commission (HDC) recommended that the town "seek a determination from the HDC as to the historic status of the building". On December 6th, the

HDC determined that the building was in fact historic and a demolition application should be submitted if that was the intent of the administration ("Office of the Town Manager," 2014). This application was submitted so that the town could keep its options open until a final decision was made; however, the application was denied by the HDC on a 3-2 vote (Graziadei, 2013). In short, the Town cannot demolish the 20 Water Street property and must reconsider how it can best use the building.

Enterprise Funds

In 1986, Massachusetts enacted the enterprise fund statute (G.L. c.44, §53F½), which

> gives communities the flexibility to account separately for all financial activities associated with a broad range of municipal services. It establishes a separate accounting and financial reporting mechanism for municipal services for which a fee is charged in exchange for goods or services. Revenues and expenses of the service are segregated into a fund with financial statements separate from all other governmental activities.
>
> (*Enterprise Funds,* 2008)

A community is able to adopt an enterprise fund "for a utility, health care, recreational, or transportation facility." An enterprise fund does not operate independently, as it is a municipal department "subject to ordinary municipal finance procedures." They may only be granted or disposed of by vote of the town council or town meeting (*Enterprise Funds,* 2008). In Nantucket's case, an enterprise fund must be agreed on by a quorum at the annual Town Meeting.

As of the April 5, 2014, Town Meeting, Nantucket has approved six (6) enterprise funds: Memorial Airport, Our Island Home (the island's nursing home), sewer (including wastewater treatment, collection & disposal, and Siasconset plant), Siasconset Water, Solid Waste, and Wannacomet Water. They have allocated more than $35 million for these enterprise funds for fiscal year 2015 (*Article 11 (Appropriation: Enterprise Funds Operations)*, 2014).

A result of enterprise funds being independently operated and separately funded is that the facilities tend to be better taken care of than the remaining town facilities. These remaining town facilities face general structural and maintenance issues that may or may not be addressed as often as they should which results in some larger issues, mostly due to the large quantity of municipal facilities on Nantucket. This kind of dilemma is faced by many New England towns which have assembled space needs and master planning processes to try to address the issues.

Comparable Case Studies

In recent years, many New England towns have conducted assessments to identify their municipal space needs and developed master plans that lay out strategies to meet those needs. The *2012 New London, NH Master Plan Executive Summary* describes a master plan as a "fundamental planning tool" that provides a town with the insight necessary to make justified and well-informed decisions regarding its future development. The document states: "by developing coordinated policies within the master plan and addressing such topics as future development, transportation, environmental protection, community facilities, and fiscal management, the plan will help New London to meet change responsibly, guiding its growth in an orderly, constructive manner" (New London Planning Board, 2012). The Rockport, Massachusetts, master plan notes that "[t]he purpose of this Downtown Master Plan is to fully identify the assets, to identify changes and challenges that affect the assets, and to develop recommendations that will result in a better downtown, and thereby a better town for its residents" (Rockport Planning Board, 2011). Overall, a master plan is used to evaluate existing problems with a town, present possible solutions to these problems, and provide justification for any costs that will be necessary to implement these solutions.

Public Involvement

Public involvement is crucial in creating an all-inclusive, well-rounded master plan. The *Municipal and Public Use Facilities Master Plan, Town of New Canaan, CT* (hereafter called the New Canaan Master Plan) emphasizes that community input was "… essential to help guide the priorities and maintain the town's sense of history. Community input was integral to developing

the goals of the Master Plan and testing options for new, renovated, and upgraded facilities, including parking, and helping to eliminate options." To ensure community involvement in the project, a total of four public workshops were held throughout the development of the town master plan (Perkins Eastman & BFJ Planning, 2012). The planning process for development of the *2011 Rockport, MA Master Plan* "…consisted of a series of meetings with public presentations and audience participation, and three meetings with specific topics designed to collect the perceptions and needs of residents and users of the Downtown" (Rockport Planning Board, 2011). To increase public involvement in the formation of its 2012 master plan, the New London, NH Planning Board organized a series of "Community Visioning Workshops" and community surveys that were "… well-attended and had high participation rates." In total, 515 surveys were completed, and "the results of the community survey provided the Planning Board with invaluable insight and the survey responses are cited throughout the Master Plan" (New London Planning Board, 2012).

Data Collection and Analysis

The New Canaan Master Plan also illustrates the need for systematic collection and analysis of data regarding the current physical conditions of town facilities. The plan identifies a range of problems regarding existing town buildings and proposes a series of solutions based on the collected data. The plan presents data tables pertaining to the targeted buildings that give insight to the methods used to collect the data in an effective manner.

The New Canaan Master Plan provides an in-depth analysis of each of the buildings in town. Many of these buildings are over a century old and contain components that have long since exceeded their useful lives. For example, in the Town Hall, the main boiler was installed in the 1950's and has exceeded its service life of 30 years (Perkins Eastman & BFJ Planning, 2012). Figure 2 illustrates the types of information that were collected for each town building, including information on existing conditions (e.g., physical space and staffing), existing issues (e.g., notable deficiencies with electrical systems, HVAC systems, and other building elements), and the remaining life of mechanical components. These same categories would likely be appropriate for a similar assessment on Nantucket.

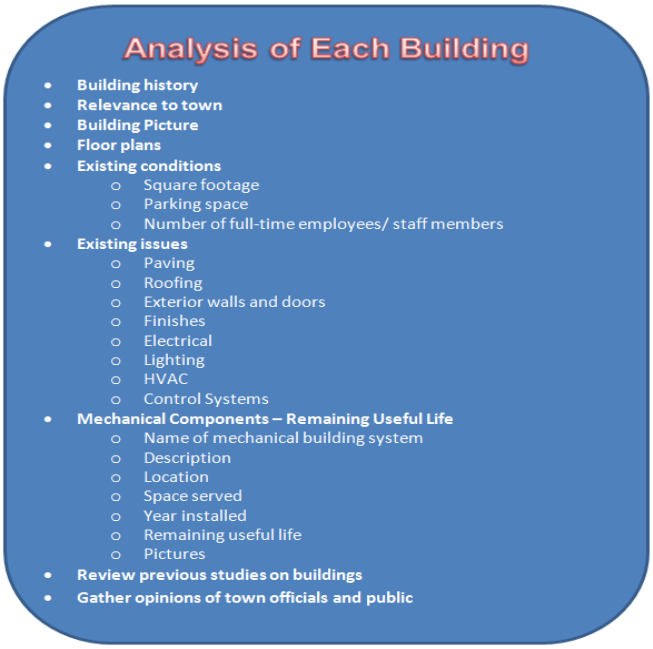


Figure 2: New Canaan Master Plan Analysis of Buildings (Perkins Eastman & BFJ Planning, 2012)

After existing conditions and issues were documented, building needs were determined by reviewing previous master plans and gathering the opinions of both town officials and members of the community. Toward the end of this master plan is a section that summarizes cost estimates for a series of improvements to be addressed by February 2015. Figure 3 presents the criteria considered in creating cost estimates.

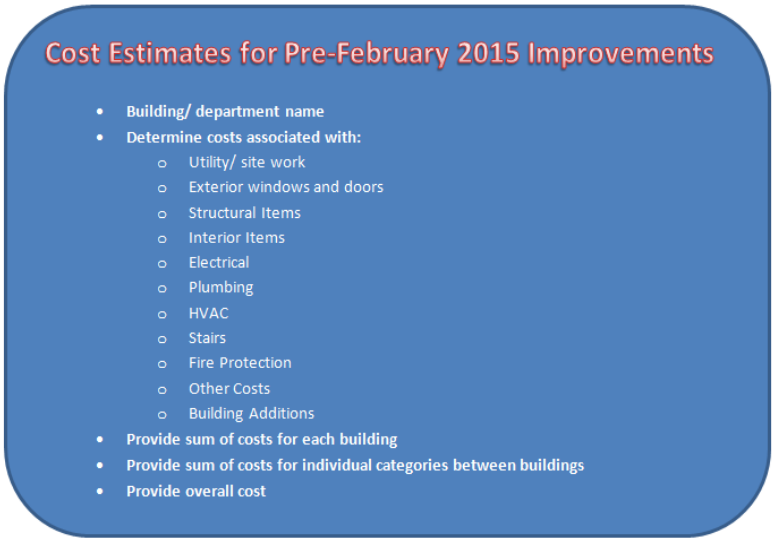


Figure 3: New Canaan Master Plan Cost Estimates (Perkins Eastman & BFJ Planning, 2012)

In addition to analyzing each of the town buildings in need of improvement, the master plan also addresses the current major assembly spaces within the town; these spaces are used by town departments, community groups, and various organizations to hold events and public meetings. An assessment of each of the town's major assembly spaces was conducted, focusing on criteria presented in Figure 4.

Figure 4: Major Assembly Spaces in New Canaan Master Plan (Perkins Eastman & BFJ Planning, 2012)

Having compiled an assortment of information regarding the current conditions and various needs of town facilities, the master plan then presents a series of alternative plans for improving the facilities. The criteria presented in Figure 5 were considered in developing and evaluating each plan.

Figure 5: New Canaan Master Plans Alternative Plans (Perkins Eastman & BFJ Planning, 2012)

To narrow down the number of alternative plans for each building, the town held three public gatherings in which conceptual alternatives were presented. Public opinion helped to refine the number of alternative plans, and to realize additional details that would be critical to the town to make well-informed decisions on final alternative plans (Perkins Eastman & BFJ Planning, 2012). To weigh the alternative plans for each of the town buildings, the master plan evaluates each alternative plan based on the criteria presented in Figure 6.

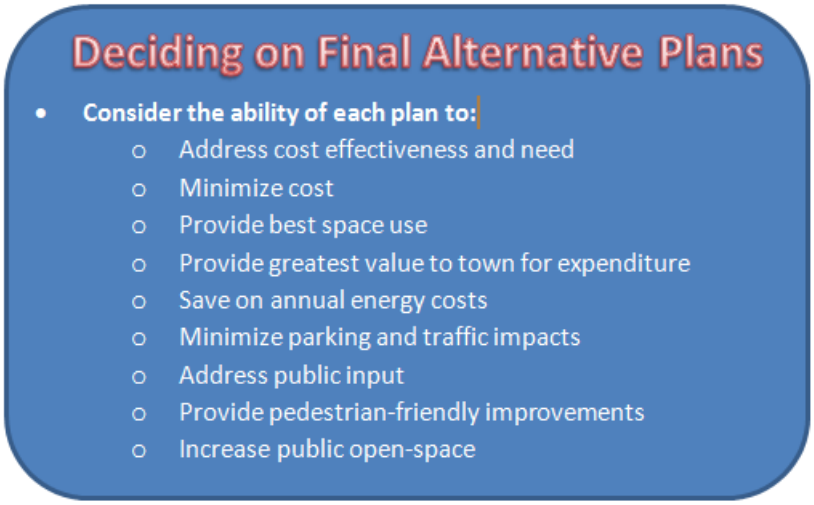


Figure 6: New Canaan Master Plan Final Plan Decisions (Perkins Eastman & BFJ Planning, 2012)

In addition to addressing problems with town buildings, the master plan also evaluates problems with existing parking conditions throughout the downtown area. To address this issue, a study was conducted to determine the existing parking inventory for municipal lots, commuter lots, and the town library parking, and to determine the demand for additional parking spaces. Figure 7 presents all of the criteria that were considered in conducting this study.

Figure 7: New Canaan Master Plan Existing Parking Space Supply (Perkins Eastman & BFJ Planning, 2012)

Having determined and evaluated the existing supply of parking spaces, the next step was to evaluate the demand for parking spaces, determine how well the existing parking supply can satisfy this demand, and determine what improvements need to be made to handle both the existing demand, and a potential growth in demand. According to the master plan, "… best management practices for parking specify that a healthy downtown area should have a supply of parking spaces approximately 10-15% higher than the projected or actual demand." BFJ Planning, a consulting firm specializing in urban design and environmental analysis, conducted an analysis that "…calculated the downtown's current total commercial floor area of both occupied and vacant uses and separated each commercial use into land use categories. These categories included retail, office, medical office, drive-in bank, and restaurant land uses" (Perkins Eastman & BFJ Planning, 2012). Figure 8 presents the criteria used in determining the existing demand for parking spaces.

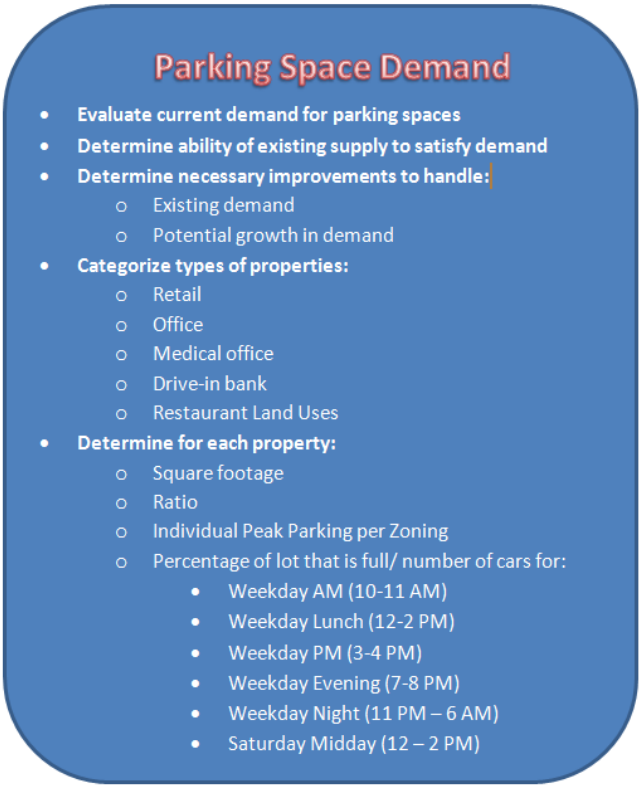


Figure 8: New Canaan Master Plan Parking Demand (Perkins Eastman & BFJ Planning, 2012)

Toward the end of the master plan, findings on energy usage and cost analysis of several of the town buildings are presented in a table that states the name of each building, its square footage, electric usage and cost, oil usage and cost, total energy cost, and energy cost per square foot. At the bottom, totals for each quantifiable item are included. Data within the table is based on billing data provided to the Solid Waste Authority (SWA) and other electricity and oil providers for the buildings. In collecting this information, a specified aggregated rate of $0.201 per kilowatt-hour and a rate of $2.56 per gallon fuel oil #2 are assumed (Perkins Eastman & BFJ Planning, 2012).

In addition to determining the aforementioned energy calculations, a process known as "benchmarking" was also presented in the master plan. According to the master plan, "…[benchmarking] facilitates energy accounting, comparing a facility's energy use to similar facilities in order to assess opportunities for improvement and quantifying/verifying energy savings" (Perkins Eastman & BFJ Planning, 2012). For each building, the name, existing square

footage, year built, total energy use (kBtu), energy intensity (kBtu/sf), and current rating (1-100) are included and compared to other buildings (Perkins Eastman & BFJ Planning, 2012).

Finally, the master plan presents a "Recommended Capital Plan" that will address "…efficiently necessary renovations, upgrades, and space requirements while maintaining and enhancing the town character and providing the best value for the New Canaan community." For each project, the Recommended Capital Plan presents information summarized in Figure 9.

Figure 9: New Canaan Master Plan Capital Plan (Perkins Eastman & BFJ Planning, 2012)

Overall, the New Canaan, Connecticut, master plan serves as a valuable source to demonstrate what a historical New England town, like Nantucket, might do to compile and evaluate information regarding a series of older town buildings.

The 2011 master plan for the town of Rockport, MA, also includes insight on some types of data and data collection methods that may be applicable in Nantucket. According to the master plan, nearly all of the buildings in a section of Rockport known as Bearskin Neck are located within a flood zone. With this in mind, "major improvements would require both building the additions above the base flood elevation (BFE) and making the building accessible, two improvements that would add significant changes to the appearance of the area and how it functions" (Rockport Planning Board, 2011). However, there is a variance in the International Building Code, adopted by Massachusetts in 2010, that exempts certain historic properties from the height and construction requirements in flood zones. To determine eligibility for the variance, a property

> …must prepare a 'Form B – Building' available on the Massachusetts Historical Commission website. These Form-B's will be reviewed by Commission staff and determined to be not eligible for listing on the National Register of Historic Places, eligible as an individual listing, or eligible as part of an area listing. A positive determination of eligibility can be used to secure a variance…
>
> (Rockport Planning Board, 2011)

This information may be of relevance to Nantucket, since some of its facilities lie within flood zones. If major improvements to any such historic buildings must be made, it may be worthwhile to submit a Form B to potentially avoid costs associated with having to build additions above base flood elevation and making the buildings accessible.

Further on in the Rockport master plan, traffic circulation and parking issues, especially in the tourist season, are addressed. In an effort to alleviate traffic congestion caused by motorists searching for parking spots in the downtown area, "the Town developed a satellite parking lot at the Transfer Station with shuttle bus service to Downtown." Later, it is mentioned that "the shuttle service from the Transfer Station Parking Lot plays an important role in reducing the number of automobiles in the Downtown" (Rockport Planning Board, 2011). Nantucket has adopted a similar approach to alleviate parking in the summer months. Parking is available outside town and a shuttle service takes construction workers and other summer commuters directly to the ferries downtown.

Building Analysis

The ability of a town to accomplish its mission and generate revenue can be hindered by maturation, obsolescence, and deterioration of its facilities and their components, elevating the risk profiles of these buildings. An additional issue can arise through the additions to building codes and regulations in a town or state, causing facilities that were once considered to be in perfect condition to become outdated and unsatisfactory. Maintenance, repair, and renovation can lessen this risk. The depletion of these facilities, coupled with a constantly increasing demand on the infrastructure, requires two strategies: "(1) to introduce new capabilities and

capacities into the infrastructure stock to meet projected demand; and (2) to adequately manage, maintain, improve, and renew the existing infrastructure stock to slow performance degradation and fill demand gaps" (Grussing, Liu, 2014). In order to do this, a series of steps must be taken to analyze these facilities and their components.

An important step in building analysis is to evaluate the energy usage and related building systems. According to the *FIELD GUIDE TO New Hampshire's Municipal Buildings & Energy Audit Guidelines*, this step can be accomplished by the breakdown shown in Appendix A. By analyzing the individual components and then the system as a whole, we can see how much of an impact each constituent has on the facility as a whole.

This energy analysis will require the acquisition and compilation of energy bills to track energy usage throughout the months, and how they fluctuate based on which systems are being used and to what degree. An example of this can be seen in Appendix B, which is taken from *How to Conduct an Energy Audit: A Short Guide for Local Governments and Communities*; this can help us compile this data into one place and make it easier to access and analyze in a broader way.

The same guide also offers a numerical way (below) to determine the energy efficiency of equipment, processes, or systems so long as their individual energy usage is known. Energy wasted can be determined from a professional energy audit.

$$EE = \frac{(energy\ input - energy\ wasted)}{energy\ input} x\ 100$$

Beyond energy, the enclosure or shell of the building must be assessed. In accordance again with the *FIELD GUIDE TO New Hampshire's Municipal Buildings & Energy Audit Guidelines*, this step includes analysis of the foundation, walls, ceiling and roof, and air infiltration. This step is further broken down in Appendix C. A similar evaluation can be done with the HVAC equipment and distribution systems and the hot water system; this evaluation can be found in Appendix D.

A different approach, as addressed by the U.S. Army Corps of Engineers Civil Works, worked to devise a uniform standard method for condition assessment, resulting in the Condition Index Scale (CIS). Similarly to the performance index in the previous example, this approach assigns a condition index (CI) number based on a 100 point scale, a breakdown of which can be seen in Appendix E. This method groups a set range of point values into a zone (1, 2, or 3) as a representation of the overall building condition and urgency of further attention and repair. This zone number can be useful in its ease of storage in a computer database, and manipulation in a mathematical equation (McKay, 1999).

With this system, there is also the possibility of manipulating the zone number (1, 2, or 3) in equations. One equation that could be of use to us is utilized to analyze the unit repair cost for a component of a facility:

$$UC_{repair} = UC_{replace}\, x\, (\frac{100 - CI}{100 - CI_{term}})^{N}$$

In this equation, UC_{repair} is the estimated unit repair cost as a function of the component's condition; $UC_{replace}$ is the estimated unit replacement cost; CI is the current predicted CI value; CI_{term} is the designated CI terminal value, usually 40. This value is the lowest ranking on the 100 point scale that the component may reach before its condition is critical. N is the cost escalation factor; this can be determined for a particular component by subtracting the typical repair costs at different points in its life cycle from the CI values associated with these points. This model also assumes a minimum service fee to account for a technician's visit (Grussing, Liu, 2014). Since repair and replacement costs are of large concern with many of the facilities on the island, this equation could potentially simplify the process of comparing the options. It can also be programmed into a database so that when new information is inputted, a repair cost estimate can be easily obtained without having to perform the calculations.

A more complex process could be carried out if sufficient funds are available. The goal of this process is to minimize the costs of maintenance, repair, and replacement under the specific conditions and constraints of the facilities. This process consists of six models and methods. Through this process, the facilities can be split into several components by grouping subclasses

by common functions. These systems, subsystems, and components can then be analyzed individually concerning age, cost of replacement, performance, and lifespan (Grussing, Liu, 2014). An example can be seen in Appendix F. Once the facilities are divided into their respective components, the conditions and capabilities of the components must be measured. The figure in Appendix G shows both condition and capability loss on a 100 point scale, with 100 being an idyllic state. Condition loss could be defined as weakened structures, nonfunctioning electrical components, mold, insect damage, etc. Capability loss is categorized as a decrease in functionality due to changing standards, codes, and aging, such as availability of parts, maintainability, energy efficiency, lead-based paint, and being aesthetically displeasing (Grussing, Liu, 2014).

Conclusion

The town of Nantucket has many concerns regarding its municipal facilities, such as structural integrity, energy usage, parking availability, and space needs, and there is no centralized location for information pertaining to these issues. Master plans from New Canaan, CT, and Rockport, MA, addressed similar issues to those of Nantucket, such as the preservation of historical features, parking, and energy. By examining these master plans, several possible methods for data collection and database formation can be determined.

In addition to examining the methods of previous master plans, there are many ways to conduct building analyses that could provide relevant information about municipal facilities. The centralization of existing data and data gathered through building analyses will aid in future maintenance plans and assist in the achievement of the goals of the town's master plan.

Methodology

Introduction

The goal of this project was to evaluate Nantucket's town facilities, organize information in a centralized database, and provide a basis and justification for future maintenance and space planning purposes. In order to reach this goal, we developed five (5) research objectives. The team:

1. Determined stakeholder preferences regarding database type, design, content, and purpose;
2. Built, tested, and refined a pilot database;
3. Conducted a facility inventory and populated the database;
4. Determined town employee and public opinion about facility use and space planning needs of the town; and
5. Made recommendations regarding space planning and facility use and maintenance.

In this chapter, we describe the methods that we used to collect and organize information from various sources in order to create a centralized and accessible database. We also describe the key information that was used in making appropriate recommendations for the town.

Objective 1: Determine Stakeholder Preferences

The Nantucket Town Manager and other officials involved in facilities management and space planning needed an easily accessible and user-friendly database that could be updated continually. We identified the stakeholders that would be interviewed based on this need. After receiving a provisional list of key contacts from Gregg Tivnan, Assistant Town Manager and the project sponsor, we conducted interviews with:

- Heidi Bauer - Procurement
- Diane O'Neil- Public Schools Facility Manager
- Charlie Gibson - Deputy Police Chief
- Lauren Sinatra - Energy Coordinator
- Rachel Chretien - Nursing Home (Our Island Home) Administrator
- Larry Kester - Facilities Manager
- Brenda McDonough – Disability Committee Liaison

- Dave Fredericks – Electrical and Energy Consultant
- Richard Ray – Chief Public Health Officer
- Mark McDougall - Fire Chief

The opinions and needs of other stakeholders in this project, such as employees of the Department of Public Works (DPW), Town Administration, and Planning and Land Use Services (PLUS), were also taken into account when creating this database and making recommendations for the town.

All interviews were conducted face-to-face. Many scripts were adapted for interviewees depending on their specific knowledge and areas of expertise. At the beginning of all interviews, the interviewees were given a brief description of the purpose of the interview. Next, the stakeholders were asked if: 1) They would like to remain anonymous in the presentation of information discussed in the interview, 2) The WPI TMO Team has permission to directly quote their responses, or 3) The WPI TMO Team does not have permission to directly quote their responses. The interviews were recorded for later reference if permission was granted by the interviewee. Two or four group members conducted each interview; one served as the main communicator with the interviewee, and the other(s) served as a scribe(s). The scribe(s) interjected and communicated with the interviewee as needed. Each interview was planned to last for approximately 60 minutes. If needed, the interviewee was allotted the right to terminate the interview at the conclusion of the 60 minutes. The main communicator then thanked the interviewee for his or her time and terminated the interview at once.

The interview scripts were based on the draft survey instrument (Appendix H) and were designed to encourage feedback pertaining to five main characteristics of the database: database type, overall design, content, purpose, and visions for facility improvements. The goal of these interviews was to develop a comprehensive understanding of how our pilot database should be constructed, and to realize what it needed to contain in order to best meet the needs of stakeholders; the stakeholders also revealed to us their visions for improvements and/or changes to their respective facilities.

Objective 2: Build, Test, and Refine Pilot Database

In order to implement a comprehensive database, we first created a pilot to serve as a rough draft. We took the information on the facility at 20 S Water Street and organized the data into a standalone Microsoft Access file. We presented the database to key stakeholders, and received feedback on the current features and implementing new features.

We chose Microsoft Access to be the software for our pilot database because of its ease of use and capacity for external links, such as photographs and documents. We felt this to be necessary as pictures would be able to show the public areas of buildings that they might not have access to or see on a regular basis. This program also allows the database structure to be updated for the addition of future building features and facility maintenance management tools. Additionally, Microsoft Access allows multiple users to view and edit the information in different ways, depending on their needs. The ability to create queries and display specific data in forms and reports will help different users get the information they need quickly and efficiently.

We began our database with a table containing a list of town facilities and a table of items on our site visit checklist explained in Objective 3. Each row contained information on one facility with the checklist items as columns.

At the beginning of each week, we would update our sponsors and advisors on our progress. During the third meeting, we presented the aforementioned tables to show what that information looked like in spreadsheet form. Our sponsors stated that they wanted the database to have different views: one for the public and one for internal use. Our solution was to divide the data into the two tables:

1. Core Building Information
2. Building Elements and Condition Ratings

The standard building information table listed facility name by primary key (PK), address, year built, square footage, number of floors, flood zone location (yes/no), number of employees, annual energy usage, energy usage per square foot, south facing roof (yes/no), and

a picture of the facility. This is a snapshot of building facts of which have no direct cost or possible maintenance history.

Facility List

ID	Address	Facility	Year Built	Square Footage	Number of Floors	Flood Zone	# of Employees	Annual Energy Usag	Energy Usage Per Sq
21	15 Harborview Way	Childrens Beach/ Grandstand Concession	1970	720	1	Yes			
18	34 First Way	Community School							
20	11 Dionis Beach Road	Dionis Beach Bathroom	Unknown	0	0				
17	188 Madaket Road	DPW - Administrative Building	1998	2226	1	No			
34	188 Madaket Road	DPW - Garages	2001	13132	1	No	0		
35	188 Madaket Road	DPW - Sheds	1978	2664	1	No	0		

Figure 10: Database Building Facts

The building elements such as the walls, roof, windows, and HVAC are listed in a table in accordance with their corresponding category from our checklist as described in Objective 3. We assigned these elements to the facilities as records in a separate table. This record lists the facility, the element, the element type, the element quantity, a condition rating, an optional picture, and a comment.

Sort & Filter | Records | Find | Text Formatting

Building Information Sheet | Facility List | Element Evaluations

Facility	Attribute	Type/Exist	Quantity	Condition	Description	
Old Police Station	Cladding	Brick	1	4		(1)
Old Police Station	Foundation	Slab on Grade	1	3		(0)
Old Police Station	ADA Compliance	General	1	0	2nd floor is not accessible but 1st floor is	(0)
Old Police Station	Crawlspaces	None	0			(0)
Old Police Station	Electrical	General	1	3	Mains protected by fuses.	(6)

Figure 11: Database Building Elements

The “facility,” “attribute,” and “condition” are each a defined primary key (PK) chosen from a related table as shown below. The lines between tables represent relationships. All of the relationships are one-to-many. The condition field within the element evaluation table is a rating system we developed to simplify the status of a facility’s elements. The system is a scale from 1 to 5 with 5 being in the best condition and 1 being unusable. This system is broken down into more detail in Objective 3.

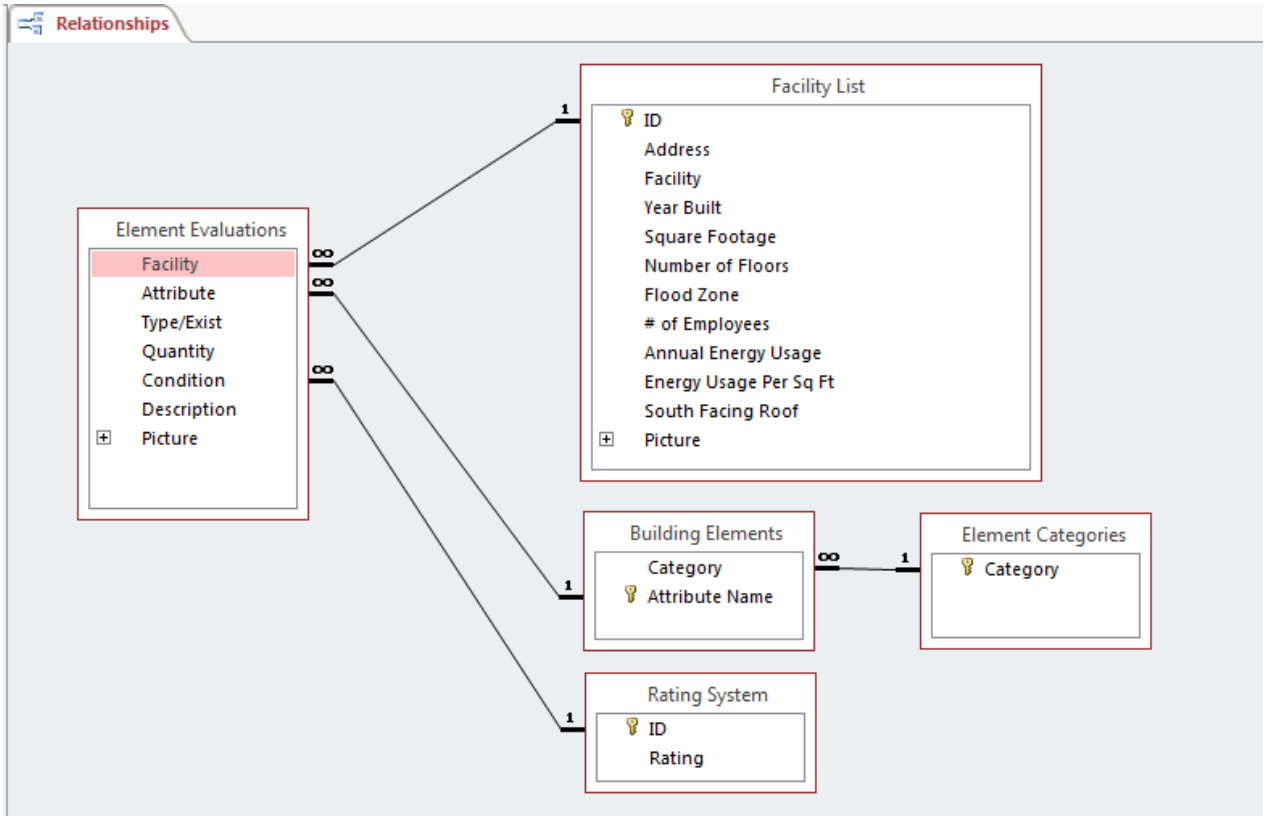


Figure 12: Database Table Relationships

We chose this relational approach, as opposed to listing all of the building information in separate columns and the facilities in separate rows, as structured in the standard building information table, for several reasons. This will enable more information to be related to a building element, such as maintenance history, without changing the way building elements are recorded. Also, this way, unique elements, such as special equipment, can be assigned to a building without having that field tied to other buildings without that piece of equipment.

To show all of the facility information, we created a report. The report is shown below in Figure 13. The report lists all of the core facility information, as well as a building picture. A building element's subform at the top of the report lists all of the available attributes for that building with all information for each attribute.

Detailed Building Information Sheet

Old Police Station

Date 12/16/2014

Core Building Info Subform:

ID	1	Parcel Number	
Facility	Old Police Station		
Address	20 South Water		
Year Built	1929	Square Footage	5153
Number of Floors	2	Full-Time Employees	3
		Part-Time/ Seasonal Employees	
		Annual Energy Usage in kWh	
		Annual Oil Consumption in Gal.	1527
		Energy Usage Per Sq Ft	

South Facing Roof No Flood Zone Yes

Building Elements

Cladding	Type/Exist:	Brick	Qty.	1	Condition:	4
Comment:							
Foundation	Type/Exist:	Slab on Grade	Qty.	1	Condition:	3
Comment:							
ADA Compliance	Type/Exist:	General	Qty.	1	Condition:	0
Comment:	2nd floor is not accessible but 1st floor is accessible. No elevator.						
Crawlspaces	Type/Exist:	None	Qty.	0	Condition:	
Comment:							
Electrical	Type/Exist:	General	Qty.	1	Condition:	3
Comment:	Mains protected by fuses.						
Encroachments	Type/Exist:	None	Qty.	0	Condition:	
Comment:							
Garage Bay Doors	Type/Exist:	Yes	Qty.	2	Condition:	2
Comment:							

Page 1 of 5

Figure 13: Database Building Report

For our fourth weekly meeting, in addition to our advisors and sponsor liaisons, we invited Libby Gibson, Nantucket's Town Manager, and Heidi Bauer, Town Procurement Officer, to review the draft database. We populated this version of the database with information from the facility at 20 South Water Street since the facility is located in the heart of the downtown area, and has substantial functional problems. It was also a facility for which we had relatively complete data and was thus a good case to illustrate the functionality of the database.

The draft database was well-received by all at this point. It enabled a quick lookup of information by facility, as well as provided expansion for future data. Our sponsors found this approach to be a presentable way of showcasing building details, and thus this became our approved pilot database, ready to be populated in full with the remaining facility information. The Nantucket Information Technology Department was able to give our team a network drive that we could access from the town's network. We split the database into a front and back end section and stored them on the network drive. The back end section held only the tables and relationships and was stored on the network drive. The front end section contained all of the queries, forms, reports, and macros. A copy was made for each team member to use. Splitting the database enabled multiple users to input facility information into the tables by using their copy of the front end, each linked to those tables.

At the week five meeting, Mr. Kester discussed with us his current system for keeping track of maintenance. Adding a maintenance section to the database wasn't part of the original proposal, but our sponsors expressed its potential usefulness to municipal facility management. With some back and forth throughout the week, we developed the criteria for a maintenance record. Each maintenance record contains the PK, service date, facility, building attribute, contractor used, contractor cost, part description, part cost, labor hours, labor cost per hour, and activity description. We simplified adding a new maintenance record by creating a popup window shown below in Figure 14. The form opens when clicking an "add a maintenance record" button from the maintenance navigation tab shown in Figure 16. The facility and building attribute are picked via a dropdown list linked to the facility and building attributes tables. The service date is easily picked with a small calendar popup.

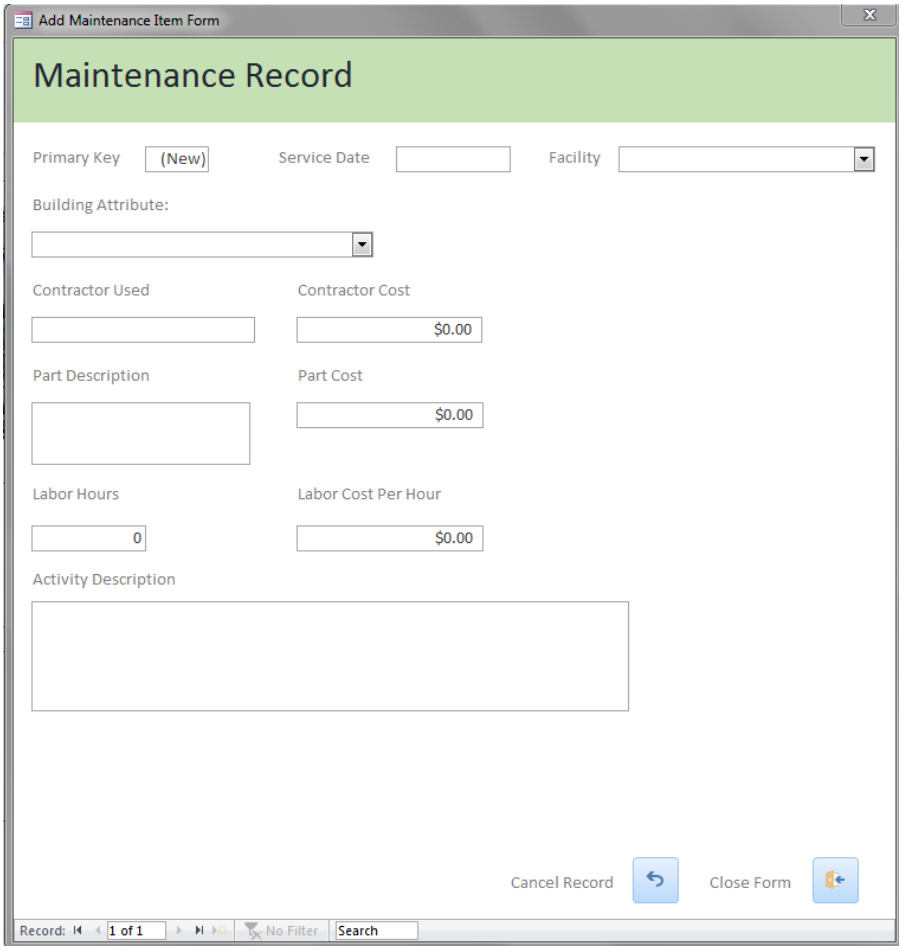


Figure 14: Maintenance Record Form

To view the maintenance history for a building, a facility is selected from a combo box on the maintenance navigation tab. Picking a facility name opens up a tabular form which lists all of the maintenance records vertically by service date. Here, any record can be changed or deleted. The maintenance history is presented in a continuous form shown in Figure 15 below.

Figure 15: Maintenance History

To aid in the navigation between forms and reports, we created a landing page. This page serves as the homepage and provides easy links to use the database's intended functions.

This page also explains what the database is set up to do and gives users without Access experience the ability to easily see its functions. The landing page is opened by a macro that is automatically run upon opening the Access file. As is shown below in Figure 16, the landing page has a tabbed section that splits up maintenance information and the information from our team's assessment, 'Facility Info'.

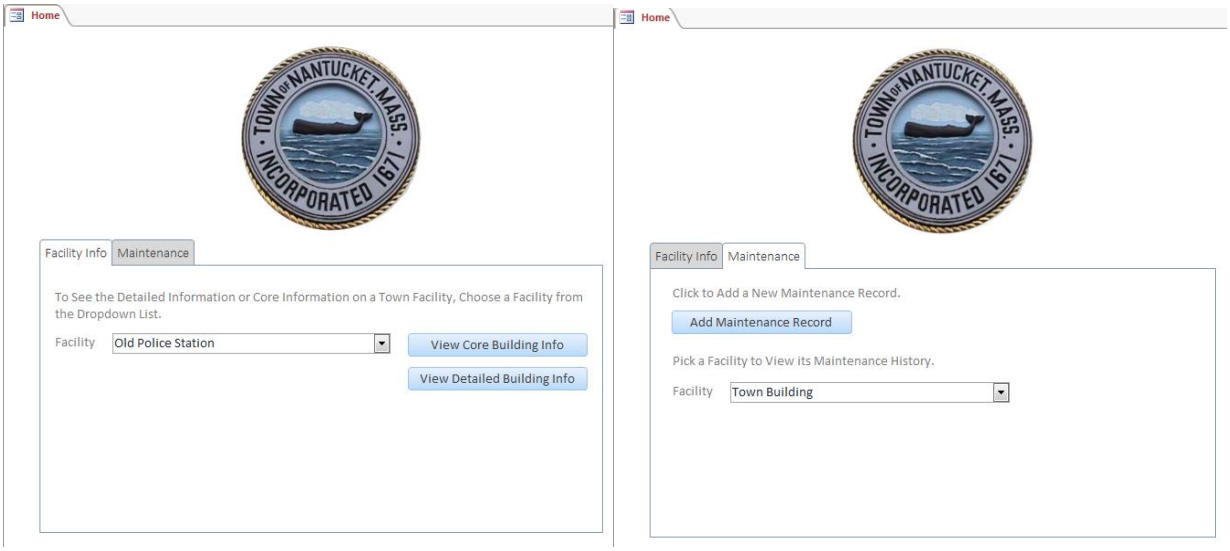


Figure 16: Database Landing Page

Objective 3: Conduct Facility Inventory and Populate Database

In order to begin populating the comprehensive database, we gathered and compiled the existing information from the Property Record Cards found on the town's online GIS maps. These cards include information on the addresses, sizes, ages, building material(s), and heating/cooling systems of the town's municipal facilities. Of course, this still left substantial gaps in the data. In order to fill in these gaps, we conducted site visits following a data collection protocol described below.

We created a site visit checklist that addressed a wide variety of building elements. We divided these building elements into the following categories:

1. Exterior structure
2. Surroundings
3. Exterior energy
4. Interior maintenance and components
5. Interior energy

For each feature in the checklist, there were spaces for “yes, this exists” (if yes, how many?), or “no, this facility does not have this feature”, and also a space for notes, such as specific feature types, issues, dimensions, etc. and an overall rating of the feature in accordance with an element rating system discussed later in this objective. The initial version of this checklist is in Appendix I.

After carrying out stakeholder interviews, the checklist was amended. Some items were added, while others were deleted. For example, we deleted an item on the historical accuracy of doors and windows because all town facilities would have been required to meet HDC standards when they were built or acquired. Conversely, we added an item on energy consumption per square foot. Updating the checklist was a continuously ongoing process throughout the duration of the project. The final draft of the site visit checklist can be found in Appendix J.

Once we determined the best way to collect and organize the data, we arranged how to gain access to buildings to execute our site visits. We coordinated with town employees, typically building managers or other town officials, to schedule times for site visits which lasted one to two hours. When conducting site visits, we met our guide at the designated building, and briefly reviewed the steps that needed to be taken to gather the necessary data. We then commenced data collection with our guide using paper forms to gather as much of the missing data as possible. We also took numerous photographs of exterior and interior features for each building.

Given the limited time that we had on the island, we generally tried to begin with buildings receiving the most public use and/or with the greatest urgency for repair, then worked toward buildings with less use or need for repair. We did, of course, vary with this order due to the timeliness of responses from our facility contacts as our schedule was much more flexible than theirs.

In order to gather information for the database, we conducted site visits of 19 town facilities (see Table 3) and completed comprehensive assessments of 17 facilities using the site visit checklist (see Appendix J).

We could not gain access to the interior of the Children's Beach Grandstand Concession and part of the Jetties Beach Facility, and thus could not fill out all pertinent parts of the checklist for those facilities. Due to time constraints and scheduling difficulties, we were unable to conduct site visits at the following facilities: Police Department Storage Garage, Police Department Housing (summer dorms), Employee Housing on 38 West Chester St., Siasconset Bathrooms, Dionis Beach Bathrooms, and Tom Nevers Sheds and Concessions. Additionally, our project did not include the six enterprise fund facilities. Seeing as maintenance performed in these facilities is typically internal (and is thus logged internally), they are generally well-cared for. If the records of these facilities need to be added to the database later, that can be done by Larry Kester, or an individual(s) appointed by him or Gregg Tivnan.

A complete list of the facilities we visited and dates of the tours is below in Table 3.

Property Name	**Contact Person/Tour Guide**	**Date**
NANTUCKET POLICE STATION (OLD)	Larry Kester	10/31/2014
TOWN AND COUNTY BUILDING	Larry Kester	11/19/2014
NANTUCKET FIRE DEPARTMENT MAIN BLDG	Chief Mark McDougall	11/5/2014
MADAKET FIRE STATION	Chief Mark McDougall	11/5/2014
SCONSET FIRE STATION	Chief Mark McDougall	11/5/2014
PUBLIC SAFETY FACILITY	Deputy Chief Charlie Gibson	11/14/2014
EMPLOYEE HOUSING (LIFEGUARDS)	Chief Sheila Lucey	11/19/2014
NATURAL RESOURCES DEPT	Jeff Carlson, Natural Resources Coordinator	11/10/2014
FINANCE DEPARTMENT	Martin Anguelov, Asst. Director of Municipal Finance	11/14/2014
HARBORMASTER BUILDING (MARINE & COASTAL RESOURCES)	Chief Sheila Lucey	11/3/2014

Property Name	Contact Person/Tour Guide	Date
SHELLFISH LABORATORY	Leah Cabral, Asst. Town Biologist	11/12/2014
PLANNING AND LAND USE SERVICES	Lynell Vollans, Administrative Specialist	11/12/2014
DEPARTMENT OF PUBLIC WORKS	Kara Buzanoski, Director	11/21/2014
NANTUCKET COMMUNITY SCHOOL & EARLY CHILDHOOD CENTER	Caitlin Waddington, Director	11/14/2014
CHILDRENS BEACH GRANDSTAND/CONCESSION	Larry Kester	11/20/2014
TOWN PIER	Chief Sheila Lucey	11/19/2014
EMPLOYEE HOUSING (LIFEGUARDS)	Chief Sheila Lucey	11/17/2014
VISITOR SERVICES	Kate Hamilton, Director & David Sharpe, Administrator	11/19/2014
JETTIES BEACH CONCESSIONS	Larry Kester	11/20/2014

Table 3: Site Visit Guides and Schedule

Another critical part of our site visit protocol was our rating system, which was developed in order to simply show the condition of a given facility feature. The system comprises a scale of one to five, with one being the worst and five being the best. Each number is fitted to a definition describing the physical condition of the item and how it meets the needs of the facility. These descriptions were assigned after completing four site visits and consulting with our sponsors. A specific breakdown of this system can be seen in Appendix K.

Objective 4: Determine Town Employee and Public Preferences

As noted previously, we conducted interviews with key stakeholders, to clarify their needs and opinions about the future of town facilities. Since these stakeholders utilize these facilities nearly every day, their opinions are extremely valuable. In addition to these face-to-face interviews, we developed an online survey for town employees to gather opinion about department locations, issues with parking, and concerns with buildings for employees and their ability to serve the public through these facilities.

In addition to the opinions of employees, we were also interested in collecting public opinion about the condition and use of town facilities, since public opinion will weigh heavily in future decision making. In order to do this, we posted a public survey on the town's website that focuses on department locations and facility issues like the adequacy of waiting space, parking, cleanliness, and so forth. Due to time constraints though, there was insufficient time to gather extensive information through this survey, but it will serve as a tool for the town to utilize in the future to better understand the public's viewpoint.

Survey Development

We developed a survey instrument for both the town employees and the general public and determine the different types of questions. We chose to use Google Forms because survey results are very easy to read and format, are consolidated into a convenient spreadsheet, and can be viewed by anyone with the link. We developed the initial questions in consultation with our advisors and sponsors to ensure the questions addressed the key topics of concern and were constructed as clearly as possible. We included a preamble explaining the purpose of the survey and that it was entirely anonymous.

Pretesting

We pretested the survey by asking several of our fellow students on Nantucket to complete the survey and comment on the clarity of questions asked and the duration of the surveys. For the pretesting versions of these surveys, the following questions were asked at the conclusion: 1) "Were you confused by any of the questions? If yes, which question(s)? Please explain your confusion." 2) "Did you feel that the survey was of reasonable length?"

We took these responses into consideration and additionally worked with our sponsors and advisors to improve the survey instrument, balancing the need for more information against the need for concision. The final versions of the employee survey can be found in Appendix L and the public survey in Appendix M.

Implementation

Since we did not have access to town employee email accounts, Erika Mooney, Executive Assistant to the Town Manager, sent the employee survey to 125 employees on our

behalf, including those of enterprise funds, but excluding public schools. The survey was sent out on November 20, 2014, with a follow up email sent on November 28. When we closed the survey on December 2, we had collected 70 responses. We decided to close the survey on this date to allow sufficient time for analysis.

The Google form for the Public Survey was posted on the Nantucket Town Website on December 11, 2014. Jason Bridges, the town's Public Outreach Coordinator, sent out the link to the survey as a news flash to 391 subscribers and set up a webpage on the town's website. Public survey responses were collected in the same manner as the Town Employee Survey. We collected 24 responses so the results of this survey were discarded as we were unable to make generalizations about them.

Objective 5: Recommendations

Once all the data were gathered, we analyzed each facility, keeping structural and space needs in mind. We did not take into consideration any sort of financial component. Based on these analyses, we divided the facilities into four priority levels:

- Level I - Facilities in Poor Condition
- Level II - Facilities in Moderate Condition
- Level III - Facilities in Good Condition
- Level IV - Newly Constructed, Recently Renovated, or Under-Renovation Facilities

Further descriptions of each of these levels can be seen in the Findings section. In general, facilities with the highest public usage or value to the town (for example the Fire Department) with the worst structural and/or space conditions were of greater priority. We recommended a time frame for repairs and renovations of each of these priority levels.

To address the space needs of the facilities, we took into consideration not only our personal observations from conducting site visits, but primarily the responses from our surveys and stakeholder interviews. This section consists of suggestions for departmental relocations

and consolidations based on the concerns and opinions expressed to us. If survey and interview results were consistent with our personal findings that two departments should be in one location, or that a specific department would be better located out of town rather than downtown, then we recommended it.

We then made recommendations on the importance of consistent maintenance and updates of the database described in Objective 2. Furthermore, we made recommendations about energy efficiency in the town's facilities and the importance of public forums to continue gathering public opinion on facility uses and future plans.

Findings

Introduction

In this section, we discuss our various findings regarding the overall design of our database, as well as our site visits to Nantucket's town facilities. We discuss how the design of the database was largely influenced by suggestions gathered from interviews and meetings with our project liaisons and other key stakeholders; then, we discuss findings pertaining to our population of the database. We present various facility issues found during site visits, discussions with key stakeholders and site visit guides, and responses to our town employee and public surveys. We begin with several general summaries of facility-wide issues, and then funnel down to specific issues within each facility. These findings are the core of our project, and will serve as the basis for our recommendations in the subsequent section.

Database Design

While interviewing stakeholders, we first focused on gathering ideas and opinions regarding the design, accessibility, and user-interaction of the database. Stakeholders expressed their need for an easy-to-read database that would require only a minimal learning process. Many stakeholders made suggestions of attributes that could be included in the database. For example, Lauren Sinatra requested the inclusion of potential energy upgrades in facilities, as well as the electrical usage, oil consumption, and account numbers for both.

Our sponsors have a long-range vision of making facility information from the database accessible through the town website. They want the public to be made aware of various facility conditions and issues that are not typically seen by the public. However, the technical knowledge required for website application development and database programming fell far beyond the timeframe and scope of our project. One of the benefits of using reports, a feature of Access, is the ability for building information to be easily printed on to a pdf or other file type. Employees in charge of the Town website could then easily upload the pdf for each building to the website; this would showcase the various facility problems and issues to the public.

We found that the addition of maintenance records, another database feature, would significantly help the town with capital planning. These maintenance records will help to keep track of when, where, and what maintenance was performed on a facility, who performed it, and how much it cost. Database queries enable each building's maintenance record to be searchable by different parts of the record, such as by date, to view the total cost of maintenance per year.

Regarding the actual data within the database, we found that there were limitations as to how in-depth we could analyze certain categories of data. Given our limited time and experience, we could not assess code violations or assign entirely accurate condition ratings on the following data items: boilers, heating and cooling systems, electrical systems, oil storage tanks, or general structural integrity. Condition ratings assigned to any of the aforementioned data types were based on appearance and/or comments and feedback from site visit guides and facility employees. While conducting site visits, in addition to filling out the checklist, we spoke with our guides, who are also stakeholders, about glaring issues with the facilities, key positive things about them, and wishes and/or ideas for improvements.

In regard to who will be able to view and/or edit this data, the general consensus from our stakeholder interviews was that the ability to edit the database should be limited to a few key town employees, but that information within the database should be available to the general public. There was mention from multiple stakeholders, however, that the publicly viewable content should be narrowed to exclude more sensitive information. For example, a detailed maintenance record for the boiler in a given facility may be very useful for a boilermaker or inspector who is doing work in the facility; however, without limited access to the database, such information could be accessed and potentially misconstrued by a citizen who has no background knowledge on such a subject. While a number of people (to be decided upon by Libby Gibson, Gregg Tivnan, Larry Kester, and Heidi Bauer) will be able to view the entire database, we decided that only a limited number of people should have permission to edit the database; most importantly Larry Kester and Gregg Tivnan. This will ensure that any data and/or pictures being added to, removed from, or edited within the database will be

controlled and monitored by only a handful of qualified individuals; this will help prevent tampering of data, biased data, or unintentional overwriting of existing data.

Facilities: Site Visits and Survey Responses

In conducting our site visits, we discovered the existence of general issues encompassing many or all of the town's facilities, such as limited parking, a lack of accessibility, inadequate meeting space, and inconvenient location. Additionally, we came upon many issues that were specific to each facility, like space needs and structural damage.

General Issues

In Nantucket's downtown area, there is a severe lack of parking, but a significant portion of the town's municipal facilities are located here, creating a high demand in a place with a small supply. The Town Building, Old Police Station, Visitor Services, and Human Resources are all located on one block that only has two hour street parking. The results of the town employee survey, as well as multiple conversations with stakeholders, showed that parking is a common and pressing concern. One responder noted that "the lack of proper parking for employees and the public makes work inefficient. During the summer months employees...drop everything to move their cars to avoid being ticketed, which is a 10-20 minute loss of productivity every two hours." Many employees tend to park in the lot behind the Finance Building on Washington Street as it is just outside of the center of town and within walking distance; but in the summer months this public lot fills very early, often leaving those working in the Finance and Harbormaster buildings without sufficient space, or if they have to attend a meeting across town they cannot find parking on their return.

The town's parking issues do not end in the downtown area. At nearly all of our site visits, many of which were outside of downtown, there were concerns expressed about parking. Specifically, at all three of the fire stations, primarily the satellite stations, there is inadequate parking in the event of an emergency. At the Madaket Station, the only possible parking space for emergency responders, that would not block the fire engine, is an unpaved, overgrown space that can fit one vehicle (see Figure 17). At the Siasconset Station, the two possible parking spaces are the driveways in front of the two fire engine garage bays; should emergency

responders park in these spaces, the fire engines would again be blocked. There are also frequent issues with drainage in parking lots, including those at the Natural Resources Department, the Main Fire Station, the Community School, and the Finance Building (see Figure 18).

Figure 17: Parking at the Madaket Fire Station

Figure 18: Poor drainage at the Finance Building

An additional issue spanning across multiple facilities is handicap accessibility and compliance with the American Disability Act (ADA). The PLUS building has a major issue with accessibility due to a large step at the front entrance (see Figure 19). The bathrooms are non-accessible and the offices are so tightly spaced that navigation with any sort of walking disability could be extremely difficult or at the very least hindered. The frequent public use of this facility demands that this issue be addressed. There are similar issues in many other facilities: those located in the downtown area may only be accessed by utilizing the brick sidewalks which are often uneven or broken. Moving outside of the downtown area, the DPW Administrative Building has a ramp at the front entrance, but has a tight 90-degree turn that could be extremely difficult to navigate for larger wheelchairs (see Figure 20). The majority of town facilities do not have automatic or even wide enough doors, and many lack elevators and handicap accessible bathrooms.

Figure 19: Large step at entrance of PLUS

Figure 20: Tight ramp at DPW Administrative Building

Aside from parking and accessibility issues, many of the town facilities also lack adequate communal and meeting spaces. This is a major inconvenience for town employees and their associates, and often hinders them from conducting comfortable, productive meetings. One such facility with this issue is the Harbormaster Building. According to the Harbormaster, summer staff meetings include up to 50 people, but the facility's conference room can seat only 15 (see Figure 21). Across the road at the Finance Department, the only communal area is a small table in the corner of an employee's office; at best, only four people can be seated at this table (see Figure 22). Similar issues exist at the Town Building, Visitor Services, and the DPW Administrative Building.

Figure 21: Meeting space at Harbormaster Building

Figure 22: Meeting space at Finance Building

Survey Responses: Location

In addition to the information gathered from conducting site visits and personal interviews, many valuable opinions were brought forth as a result of the town employee online survey. We received a total of 68 responses from town employees. One part of this survey asked employees for their opinions regarding the locations of town facilities and functions, so as to potentially incorporate these responses into consolidation-related recommendations. The most outstanding response to this question was that Visitor Services should remain downtown; 88% of responders believe that it should remain downtown, and the other 12% is indifferent.

Other responses to this question were rather consistent with responses in stakeholder interviews and discussion with site visit guides. Many of the responses regarding requisite town functions (i.e. Assessor, Finance, Registry of Deeds, Procurement Office, Town Administration, and Town Clerk) recommended that they stay in town, seeing as they have been there since the town's inception. This question did yield particularly controversial responses in regard to the Massachusetts Registry of Motor Vehicles; responses were split almost equally between "stay in town" and "relocate." This office is currently located in the Town Building; this frequently causes congestion in the hallways, as well as significant parking issues. One survey responder noted:

> RMV is a tenant of the Town. Relocating them to the 2 or 4 FG complexes makes good sense. 1) Most people have to have their vehicle with them when visiting

the RMV. There is ample parking at 2 or 4 FG which they currently do not have. 2) Moving the RMV frees up a substantial amount of square footage that could be utilized by town offices.

Six percent of respondents think that the police department and one percent of respondents think that the fire department should move back into the downtown, where they have been located previously. Several responses indicated a need for some sort of satellite station downtown so as to increase emergency response times. This contradicts other responses which state that the town should "take the congestion out of the town area" and "relocate all core departments to one location with ample unrestricted parking…" Overall, these survey responses provided us with substantial insight into the mindset of the town employees, who work in and use these facilities on a daily basis. Responses regarding facility and departmental relocations will be further elaborated on in the Recommendations section.

Classification of Town Facilities by Condition

After completing our site visits, we organized each facility into one of four condition levels: I) Facilities in Poor Condition, II) Facilities in Moderate Condition, III) Facilities in Good Condition, IV) Newly Constructed, Recently Renovated, or Under-Renovation Facilities. Facilities were put into their respective categories based on criteria summarized in paragraphs at the beginning of each section. For each facility in a given level, we have included specific pieces of information that highlight key issues. In the following lists, we also included information from the town employee survey for the buildings that we felt received adequate responses; these include the Town Building, PLUS, and the Finance Department. We did not receive enough responses for the remaining facilities to speak for the majority of their employees.

Level I - Facilities in Poor Condition

Over the course of our site visits, we found each of these facilities to be in overall poor condition. These facilities have either one or both of the following traits: 1) Space issues that severely inhibit traffic flow throughout the building and/or employees' abilities to work comfortably and efficiently; 2) Structural and/or physical problems that largely compromise the

structural integrity of the building, jeopardize the safety of building occupants, and/or severely diminish the energy efficiency of the building. Key stakeholders interviewed about these facilities expressed the need for significant renovations, or entire rebuilds, in the very near future. Figures 23, 24, and 25 below illustrate some of the very poor structural and physical conditions that are characteristic of the facilities in this level.

Figure 23: Condemned staircase at 20 South Water St

Figure 24: Messy attic at PLUS

Figure 25: Water damaged brick veneer at main fire station

Planning and Land Use Services (PLUS)

Figure 26: PLUS

The PLUS Building, located at 2 Fairgrounds Road, was constructed in 1969. The building is a pre-engineered warehouse and garage, consisting of a steel frame. As suggested by its name, it is currently used for Town Planning and Land Use purposes. The primary issues of concern that we identified include:

- Metal shell is rusted and uninsulated (in 48th year of intended 50 year lifespan) (see Figure 27);
- Building uses inefficient electric heat;
- Lack of moisture control and garage design makes building ill-suited for storing important files;
- 20 full time employees and one seasonal employee jammed into front-end of facility with less than 4,000 square feet for offices, meeting space and conference rooms, bathrooms, and copying room (see Figure 28);
- Inadequate meeting space to review and sign plans and documents;
- Non accessible bathrooms;

- High roof that causes heat loss due to larger temperature gradient; and,
- Front entrance is not wheelchair accessible due to large step and lack of automatic doors (see Figure 29).

Figure 27: Rusting building shell

Figure 28: Cramped office space

Figure 29: Non-ADA compliant entrance

People have been satisfied with its location outside of downtown. Seventy percent of 68 employees who responded to our survey stated that the PLUS should be located outside of town. People also benefit from the PLUS being located near the complex at 4 FG. Employees and the public go back and forth between 4FG and 2FG to interact with the Deeds Department, and to utilize meeting space.

We received 12 responses from employees who work in the PLUS building and asked them to rank 12 different attributes regarding their facility. The responses for each attribute varied significantly (for example, storage space received a 1 and a 5 from two separate employees) and the averages of the respondents' ranks can be found in Figure 30. Considering that a 1 is poor and a 5 is excellent it is very telling that the average of only three attributes' responses were higher than a 2. Evidently, employees are reasonably pleased with the parking situation and believe there is adequate storage, but the facility is rated poorly on most other attributes. The open-ended responses were also very informative and the anonymity allowed employees to fully express their opinions. Regarding communal areas, one survey response was that "there are hardly any employee communal areas and those that are designated as 'lunch space' are dingy and dirty." Although most aspects of the building did not receive high scores, regarding the question "How does the location of your department affect your ability to do your job efficiently?" the average response was a 3.7. This is likely due to the fact that these

departments are away from downtown, have ample parking, and enjoy relatively easy interdepartmental communication and cooperation.

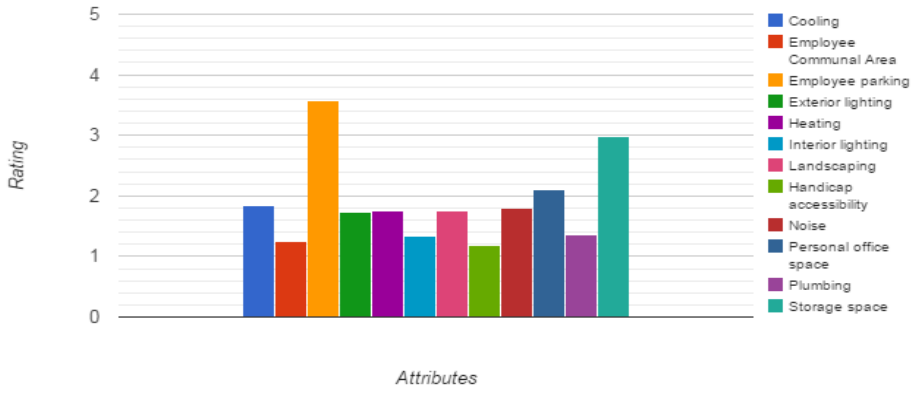


Figure 30: Average Employee Attribute Rating for PLUS Building

20 South Water St. (Old Police Station)

Figure 31: 20 South Water St

The facility located at 20 South Water Street, was constructed in 1929. Having served as both a fire and police station in times past, the building is constructed with a masonry frame. It currently hosts the Sheriff's Office, holding cells, and an administrative office, and serves as venue for various community events. The town has previously considered demolishing the building, but the HDC denied the request as it is a structure of historical significance**.** The primary issues of concern that we identified include:

- Currently occupied by only three full-time employees (only use approximately 1000 of the 5200 square feet);
- Drywall deteriorating and insulation falling through ceilings and walls;
- Exposed electrical wires and uninsulated pipes;
- Multiple holes in walls and floors;
- Significant water damage on ceilings/walls, especially second floor (see Figures 32 & 33);
- One of two staircases is condemned according to Facility Manager, Larry Kester;
- Many unused/unidentified wiring systems still in place (see Figure 34); and,
- Outside trim and windows are deteriorating (i.e. rust and rotting wood).

Figure 32: Water damaged ceiling

Figure 33: Water damaged ceiling

Figure 34: Messy IT room

Town Building

Figure 35: Town Building

Nantucket's Town Building, located at 16 Broad Street, was built in 1964. The building, constructed with a masonry frame, is one of Nantucket's most frequently used and visited buildings. It currently hosts the Town Procurement Office, Town Clerk, Town Administration, Registry of Deeds, Registry of Motor Vehicles, Courthouse, and Energy Office. The primary issues of concern that we identified include:

- Leaking water circulators;
- Boiler room floor does not drain properly;
- Asbestos is present in the building's slate tiles, stucco ceiling, and radiator backing boards (*Report for Hazardous Materials Identification Survey at the Town Hall Nantucket, Massachusetts*, 2014);
- The building's only security system is located in the upstairs courtroom area;
- Significant lack of waiting space throughout building - waiting people often spill out on stairs, within the court security area, and outside of the building;
- Lack of meeting space – only two conference rooms (one is private and the other comfortably fits about eight) (see Figure 36);
- Some windows cause noticeable heat loss to office spaces; and,
- Lack of parking, notably in summer months (see Figure 37).

Figure 36: Limited meeting space

Figure 37: Limited parking

We received 13 survey responses from employees of the Town Building. An average of the respondent's ranks can be found below in Figure 38. Like those of the PLUS, the responses varied significantly, and provided many insightful opinions. The average ranks given to the various attributes were much higher than those of the PLUS (only two attributes scored lower than a 2). Although we grouped this building in the same category as the PLUS, it was largely due to the lack of departmental organization rather than structural deterioration. One response summed these problems up: "Very little storage space in the Town Building, things pile up fast. Town building is stuffed with offices that need to be here but there is no room for storage or communal areas. Little meeting space as well..." The location, however, is generally good for employees and the public, with the average rank being a 3.2. Nearly all respondents mention that the most significant problem with the location is parking, with waiting and meeting spaces being identified as the next most prominent issues.

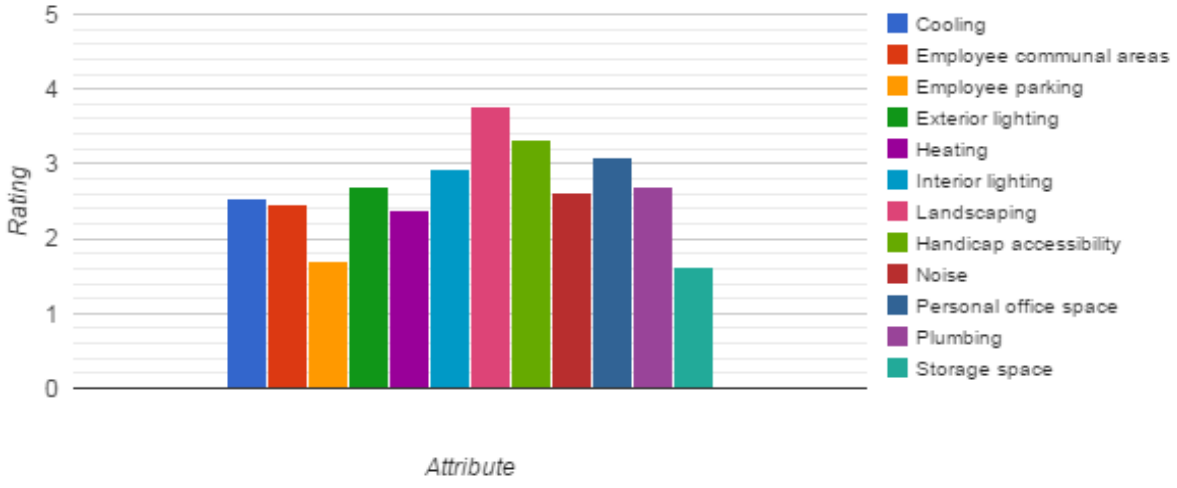


Figure 38: Average Employee Attribute Rating for Town Building

Fire Station (131 Pleasant St.)

Figure 39: Fire Station

The central fire station, located at 131 Pleasant Street, was constructed in 1979. The building is composed of a wood frame and brick veneer. With its island-central location, hence its name, this building serves the island's main fire station. The primary issues of concern that we identified include:

- Water seepage through non-waterproofed brick veneer and rotten wooden frame;
- Termite damage to wooden structure;
- No separate male and female sleeping quarters - deputy chief gave up office to provide only female firefighter with sleeping quarters;
- Current sleeping quarters are at maximum capacity (see Figure 40);
- Upstairs office space was originally designed as a storage area, has only one means of egress, and is not handicap accessible (see Figure 41);
- Equipment in call/communications station is outdated;
- Diesel and oil storage tanks will need replacement in the next 5 years;
- 2,000-gallon oil tank was supposed to be removed in 2000 per code, but is still in use;
- Parking lot is shared with the public and has poor drainage - this creates significant parking difficulty for employees, especially when flooded and several spaces are unusable;
- Fume extraction system is broken and needs significant repair; and,
- Garage bays are filled to capacity with emergency vehicles and equipment (see Figure 42).

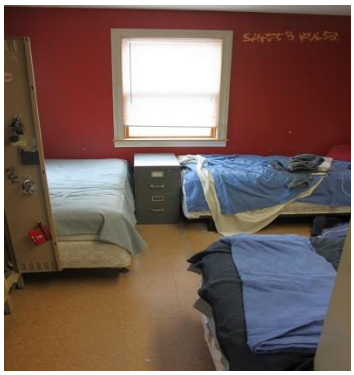


Figure 40: Cramped sleeping quarters

Figure 41: Cramped office space

Figure 42: Packed garage bays

Town Pier

Figure 43: Town Pier

Nantucket's Town Pier, located behind the Harbormaster Building at 38 Washington Street, was constructed in the 1980's and '90's. Constructed entirely of wood, with the exception of steel pylons used to anchor the floating docks, the pier serves as Nantucket's primary destination and docking point for private boats. The primary issues of concern that we identified include:

- Main pier constantly faces strong, harsh weather from east because harbor is open to ocean;
- Two steel batter boards at end of pier are the only defense from wind and waves;
- Cross bracing is in need of replacement and deteriorated piles along the breakwater need to be replaced (GZA GeoEnvironmental, 2013) (see Figure 44);
- Wood decking is extremely worn and beginning to rot in some areas (see Figure 45);
- Many pylon guards on wood pylons are extremely aged/ in need of replacement;
- Harbormaster would like to see existing pier demolished and replaced with a concrete one, or see all wood pylons replaced (at a rate of 10 pylons per year);
- 19 floating docks have been installed to accommodate more boats - meant for use in lakes/ ponds and are not suited to handle strong winds and waves;
- Sub-sections of floating docks snap apart due to rusting at joints and strong weather - many sub-sections have been largely damaged (see Figure 46);
- Several locations on floating docks have been re-decked to replace rotting/ broken wood;
- Steel pylons have been deemed structurally sound by engineer and can be kept for re-use if remainder of pier is demolished;
- Main pier and floating docks together host a total of 100 boat slips; and,
- Home to the only dinghy dock in town.

Figure 44: Broken bracing/rotting pylon

Figure 45: Rotting decking

Figure 46: Rusting connections

Level II - Facilities in Moderate Condition

In completing our site visits, we found each of the following facilities to be in moderate condition. Facilities in this category typically have little to no significant structural defects, and minimal physical or cosmetic problems that could be addressed with relative ease. We found that the space needs issues in these facilities were generally more prominent than structural or physical problems. These issues range from little to no communal space, to storage space inadequacies that could ultimately cost the town thousands of dollars. In conducting interviews with key stakeholders regarding these facilities, it was generally expressed that, although these facilities do not have issues that jeopardize structural integrity or occupant safety, they will need improvements in the foreseeable future in order to best serve their intended functions. Figures 47, 48, and 49 below illustrate some of the varying issues, especially in regard to space needs, that are characteristic of the facilities in this level.

Figure 47: Inadequate storage space at Visitor Services

Figure 48: Inadequate covered storage space at DPW

Figure 49: Expensive equipment stored outside at DPW

Visitor Services

Figure 50: Visitor Services

Nantucket's Visitor Services building, located at 25 Federal Street, was constructed in 1950 and has a wood frame. The building serves as a primary source of island information for newcomers and people who are unfamiliar with all of the island's offerings. Important aspects of this facility that we identified include:

- Great location - close to ferry docks, and in center of downtown; home to public bathrooms in the downtown area;
- Poor heating - during winter, employees must wear layers of clothing and coats to stay warm, and during especially harsh winters, pipes freeze;
- No communal staff space;
- Inadequate office or storage space;
- No interior doors - not possible to have private offices or quiet; and,
- Exterior doors have large gaps, broken knobs, and do not open or close properly.

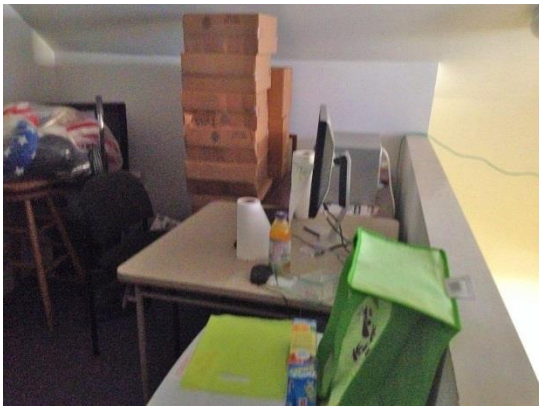


Figure 51: Cramped break room

Children's Beach and Concession

Figure 52: Children's Beach

Children's Beach and Concession, located at 15 Harborview Way, was constructed in 1970 and has a wood frame. This facility provides food, beverages, bathrooms, and seating for those using Children's Beach, or the facility's playground equipment, stage, or grass area. The primary issues of concern that we identified include:

- Needs new side shingles in some areas;
- Building is located in a flood zone, but is sufficiently raised off of the ground;
- Two bathrooms located in building are inadequate for their frequent seasonal usage;
- Location of sewer pipe and connection to sewer main are unknown - this will largely inhibit the DPW's ability to address related issues in a timely manner;
- Location of irrigation lines within grass area are unknown - tent stakes, etc. are inadvertently driven into these lines, and damages go unnoticed for days or weeks;
- Security issues with area surrounding the building - vagrant citizens often take advantage of the poorly lit area; and,
- Playground is outdated and in need of replacement - of large concern is its wood construction, which poses a splinter hazard to users.

DPW Sheds

Figure 53: DPW Sheds

The DPW's sheds, located on DPW property at 188 Madaket Road, were built in 1978. These wood-framed buildings, some of which are portable, serve as space for both storage and employee functions. The primary issues of concern that we identified include:

- Two of these sheds are outdated portable classrooms;
- Used for storage, communal space, offices, and break rooms;
- Insufficient space to serve all necessary functions; and,
- Several sheds are unheated and in significant disrepair - the door for one of the sheds is constructed from a piece of plywood and section of rope.

Figure 54: Break room/communal space

DPW Garages

Figure 55: DPW Garages

The DPW's garages, located on DPW property at 188 Madaket Road, were built in 1978, with the exception of the Fleet Maintenance Garage being built in 2001. These garages, varying between wood and steel frames, store DPW vehicles, equipment, and serve as maintenance areas for both of these. Important aspects of this facility that we identified include:

- In generally good condition from a structural standpoint;
- Garages do not provide adequate space to house all of the town's equipment - multiple trucks and pieces of equipment are left outside and exposed to weather (see Figure 56 and 57);
- Inadequate storage space for spare parts for equipment; and,
- Inadequate space to house equipment needed to repair vehicles - it is time-inefficient to not have all equipment on hand, seeing as it already takes, on average, 4-6 weeks for repair requests to get through the procurement process.

Figure 56: Expensive equipment stored outside

Figure 57: Garage nearly at capacity

Harbormaster Building

Figure 58: Harbormaster

Nantucket's Harbormaster Building, located at 34 Washington Street, was constructed in 1988 and consists of a wood frame. The building hosts public bathrooms, offices and meeting space for the Harbormaster and dock workers, and storage space for various marine and lifeguard equipment. Important aspects of this facility that we identified include:

- Building contains public bathrooms - used by up to 500 people on an average summer day; mostly from private boats that dock at the town moorings;
- Bathrooms are entirely usable and ADA compliant, but do not offer an aesthetically pleasing first impression of the island (see Figure 59);
- Communal staff space overflows in summer season;
- Building is used as office space for harbormaster, lifeguards, and dock boys;
- Lack of emergency power - in a power outage, the Harbormaster must bring her personal generator to the building to maintain contact with police station, including radios and surveillance cameras;
- Building floods frequently, especially during storms (see Figure 60);
- East facing doors and windows on second floor leak water and are rotting (see Figure 61); and
- ADA ramp railing needs to be replaced.

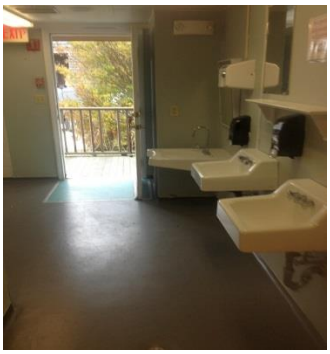


Figure 59: Female bathrooms

Figure 60: First floor flooding

Figure 61: Silicone seal

Level III - Facilities in Good Condition

During our site visits, we found each of the facilities in this category to be in overall good condition. These facilities do not have any structural problems, but in some instances have very

minor physical damages, such as occasional ceiling leaks or worn side shingles. Any space needs issues in these facilities typically pertain to a lack of adequate storage space. Based on feedback from stakeholder interviews, we found that these space needs issues are not severe at present. However, they may become more severe within several years if left unaddressed. From these interviews, we also found that employees in these facilities are generally content with their overall work environments and facility layouts. Figures 62, 63, and 64 below illustrate some of the inadequate storage spaces and minor physical problems that are characteristic of the facilities in this level.

Figure 62: Filing cabinets in the bathroom

Figure 63: Excess files at the Finance Department

Figure 64: Ceiling leak in the DPW Administration offices

Natural Resources Building

Figure 65: Natural Resources Department

Nantucket's Natural Resources Building is located at 2 Bathing Beach Road. The entire building has a wood frame, with its main structure being built in 1950, and a series of additions being added at later points in time. The building hosts office and storage space for the Town's Natural Resources Department. Important aspects of this facility that we identified include:

- Comprised of a series of three additions;
- Only one office for four full-time employees;
- Severely inadequate storage space for permit files - one wall of the bathroom is lined with filing cabinets;

- Building is located in a flood zone - does not usually flood due to pitch of land up to doors; and,
- Parking lot often floods during storms.

DPW Administrative Building

Figure 66: DPW Administration

The DPW's Administrative Building, located on DPW property at 188 Madaket Road, was constructed in 1998 and consists of a wood frame. This building serves as the administrative center for the DPW and is located next to the island's landfill. Important aspects of this facility that we identified include:

- Built more recently than many of the town's other facilities;
- Structure is in overall good condition;
- Cathedral ceiling in main entrance causes issues with heating - space heaters are often used to keep employees warm;
- Sufficient office space for the current staff in the building, however, space will be very tight should the facility reach its intended capacity;
- Oil and diesel storage tanks on the property are 18 years old - will need to be replaced within the next two years;
- Building's close proximity to other DPW buildings and landfill is convenient for employees; and,
- One leak area in the ceiling of the DPW Director's office due to a bad seal where two sections of the building, having two different heights, conjoin.

Jetties Beach Concession

Figure 67: Jetties Beach Concession

Jetties Beach Concession, located at 4 Bathing Beach Road, was constructed in 1890 and consists of a wood frame. This facility provides food, beverages, bathrooms, and seating for those using Jetties Beach. The building also hosts a bar on its water-facing side. Important aspects of the facility that we identified include:

- Building has very few issues and is in generally good condition;
- Some railings are showing signs of wear, but are still in fair condition; and,
- Kitchen ceiling is showing signs of wear and aging - water stains, grease, and mold.

Madaket Fire Station

Figure 68: Madaket Fire Station

The Madaket Fire Station, located at 293 Madaket Road, was built in 1981 and consists of a wood frame. This building serves as one of two satellite stations to the Central Fire Station, and houses a single fire truck and various firefighting equipment. Important characteristics of this facility that we identified include:

- Seldom used by fire department;
- Inadequate parking - only one, overgrown parking space exists; and,
- Siding and roofing recently replaced and in good condition.

Finance Building

Figure 69: Finance Building

Nantucket's Finance Building, located at 37 Washington Street, was constructed in 1977 and consists of a wood frame. This building, located just out of the downtown area, currently hosts office and storage spaces for the Town's Finance Department. Important characteristics of this facility that we identified include:

- Overall good condition with very few significant problems;
- Building lacks a second staircase;
- Lack of sufficient storage space - minimal remaining storage space in attic; boxes of paperwork are stacking up on top of file cabinets on second floor;
- Inadequate meeting space/ communal area - the only meeting space is located in a portion of an employee's office;
- Building contains no break area; and,
- Inadequate parking during summer due to parking lot being shared with public.

There were a total of 11 employees from the Finance Building that took the town employee survey. An average of the respondent's ranks can be found below in Figure 70. The building underwent a complete overhaul in 1995, and despite being nearly 20 years ago, is much less outdated than other facilities. All of the attributes received a rank higher than a 2

with the exception of “storage space,” and all but three of the attributes ranked higher than a 3. Also, employees are generally content with the location of this building, with the average rank for this attribute being a 3.8; one response states that,

> It is away from the hubbub of downtown. Previously, when housed at 16 Broad Street, we were often inundated with tourists seeking trivial information and the location of public restrooms which was very disruptive. Being on the edge of the ‘core’ district allows us to still be considered ‘in town’ yet the volume of walk-ins has significantly been reduced which has been an improvement for productivity.”

The Financial Department’s current location is desirable, as it is still close enough to Town Administration, but is still a separate entity and avoids most of the disruptive downtown traffic.

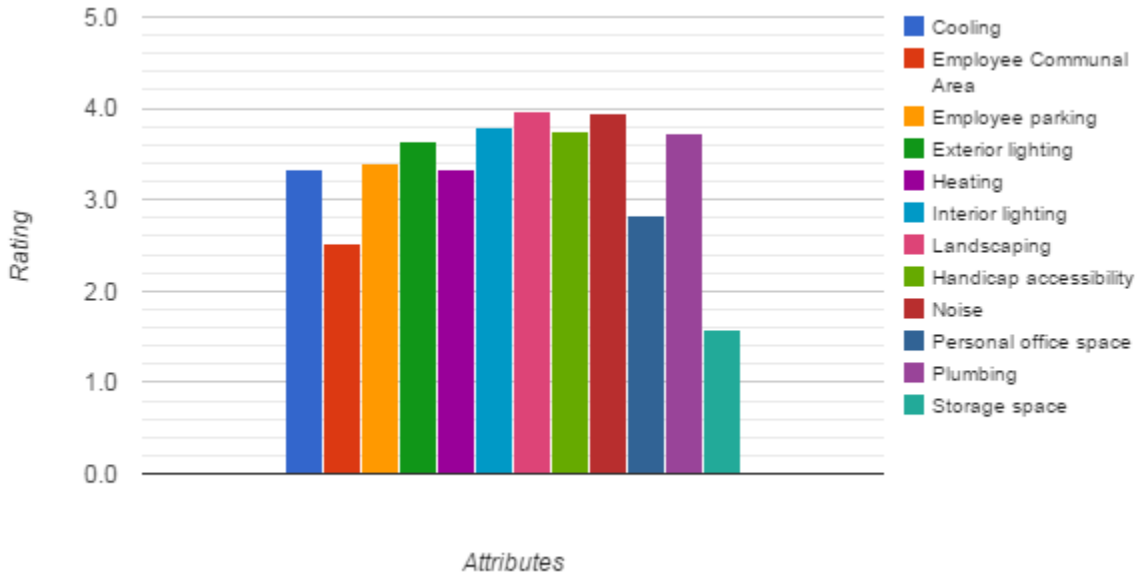


Figure 70: Average Employee Attribute Rank for Finance Building

Female Lifeguard Housing

Figure 71: Female Lifeguard Housing

The Female Lifeguard Housing, located at 109 Washington Street, was constructed in 1970 and consists of a wood frame. This building hosts the Harbormaster's female lifeguards in the summer months. Important aspects of this facility that we identified include:

- Inadequate space to serve its purpose - designed to house four people but houses eight;
- Kitchen was just redone and is in great condition;
- Walls are not well-insulated - not an issue seeing as it is only used in the summer; and,
- Aging upper deck.

Level IV - Newly Constructed, Recently Renovated, or Under-Renovation Facilities

Upon completing our site visits, we determined that the facilities in this category are either in like-new condition, currently being renovated, or are being renovated or improved upon in the near future. With this being said, these facilities generally do not have any structural, physical, or space needs issues that are not already being addressed. Figures 71, 73, and 74 below illustrate some of the recent renovations, and renovations-in-progress, that are characteristic of the facilities in this level.

Figure 72: Roof construction at Siasconset Fire Station

Figure 73: Remodeled dining area in male lifeguard housing

Figure 74: Rebuilt wall frame in Shellfish Lab

Public Safety Facility

Figure 75: Public Safety Facility

Nantucket's Public Safety facility, located at 4 Fairgrounds Road, was constructed in 2010. This building hosts the Nantucket Police Department, as well as two community meeting rooms. Notable characteristics of this facility that identified include:

- Building is in like-new condition with no obvious issues;
- Includes a new public community room and training room - both of which are frequently booked; and,
- Contains 107 security cameras, data and dispatch rooms that can be protected from fire for two hours.

Community School

Figure 76: Community School

Nantucket's Community School, located at 34 First Way, is constructed with a wood frame. The building currently hosts continuing education and teen program centers. Notable characteristics of this facility that we identified include:

- Building is currently unfit to fulfill its purpose - will be undergoing renovations in very near future that will address existing issues;
- Currently used as a continuing education and teen program center - renovations will transform it to include the Early Childhood Center; and,
- Building location is ideal - it is in close proximity to the public schools.

Shellfish Research Laboratory

Figure 77: Shellfish Laboratory

The Shellfish Research Laboratory, located at Brant Point next to the light house, consists of a steel structure and wood framing. The building is used for shellfish research and breeding, and has a boat ramp and storage spaces for related activities. The primary issues of concern that we identified include:

- In off-season, underside of building is used as a space for storing equipment - this area is extremely cluttered and hazardous to people walking around in it (see Figure 78);
- Boat loading dock was recently redone and is in excellent condition;
- Black mold present on building shell, interior windows, and steel beams (see Figure 79);
- No seals around interior supporting pillars (steel) - ground is visible in gaps surrounding pillars (see Figure 80);
- No sealed doors upstairs - this creates the largest facility problem for the shellfish biologist, because it prohibits sterilization and temperature control for optimal shellfish breeding; however,
- Plans are in place for a complete renovation.

Figure 78: Cluttered storage space

Figure 79: Black mold

Figure 80: Gap around pillar

Siasconset Fire Station

Figure 81: Siasconset Fire Station

The Siasconset Fire Station, located at 10 West Sankaty Road, was built in 1930 and consists of a wood frame. This building serves as one of two satellite stations to the Central Fire Station. It houses one fire truck and one tanker, and provides storage space for fire department equipment. Important characteristics of this facility that we identified include:

- Front door and windows in need replacement and/or paint - they are all in disrepair and are not weatherproofed;
- Concrete front steps in need of replacement (see Figure 82);
- No parking (see Figure 83);
- Front steps, front door, garage bay doors, and windows all need replacement - they are all in disrepair and are not weatherproof; however,
- Plans are in place to request funding for many additional alterations within the next year and,
- Building is currently undergoing repairs - roof and gutters are being replaced.

Figure 82: Deteriorating concrete staircase

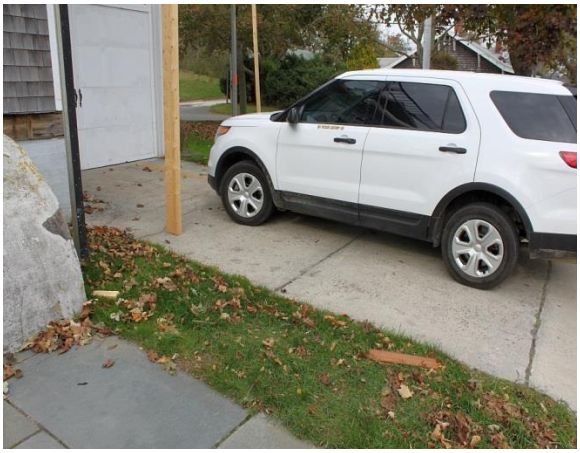


Figure 83: Parked vehicles block engine bays

Male Lifeguard Housing

Figure 84: Male Lifeguard Housing

The Male Lifeguard Housing, located at 47 Okorwaw Avenue, was built in 1900 and consists of a wood frame. This building hosts the Harbormaster's male lifeguards in the summer months, and the surrounding property serves as storage space for lifeguard equipment. Important aspects of this facility that we identified include:

- Building is in overall good condition with very few problems;
- Interior of building was recently refurbished and is in excellent condition;
- Up to twelve people live in the building during the summer months;
- Due to high occupancy, the septic tank must be pumped multiple times during summer months; and
- Use of indoor shower is prohibited due to concern with overwhelming the septic tank.

Recommendations & Conclusions

Introduction

Taking into consideration the results from our town employee and public surveys, stakeholder interviews, and our own findings and conclusions from site visits, we have developed a set of recommendations as to how we believe the town should proceed with its municipal facilities. This includes components on the structural needs of the buildings, departmental consolidations and relocations, the database, and other recommendations, including energy and public forums. It is important to note here that none of these recommendations take into consideration a financial component. We believe that the financial analysis of the town's facilities, their repair and/or renovation, and the cost benefits of possible space need changes, upgrades, or repairs should be left to experts in the field. We are not qualified, nor do we have the resources or time, to perform such an analysis, and thus the order of and timeline for the changes that we suggest in the following do not incorporate specific monetary details.

Structural Recommendations

It is also important to note here that the building-specific recommendations, and those concerning space needs, are not necessarily consistent. Those explained in the priority level sections assume that all departments and facilities remain in their current locations, while the recommendations in the space needs section focus on the locations and physical space required for departments. We recommend, though, that the structural issues be addressed before the space needs recommendations can be brought into effect.

Level I - Buildings to Repair in 1-3 Years

The PLUS building is inadequate for hosting its current operations. We deemed it a high priority for attention because of the number of issues, as well as the varying types of issues, that this facility has. Most of these issues center on its shell structure, which was designed for the electric company that used to occupy the facility. We recommend strongly considering a new building. There are enough improvements that need to be made to bring it up to the town's standards, that it is likely that the benefits of a new building would outweigh the cost of

repairing the current facility. The town employee survey results showed that, of those who took the survey, 4 of the 12 employees working at the PLUS recommend that the building be replaced. A few key stakeholders were also in agreement that a new facility would better serve the needs and purposes of the PLUS.

The facility at 20 South Water St is also a high priority for attention. The building does not make good use of its space, having the most area-per-employee of any town building. This building is an asset to the town and thus should be taken advantage of. As the cost of renovation increases every year, we suggest that this be done sooner rather than later, ideally within the next 3 years. This facility would need extensive renovation to make the remaining space usable and cost effective to maintain. If the building were upgraded, the town could utilize it in the ways described in the Space Needs Recommendations section.

The Town Building should also be addressed within the next 1-3 years. A hazardous materials report done in September 2014 shows lead paint and asbestos in several locations throughout the building. Although these hazardous materials are not currently an issue or hindrance to the employees or public, they would need to be removed before future upgrades could take place. For instance, replacing the light fixtures in the main hallways would require the removal of asbestos from under the stucco layer of the ceiling. However, we believe that the town would benefit from securing new facilities for the Fire Department and PLUS before major renovations be done to the Town Building.

With this being said, the building is also in need of some minor repairs that should be addressed sooner. To keep heating costs down, several of the windows that are in poor condition and especially drafty should be replaced. Much of the wiring raceway should also be repaired. Additionally, smaller trim repairs and landscaping improvements would benefit the building's overall appearance and aesthetic appeal.

The Fire Station is in the Level I category because it currently fails to meet the needs of the fire department and emergency services. We recommend that it be integrated into the Public Safety Facility at 4 Fairgrounds. Moving the department to a new, larger facility would solve the current office, living quarter, and storage space issues discussed in the Findings

section. The Public Safety Facility is at an ideal location because of its central location on the island. The Public Safety Facility was also built to accommodate the addition of a fire station. It was built with high ceilings to be able to fit the fire trucks and the sewer and water main lines are already in place for use by the fire station.

The Town Pier is also in need of attention within the next 1-3 years. Based on the structural issues presented in the Findings section, we believe that the Town Pier, including the main pier and floating docks, should be completely replaced with a new pier. The current structure would be very costly to repair, and would nearly need an entire rebuild. We recommend that the Town considers a concrete-based structure, as this would significantly help to avoid the major fire hazard and susceptibility to weather-related damages associated with a wooden construction.

Level II - Buildings to Repair in 3-5 Years

We recommend that the buildings in this level be repaired and/or upgraded in the next three to five years. Beginning with the Visitor Services building, based on our findings, we primarily recommend that all doors be replaced with new, energy efficient, handicap-accessible doors. In addition to replacing existing doors, more interior doors should be added to allow for private offices since the service desk can become quite noisy in the summer. We also recommend that room be made for adequate staff communal space; this space should be in an enclosed area, so as to avoid the distracting noise in the visitor area. Additionally, we recommend that a new heating system be installed so that employees stay warmer in the winter, and so that pipes do not freeze so easily. These improvements could be made with relative ease and would significantly help to increase employee comfort, morale, and productivity.

On the other side of town, the DPW Sheds and Garages also need to be repaired (or replaced) and expanded in 3-5 years. Small improvements, like new doors and heated work areas, will help employees to do their work in greater comfort. Garages need to be expanded or rebuilt to better house vehicle repair equipment, and to house DPW trucks and heavy equipment that are currently stored outside, exposed to harsh weather. If these trucks and

pieces of equipment can be stored inside, their lifespans will increase and maintenance issues will decrease, potentially saving the town significant amounts of money in the long term from replacing expensive DPW equipment. The sheds are currently old, unheated portable schoolhouses. Disposing of these, building new sheds, and constructing a proper building for employee offices and common areas with adequate heat, could significantly improve employee morale, as well as promote shed organization and cleanliness.

Moving to the Children's Beach and Concession, we first recommend that a map, displaying the locations of sewer pipes and irrigation lines be developed and made readily available to users of the facility so as to avoid the issues addressed in the Findings section. We also recommend that more adequate lighting and cameras linked to the Public Safety Facility be installed to prevent vagrant citizens from taking advantage of the otherwise dark area. Finally, we recommend that new, metal playground structures be installed to replace existing wooden structures, so as to avoid splinter hazards.

Also, we recommend that the Harbormaster Building bathrooms be upgraded and/or rebuilt in the next 3-5 years. As mentioned in the Findings section, these bathrooms are used by hundreds of people per day in the summer months, and serve many people with a first impression of the island; currently, they are not be as aesthetically pleasing as they should be.

Level III - Buildings in Sufficient Condition for Next 5+ Years

We conclude that the facilities in this level are in sufficient condition for at least the next five years, but currently have minor issues that will eventually need to be addressed. Based on our findings, we recommend that the Natural Resources Building and Finance Building be given more storage space; this could be accomplished by making small additions to the existing buildings. Storage space in these facilities is already limited, and the number of files that need to be stored will grow as time goes on. We also recommend that these buildings, as well as the Harbormaster Building, be updated with larger communal areas to better accommodate meetings. Although existing communal areas in these buildings serve their functions, albeit barely, larger communal areas would allow for more comfortable and productive meetings and gatherings. The Harbormaster Building also should have an emergency generator installed so

that the Harbormaster does not need to continue using her personal generator to power the radios used to communicate with vessels, as well as radios and surveillance cameras connected to the Public Safety Facility, during outages.

Although the DPW Administrative Building and Jetties Beach Concession are in overall good condition, we suggest that the minor issues discussed in the Findings section be addressed in the next five years in order to keep them from becoming worse. We recommend that the leak in the ceiling of the DPW Director's office be repaired, as well as the worn railings and kitchen ceiling at the Jetties Beach Concession.

The Madaket Fire Station and Female Lifeguard Housing are in overall good condition, and do not have any significant physical issues. Based on our findings, we recommend that additional bedroom space be added to the Female Lifeguard Housing. Although it is currently fit to house its summer occupants, more bedroom space would afford its occupants greater comfort and more space for personal items.

Level IV - Buildings in New Condition/Recently Renovated/Under Renovation

We recommend that the Level IV buildings only be looked at as necessary. Since some facilities, like the Public Safety Facility, are brand new, they will not need attention for many years to come, but others, like the Siasconset Fire Station, are undergoing major renovations to only specific parts of the facility and other aspects may require attention in the near future. The Male Lifeguard Housing underwent extreme renovation in the recent past and the Community School and Shellfish Research Lab will undergo similarly extreme, comprehensive renovations in the near future.

Space Needs Recommendations

Within many town facilities we found space needs to be a large issue. We would often hear complaints of inadequate office space, poor locations, or inconvenient distributions of departments throughout the island. As a means of resolution for this issue, we have created a set of recommendations for departmental consolidation, relocation, or no action. These recommendations are based entirely on survey results, conversations with stakeholders, and

our personal observations from site visits. Detailed graphs of our town employee survey results concerning the locations of individual departments (in or out of town) can be found in Appendix N. One particular response to our survey summarized our recommendations very well:

> The departments currently out of the downtown are fine to remain out of town. They are too busy and require too much parking and communal space to be useful in town. The county and state functions can be together out of town. They need better parking and space, particularly the Courts and RMV. Also, the Sheriff's office should be near the police station/holding cells as long as he is still near the courts, too. Administration and Finance should be close to each other as their functions cross over and rely on each other. Although all the Administration and Finance functions COULD be out of town and better serve the public and the employees by being together, with better parking and updated office space, it is also still good to have them downtown for visibility and a sense of place for the locals (so the downtown doesn't just become a tourist destination that closes in the winter).

A common response to our town employee survey, similarly to above, was that the Finance Department, Town Clerk, Procurement, and Town Administration should be in one location, with occasional mention of the Tax Collector, Assessor, and Human Resources also sharing this location. Because it is a real concern to many of those living and working on the island to maintain a downtown presence, we think that it would be best suited for the town to utilize the current town building for these departments; "...having the Town Building in town keeps the town alive. If we move everything out of town we will lose something special. Down Town will become a tourist town." This building is in the heart of the downtown area and it would be very convenient for all of these departments to be in one location. Should the Town Building not be sufficient space, we recommend that the top floor of the facility at 20 South Water St. be used house the remaining department(s), preferably those with less public traffic. If the Town Building is sufficient space for all of the aforementioned departments, we suggest

that the second floor of 20 South Water be used as conference and meeting space due to its close proximity to the Town Building and the town's extensive need for greater common space.

A further suggestion concerning the facility at 20 South Water St. is the relocation of Visitor Services (which is currently within the same block). The current facility is not adequate space for the public traffic received by the department, and is there enough space or privacy for the employees. There is ample room on the ground floor of 20 South Water St. to house individual, private offices for the employees and have meeting and storage space which they currently lack in their facility. This location change is so minor though that the department will still be in the center of town where it needs to be to serve its purpose. The current employees of 20 South Water can still utilize the facility or can be moved to the 2-4 Fairgrounds area.

As mentioned in the quote above, the state and county functions could be moved out of the downtown area. The RMV and courts add to the traffic and parking congestion, as well as the noise level in the Town Building. By relocating these functions, there would be more available waiting space for other departments, less hall traffic, and a quieter workspace. Concern has also been expressed regarding the security of the building, as the court is located in its center. These can be moved to the 2-4 Fairgrounds complex, either as their own facility or as an extension of one of the existing facilities. This way the holding areas at 20 South Water St can be removed and the space be repurposed. The Sheriff's office can be relocated to the Public Safety Facility to be near the court, holding area, and the police station.

The current 2-4 Fairgrounds area is adequate as is. While the current PLUS facility needs to be completely redone, we believe that the departments in that facility should remain at that location. It is conveniently located away from the general congestion of the downtown area, and is close enough to the Public Safety facility to utilize its parking and to allow for easy travel between the two facilities. This is also important because many of the vehicles visiting the PLUS will, in general, be larger than those in the center of town as they are work and construction vehicles. We do, however, believe that the Fire Department should be relocated to 4 Fairgrounds. The current location of the Fire Department is inadequate in size to support its necessary staff and the demand for a new facility is growing rapidly. The Public Safety Facility is

already equipped to handle the addition and it would be convenient for the police and fire/rescue departments to be in one location. The sharing of resources by these two departments would also save the town money on electricity and heat.

The Finance Building, should our recommendation about relocating this building's departments to the Town Building be carried out, could have many possible functions. The foundation of the building is slab on grade and thus the building could be relocated. It could be moved to the Fairgrounds area and utilized as the RMV and/or courthouse. It could also be moved to the Natural Resources Department location to provide the employees with more office and storage space. The Natural Resources Department could potentially be relocated to the current location of the Finance Building, but the Natural Resources employees seem content with its current location.

To resolve the extensive parking issue in the downtown area, we suggest the town once again explore the possibility of constructing a parking garage where the current parking lot is behind the Finance Building. As was expressed by one town employee, "our jobs are customer service based and as such providing an easier location, with less traffic issues, and easier parking would be beneficial to our public and Town's people." This location is already used as employee and public parking, not just for the Finance Building employees, but also those working in the center of downtown. In the summer, this lot does not provide sufficient parking for employees though with the extensive public use. We recommend that one level, or a specific portion depending on the exact number of employees that would be using the garage, be employee-only parking. The remainder can be open to the public. An additional suggestion would be to charge the public for use of the garage, but allow town employees free or discounted usage.

We do, however, understand that this could be seen as uncharacteristic for the downtown area of Nantucket. We have selected the location on Washington Street because it is far enough from Main Street to be in a less populous area where it is more easily accessible by car and also less noticeable by pedestrians, but it is also close enough that users can easily access the center of town. The sides of the garage can be shingled and the structure can be

styled in the characteristic Nantucket way to make it blend in more. Should this suggestion be unacceptable, we suggest a shuttle service for town employees from a lot outside of town where ample parking is available.

We have found that the locations of the DPW facilities, Natural Resources Department (including the Shellfish Research Lab), Harbormaster Building, Community School, concessions, and housing are functional in their current locations. The DPW should be located near the landfill, the Harbormaster needs to be at the Town Pier, and Natural Resources Department, specifically the Shellfish Research Lab, needs to located on the coast. The employees of the Natural Resources Department are happy with their current facility and thus we decided against making recommendations of relocation and/or consolidation for this function.

Database Recommendations

Our third category of recommendations is regarding the database and its future use. The facility information that we entered into the database is information that should have been collected and centralized a while ago, and we feel that it is in the town's best interest to continue keeping this information in one place. With the current system, there is no way for anybody to see all of the problems and maintenance expenses for a specific building or for a type of maintenance performed (i.e. roofing). Additionally, public access of this kind of information is difficult. Our database includes building reports that can be converted into PDF's that can be uploaded online for public viewing.

However, this database will need to be updated regularly. We recommend it should be updated weekly to track maintenance work and to record any complaints brought forth by employees. This way, our database would evolve into a low risk option that could set the groundwork for a third party vendor to develop the content and functionality of the database further. We would recommend taking advantage of the services provided by an integrated facilities management firm, such as UG2, that has experience creating maintenance logs and handling deferred maintenance issues (Cassidy, 2014).

Other Recommendations

In addition to the structural and space needs recommendations, we also have a series of other recommendations that the town should consider as they are moving forward in this process.

Deferred Maintenance

Deferred maintenance has been a serious issue within the town's facilities. A large, all-encompassing recommendation that we have for the town is to address minor issues as they arise. Throughout the course of our process, we have noticed many problems that could have been prevented had more immediate action been taken, for example the wooden frame of the current Main Fire Station is rotting because the brick veneer was never resealed and waterproofed. As one town employee remarked on the survey in response to the question about additional suggestions for the improvement of town facilities, "better maintenance programs... Building improvements would also improve employee morale instead of having facilities in mediocre to substandard conditions." We believe that consistent use and upkeep of our database will significantly assist in this.

Energy Conservation

In addition to the specific building and department recommendations, we also would like to make a few general recommendations for the buildings as a whole. One of the most important aspects of buildings in general nowadays is the energy efficiency. As noted in our findings section, we saw how energy inefficient most of the buildings are, and so we recommend that the Town looks into more energy-saving techniques in order to save money and conserve energy. We recommend the installation of weather resistant windows and doors in all of the facilities. As mentioned above, a lot of the windows and doors have gaps or do not function properly. Weatherproof doors and windows with fitted frames would make a huge difference in the Town's energy bills.

Public Input

Additionally, we cannot emphasize enough the importance of public input, and so we strongly recommend continuing this conversation through public forums and continuing to

record the responses to the online public survey. The residents who pay taxes are paying for these buildings, and obviously would like to get the best and most use out of them. Public forums or discussions could potentially bring up a future possibility that no one else had thought of. We believe that Nantucket residents should be given the opportunity to be involved in the planning of the future of their town.

Space Needs Assessment

Finally, we recommend that the town go beyond just our findings and conduct a more thorough space needs and planning assessment. This should include a more comprehensive inventory of the building conditions, including code violations, lifespans and conditions of equipment and systems, and complete structural analyses. This analysis should also incorporate cost estimations for replacements, upgrades, and renovations. By doing this, the town will better be able to prioritize facility plans to incorporate the availability of funding. A comprehensive inventory and cost assessment could be used as an integral part in building public support through a much larger space needs assessment and planning process.

References

Acquisition of Land for Town Offices, 46-4 C.F.R. (1997).

Article 11 (Appropriation: Enterprise Funds Operations). (2014). Nantucket, MA.

Butler, P. (1996). The Nantucket Historic District Commission: An Overview. *Historic Nantucket, 45*, 145-146. Retrieved from Nantucket Historical Association website.

Cassidy, J. (2014). The Emergence of UG2. *Facilities Engineering Journal*.

CERC Town Profile 2013. (2013, November). *New Canaan, CT*. Retrieved September 16, 2014 from http://www.cerc.com/TownProfiles/Customer-Images/newcanaan.pdf

Corzine, J. S., & Jackson, L. P. (2006, April). *How to Conduct an Energy Audit: A Short Guide For Local Governments and Communities*. Retrieved September 29, 2014, from New Jersey Department of Environmental Protection Division of Science, Research and Technology Bureau of Sustainable Communities and Innovative Technologies website: http://www.co.middlesex.nj.us/mcset/EnergyAuditGuide.pdf

Department of Revenue. (2008). *Enterprise Funds G.L. c. 44, § 53F½.* Massachusetts, USA. Retrieved from http://www.mass.gov/dor/docs/dls/publ/misc/enterprisefundmanual.pdf

Department, Town of Nantucket Energy (2014). History of Energy on Nantucket. 2014

Dillon, M. (2011, September 5). *Field Guide to New Hampshire's Municipal Buildings & Energy Audit Guidelines*. Retrieved September 29, 2014, from New Hampshire Charitable Foundation website: http://www.nhsea.org/download/Audit_Guidelines_Nov2011.pdf

Graziadei, J. (2013). HDC rejects request to raze 20 South Water. *The Inquirer & Mirror*. ACK.net

Grussing, M. and Liu, L. (2014). "Knowledge-Based Optimization of Building Maintenance, Repair, and Renovation Activities to Improve Facility Life Cycle Investments." *J. Perform. Constr. Facil.,* 28(3), 539-548.

GZA GeoEnvironmental, Inc. (2013). NANTUCKET TOWN PIER FINDINGS REPORT - ABOVE AND UNDERWATER INSPECTION (pp. 11).

Maguire Group, Inc. (2007). Nantucket Municipal Building Evaluation (pp. 15).

McKay, D., Rens, K, Griemann, L, and Stecker, J. (1999). "Condition Index Assessment for U.S.

Army Corps of Engineers Civil Works." *J. Infrastruct. Syst.,* 5(2), 52-60.

Nantucket Historic District Commission. (1995). *Building with Nantucket in Mind* (J. C. Lang & K. Stout, Authors). Orleans, MA: Casey Publications.

New London Planning Board. (2012). Town of New London, New Hampshire Master Plan Executive Summary. Retrieved from http://www.nl-nh.com/vertical/sites/%7B26F9F697-D5BE-4423-95D7-E1EECBB7F549%7D/uploads/New_London_Master_Plan_Executive_Summary_8-2012_.pdf

Nantucket Planning and Economic Development Commission. (2009, April). *Nantucket Master Plan*.

Nantucket, T. a. C. o. (2013). *FY2015 Budget Projection*.

Office of the Town Manager. (2014). Retrieved September 14, 2014, from nantuckettownmanager.org

Office, T. M. s. (2009). *2009 Nantucket Master Plan*.

Perkins Eastman, BFJ Planning. (2012). *Municipal and Public Use Facilities Master Plan, Town of New Canaan, CT*. Retrieved from http://www.newcanaan.info/filestorage/9490/293/331/12636/11435/New_Canaan_Facilities_Master_Plan_-_FINAL_120316.pdf

Preliminary Long-term Municipal Space Needs Plan Outline. (2013).

Report for Hazardous Materials Identification Survey at the Town Hall Nantucket, Massachusetts. (2014). Universal Environmental Consultants. (pp. 3,4).

Rockport Planning Board 2010-2011. (2011). *A Master Plan for Downtown Rockport 2011*. Retrieved from http://www.townofrockport.com/doc/004/DMP-COM11-2-11.pdf

Sullivan, G. P., Pugh, R., Melendez, A. P., Hunt, W. D. (2004). *Operations & Maintenance Best Practices, a Guide to Achieving Operational Efficiency*. Available from http://www.mass.gov/anf/docs/dcam/mafma/manuals/o-and-m-femp-best-practices-guide-achieving-op-efficiency.pdf

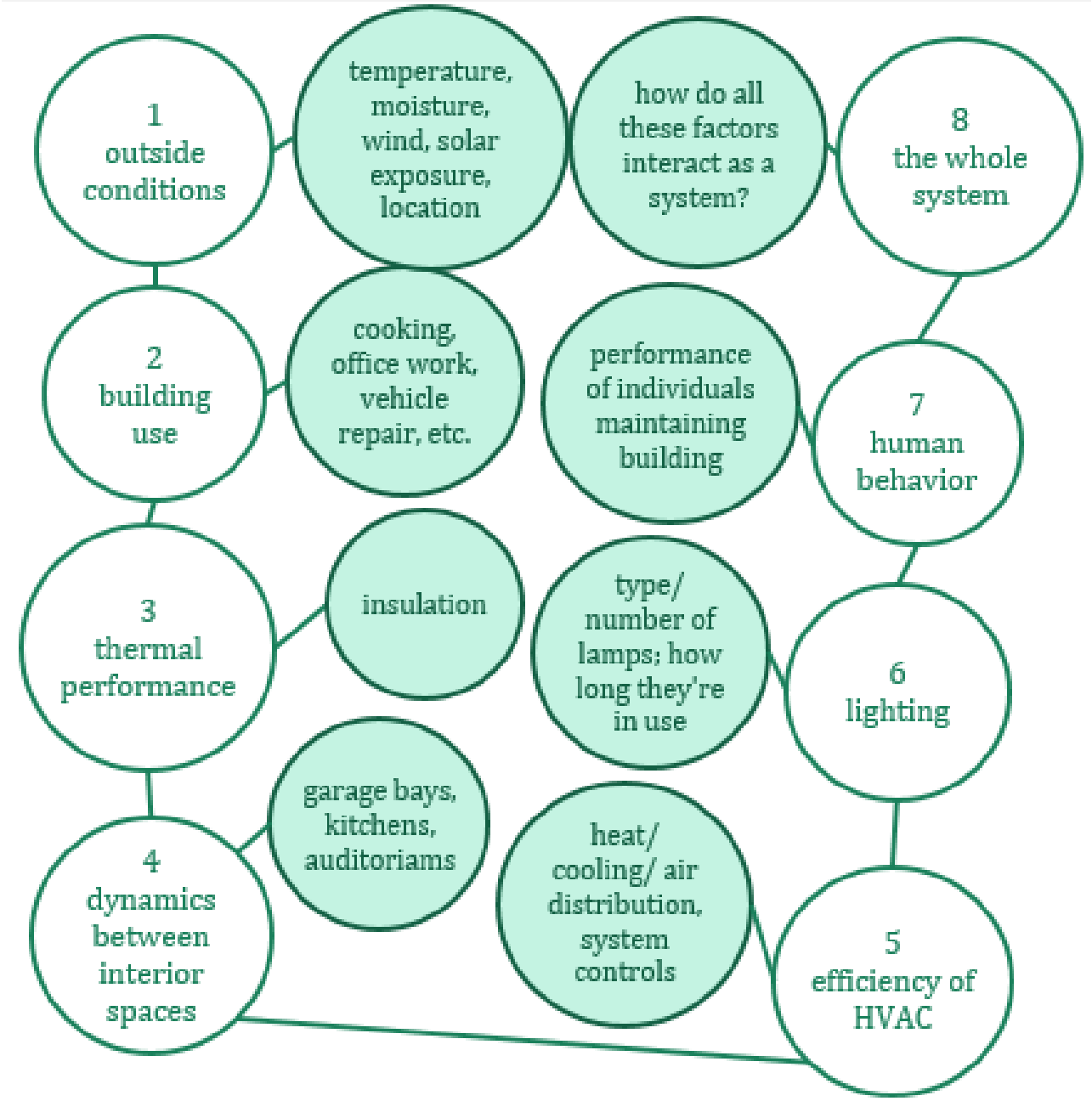
United States Census Bureau. (2014, July 8). *Nantucket County, Massachusetts*. Retrieved September 16, 2014 from http://quickfacts.census.gov/qfd/states/25/25019.html

White, Martha; Young, Michael Walters. (2010, September 10). *Town of Natick Facilities Management Study Update*. Retrieved from http://www.natickma.gov/sites/natickma/files/file/file/facilitiesmanagementupdate-091310_0.pdf

Appendices

Appendix A: Analysis of Energy Use in Buildings

from FIELD GUIDE TO New Hampshire's Municipal Buildings & Energy Audit Guidelines



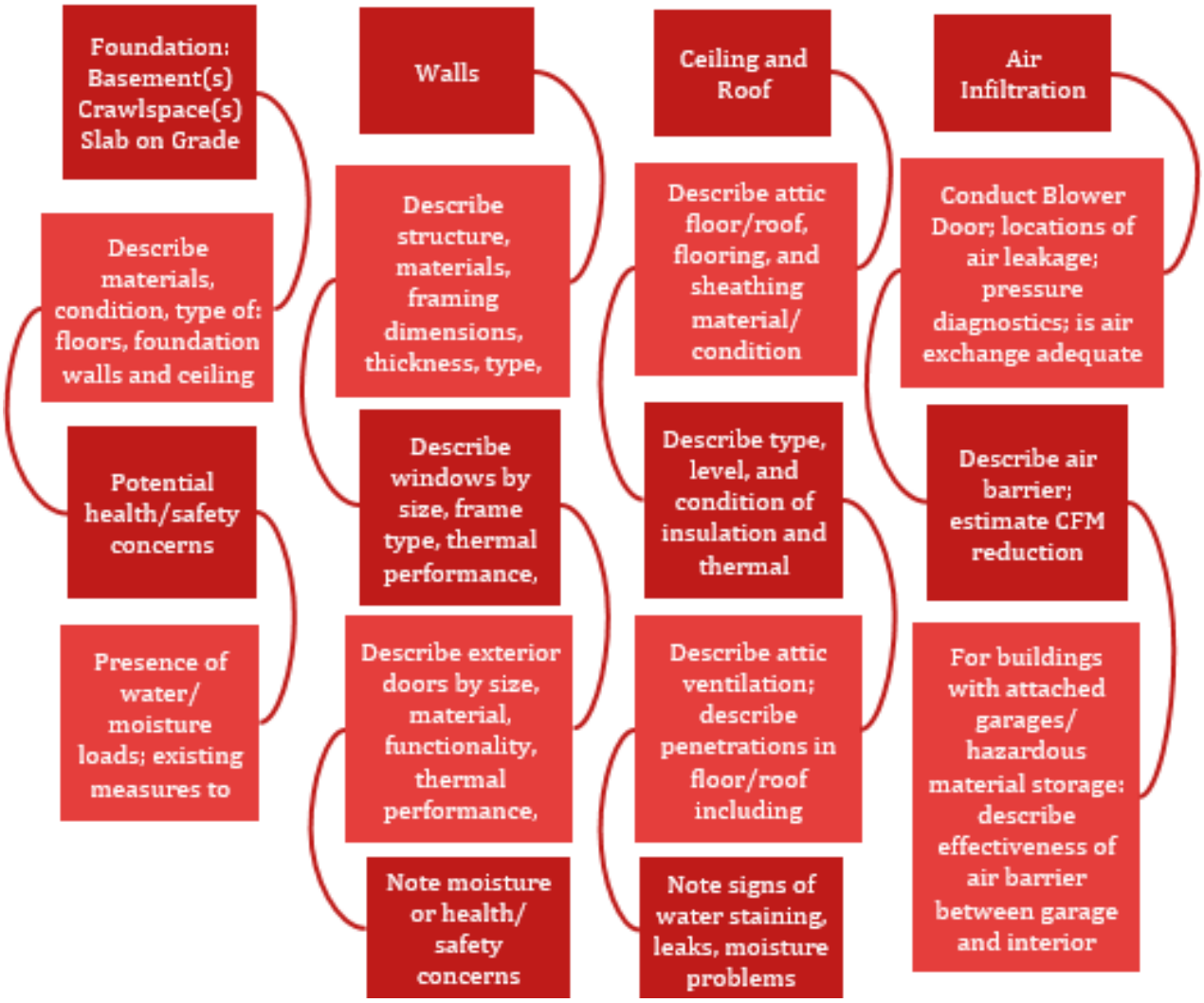
Appendix B: Monthly Energy Record

from *How to Conduct an Energy Audit: A Short Guide for Local Governments and Communities*

Month	Electricity			Gas		
	kWh Used	Billing Demand	Actual Demand	CCF Used	Cooling Degree Days	Heating Degree Days
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						

Appendix C: Enclosure Assessment

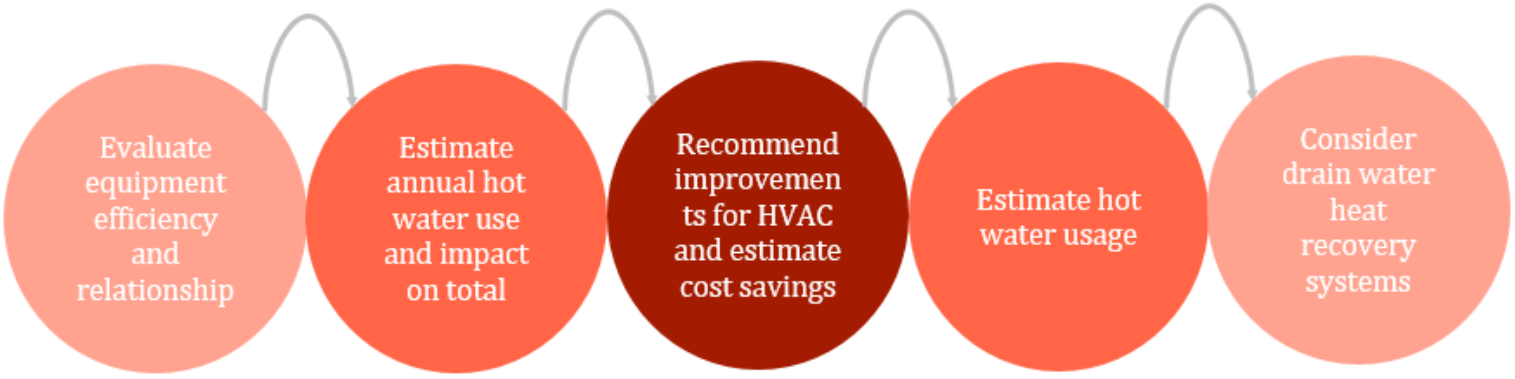
from *FIELD GUIDE TO New Hampshire's Municipal Buildings & Energy Audit Guidelines*



Appendix D: HVAC & Hot Water Assessments

from *FIELD GUIDE TO New Hampshire's Municipal Buildings & Energy Audit Guidelines*

Heating, Cooling, and Ventilation
1. Equipment **a) Identify Type: Boiler or Furnace and record Model and Plate information** **b) Record service record** **c) Describe how the system is zoned and thermostatically controlled** **d) List Fan motor size in HP and Efficiency, if listed (for furnaces) or circulators hp/ amp/volts / phase / GPM flow data** **e) Pilot type–electronic or continuous (for boilers & furnaces)** **f) Combustion Air Source and functionality** **g) SEER and/or AFUE rating** **h) Water temperature setting; Reset function? Modulation?**
2. Record all space heaters, type, and energy use data
3. Record all cooling equipment by type, model, and SEER rating
Distribution
1. Identify Type: Forced Hot Water, Forced Hot Air, Direct
2. Record and describe all material types.
3. Describe condition of ducts, location (%inside or outside condition space) and condition of seals (sealed or not) and insulation
4. Describe method for testing duct leakage and record results
5. Determine % of water pipes insulated or not insulated
Ventilation
1. Describe all other existing ventilation equipment: Exhaust fans; Energy Recovery Unit. If additional ventilation is needed, estimate the cost for installing a whole building, balanced Heat Recovery Ventilation System (HRV).
2. If whole building ventilation exists, check ventilation rate and recommend improvements such as an air side economizer or indoor CO monitored control system.
List any other system controls CO monitors, etc. and evaluate functionality
Evaluate the size of equipment in relationship to the existing enclosure performance and estimate the impact on efficiency



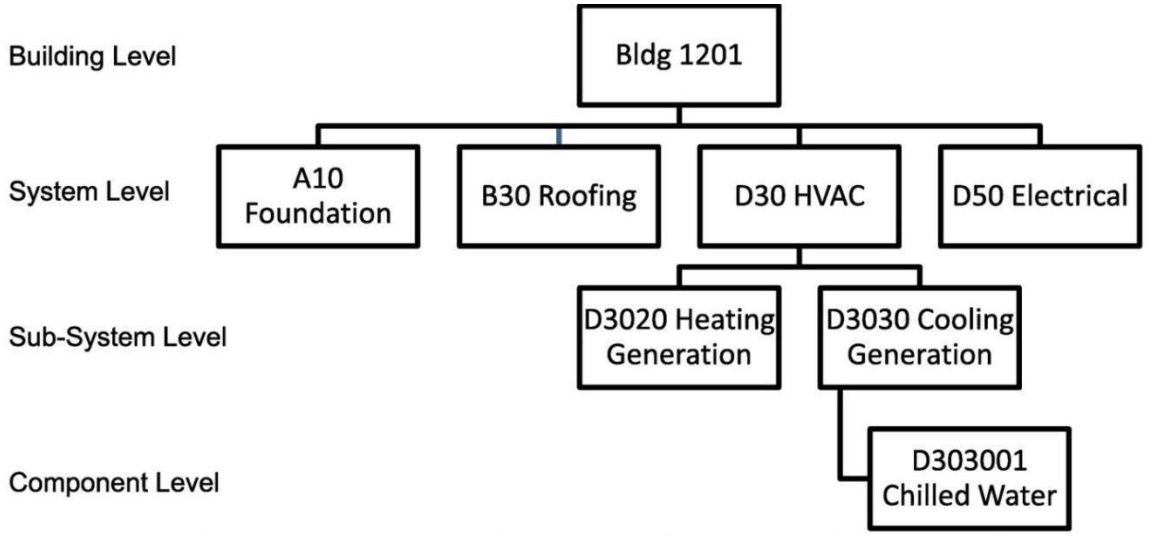
Appendix E: Condition Index Scale

from *Condition Index Assessment for U.S. Army Corps of Engineers Civil Works*

Zone (1)	Condition Index (2)	Condition Description (3)	Recommended Action (4)
1	85-100	Excellent: No noticeable defects. Some aging or wear may be visible	Immediate action is not required.
	70-84	Good: Only minor deterioration or defects are evident	
2	55-69	Fair: Some deterioration or defects are evident, but function is not significantly affected	Economic analysis of repair alternatives is recommended to determine appropriate action.
	40-54	Marginal: Moderate deterioration. Function is still adequate	
3	25-39	Poor: Serious deterioration in at least some portions of the structure. Function is inadequate.	Detailed evaluation is required to determine the need for repair, rehabilitation, or reconstruction. Safety evaluation is recommended.
	10-24	Very Poor: Extensive deterioration. Barely functional	
	0-9	Failed: No longer functions. General failure or complete failure of a major structural component	

Appendix F: Building Object Model with Life Cycle Attributes

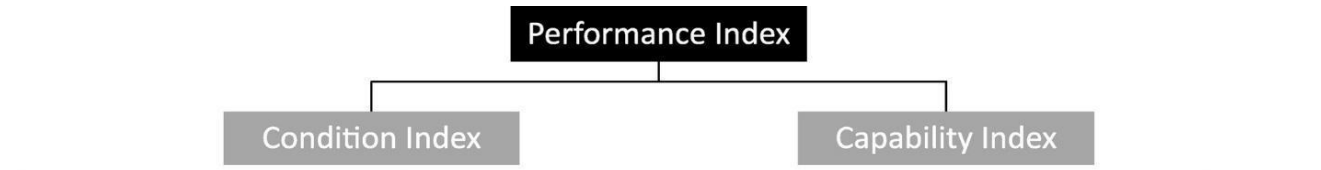
from *Knowledge-Based Optimization of Building Maintenance, Repair, and Renovation Activities to Improve Facility Life Cycle Investments*



Component Description	Quantity	Year Installed	Age (Years)	Performance (0-100)	Design Life	Replacement Cost
Reciprocating Chiller, 40 t	2 Each	1989	23	67	30 yrs	$104,000
Absorption Chiller, 60 t	1 Each	2010	2	98	35 yrs	$121,000

Appendix G: Description of Condition, Capability, and Performance Indexes

from *Knowledge-Based Optimization of Building Maintenance, Repair, and Renovation Activities to Improve Facility Life Cycle Investments*



Based on observed distresses from a condition assessment

Condition Index	Descriptor
100-85 Good	Slight or no serviceability or reliability reduction
85-70 Satisfactory	Serviceability or reliability is degraded but adequate.
70-55 Fair	Serviceability or reliability is noticeably degraded
55-40 Poor	Significant serviceability or reliability loss.
40-25 Very Poor	Unsatisfactory serviceability/reliability reduction
25-10 Serious	Extreme serviceability or reliability reduction
10-0 Failed	Overall degradation is total.

Based on observed obsolescence or requirements gaps from a capability assessment

Capability Index	Descriptor
100-85 Good	Slight or no capability reduction
85-70 Satisfactory	Capability degraded due to obsolescence but adequate
70-55 Fair	Capability noticeably degraded from obsolescence
55-40 Poor	Significant capability loss or obsolescence
40-25 Very Poor	Unsatisfactory capability gaps or obsolescence
25-10 Serious	Extreme capability gaps or obsolescence
10-0 Failed	Overall obsolescence or capability loss

Appendix H: Stakeholder Interview/Survey

General Stakeholder Interview/Survey
for Database Characteristics and Facility Improvements

This survey is being conducted by a group of students from Worcester Polytechnic Institute (WPI), called the WPI TMO Team, to determine opinions regarding the type, design, content, and purpose for the Town Facilities Database, and visions for facility improvements.

Before completing this survey, please mark the boxes next to each statement below as desired. If this survey is being completed on paper, please write in ink.

- I would like to remain anonymous in the presentation of information discussed in this survey/ interview.
- The WPI TMO Team **DOES** have permission to directly quote my responses
- The WPI TMO Team **DOES NOT** have permission to directly quote my responses

Questions:
If you do not wish to answer a survey question(s), please leave the response area for that question(s) blank

Database Type

1. How familiar are you with Microsoft Excel and Access?

2. Would you be willing to familiarize yourself with a new program?

Database Design

3. Who needs to be able to edit, add, or remove from the database?

4. Who needs to be able to access or view the database?

5. How would you like data to be visually presented?

6. What level of detail is required for each area of data (i.e. does a section within the database for an individual data category, such as “heat generating systems”, need to be able to accommodate two sentences of pertinent information, or two paragraphs)?

Database Content

7. What types of data would you like to be included in the database (for example, floor

plans or energy usage)?

8. What data categories require photographs, and what specific elements need to be photographed?

9. How would you like the database to present areas of missing or conflicting data?

Database Purpose

10. How will this database contribute to town affairs?

11. What would you like to be able to do with information in the database?

Visions for Facility Improvements

12. Are there currently issues within your facility that hinder the work performance of personnel?
    a) Is there a lack of sufficient parking spaces for facility personnel?

    b) If your facility is not ADA compliant, does this present challenges for disabled workers?

    c) To your knowledge, are there any additional structural, mechanical, or staff management issues within facilities? If so, please explain these issues.

    d) If aforementioned issues exist, have you developed potential solutions for these problems? If so, please explain.

13. What visions do you have, if any, for the future of your facility (i.e. expansion with more employees or a larger, more centralized location)?

Appendix I: Initial Site Visit Checklist

Feature	Yes/No	How many?	Notes
EXTERIOR-maintenance and components			
Sidewalks			
Storm water runoff from roofs			
ADA compliance			
Ramps			
Landscape drainage			
Gutters			
Trees too close to buildings			
Building material (brick, wood, etc.)			
Foundation			
Parking spaces			
Needed parking spaces			
Paving			
Sewer system			
EXTERIOR- energy			
Roofing			
Leaks			
Protection from air/ moisture movement			
Openings (chimneys, pipe penetrations, dormers)			
Doors			

Historically accurate			
Protection from air/ moisture movement			
Thermal insulation			
Windows			
Historically accurate			
Wind/ storm protection			
Thermal insulation			
INTERIOR-maintenance and components			
Visible hazardous material			
Lead paint			
Mercury containing thermometers			
Known asbestos/ radon			
Floor and Ridge heights			
Basement			
Crawl spaces			
Plumbing fixtures			
Domestic water distribution			
HVAC			
Fire protection			
Sprinklers			
Standpipes			
Smoke detectors			
Fire alarms			

Fire extinguishers			
Square footage			
Faculty/staff working in building			
Part- and full-time			
Boiler			
Security systems			
Equipment/ furniture			
Vehicular			
Commercial (lockers, shelving, office furniture)			
Institutional (jail cells in the police station)			
Water supply			
Stairs			
Year built			
Evacuation procedures			
ADA compliance			
Elevators			
Bathrooms			
INTERIOR- energy			
Walls			
Insulation			
Material used			
Heat generating systems			
Cooling generating systems			

Electrical service and distribution			
Energy usage			
Lighting			
Emergency power			
Fuel distribution (oil storage tank)			

Appendix J: Revised Site Visit Checklist

Feature	Yes/No	How many?	Notes
Address			
EXTERIOR- structure			
Year built			
Cladding material (brick, wood)			
Foundation			
ADA compliance			
Ramps			
EXTERIOR – surroundings			
Landscape drainage			
Gutters			
Irrigation			
Trees too close to buildings (encroachments)			
Sidewalks			
Storm water runoff from roofs			
Parking availability			
Paving			
Sewer/septic system			
Flood zone			
Flood Procedure			
EXTERIOR- energy			
Roofing (slate, asphalt, shingles)			
Style (pitched, flat)			

South facing			
Winterized? (insulation)			
Leaks			
Protection from air/ moisture movement			
Openings (chimneys, pipe penetrations, dormers)			
Doors			
Protection from air/ moisture movement			
Weatherized			
Windows (number)			
Wind/storm protection			
Weatherized (date)			
INTERIOR-maintenance and components			
Square footage			
Evacuation procedures			
Faculty/staff working in building			
Part- and full-time			
Visible hazardous material			
Lead paint			
Mercury containing thermometers			
Known asbestos/radon			
Exposed wires			
Uninsulated pipes			

Other			
Plumbing condition			
Public or employee only			
Water source (well or town)			
Domestic water availability			
Water Heater			
Fire protection			
Sprinklers			
Standpipes			
Smoke detectors			
Fire alarms			
Fire extinguishers			
CO detectors			
Security systems			
Equipment/furniture			
Vehicular (bays/garages)			
Institutional (jail cells in the police station)			
Communal spaces (conference/break room)			
Stairs			
ADA compliance			
Elevators			
Bathrooms			
Basement/ Attic (finished?)			
Crawl spaces			

INTERIOR- energy			
Walls			
Insulation			
Material used			
HVAC			
Heat generating systems			
Cooling generating systems			
Electrical service and distribution of fuse boxes			
Lighting (number & type (LED, fluorescent, T8))			
Emergency power			
Fuel distribution (oil storage tank)			
Meter Number			
Maintenance Contractor(s)			

Appendix K: Element Rating System

This document describes the rating system for categorizing the conditions of building elements in the Town of Nantucket's municipal facilities.

1. Unusable:
    a. The item is nonoperational.
    b. The item in question does not fulfill its intended purpose.
    c. The item is nonoperational due to code violation or safety hazard.
    d. Repair cost is equal with cost of replacement.
2. Poor:
    a. Item exceeds recommended lifespan but still operational.
    b. Item is no longer cost effective with maintenance and repairs.
    c. Item is no longer cost effective due to inefficiency.
3. Fair:
    a. Item shows signs of wear and tear that do not significantly hinder operation.
    b. The item barely suits its purpose and needs of the operators
4. Good:
    a. Item has minor cosmetic wear and tear.
    b. Item operates reasonably close to new condition.
    c. Item meets the needs and demands of operators.
5. New:
    a. Item operates to specification.
    b. No cosmetic or functional damage.

Appendix L: Town Employee Survey

Nantucket Town Facilities Employee Survey

This survey is being conducted by a group of students from Worcester Polytechnic Institute (called the WPI TMO Team) working with Gregg Tivnan, Nantucket's Assistant Town Manager, and Larry Kester, Town Facilities Manager, to gather opinions about town facilities and visions for facility improvements. We will be making recommendations regarding these facilities and appreciate feedback from employees who work in them. Please note that all responses will remain anonymous. This survey should take no longer than 10 minutes. Thank you for your time and input.

1. What is your primary office building?

Please select one.

__ Airport Administration (Airport Rd)
__ Airport Rescue and Fire (Airport Rd)
__ Airport SRE (Bunker Rd)
__ Department of Public Works- any building (188 Madaket Rd)
__ Finance Building (37 Washington St)
__ Fire Station (131 Pleasant St)
__ Harbormaster Building (34 Washington St)
__ Memorial Airport (Airport Rd)
__ Natural Resources Department (2 Bathing Beach Rd)
__ NRTA building (3 East Chestnut St)
__ Nursing Home (Our Island Home)
__ PLUS (2 Fairgrounds Rd)
__ Public Safety Facility (4 Fairgrounds Rd)
__ Saltmarsh Senior Center (81 Washington St)
__ Shellfish Laboratory (Brant Point)
__ Town Building (16 Broad St)
__ Visitor Services (25 Federal St)
__ Wannacomet Water (Milestone Rd)
__ Wastewater Treatment Plant (81 South Shore Rd)
__ Other _____

2. In which department(s) do you work?

3. Please rate your building on the following attributes on a scale from 1 (Poor) to 5 (Excellent).

__ Cooling
__ Employee communal areas
__ Employee parking
__ Exterior lighting
__ Heating
__ Interior lighting
__ Landscaping
__ Handicap accessibility
__ Noise
__ Personal office space
__ Plumbing
__ Storage space

If any attributes received a 3 or lower, please explain why.

4. How does the location of your department affect your ability to do your job efficiently? *Circle one.*
   Negative Impact 1 2 3 4 5 Positive impact

Please elaborate.

5. Please indicate how well the building in which you work serves the needs of the public. *Circle one.*
   Not at all 1 2 3 4 5 Extremely well

Please explain your choice. i.e. is there a lack of public parking availability? Lack of waiting space?

6. What other improvements or updates does your building need to maximize usability for the employees and the public?

7. Which of the town functions currently located downtown should remain downtown, and which should be relocated elsewhere? *Please note that Nantucket Bylaw 46-4 "Acquisition of Land for Town Offices" requires town functions to be downtown, unless otherwise approved at the Town Meeting.*
   Please select one option per function.

	Stay in town	Indifferent	Relocate
Assessor			
Courthouse			
Energy Office			
Finance			
Human Resources			
Human Services			
Parks & Recreation			
Procurement Office			
Registry of Deeds			
RMV			
Tax Collector			
Town Administration			
Town Clerk			
Visitor Services			

8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area? *Please select one option per function.*

	Move into town	Indifferent	OK out of town
Fire Department			
Health Department			
Information Technology & GIS			
Natural Resources Department			
Planning and Land Use Services			
Police Department			
Wannacomet Water			

Please explain your choices for questions 7 and 8 if you think any departments should be relocated.

9. Please explain which departments, if any, should be consolidated.

10. What other suggestions do you have for the improvement of town facilities?

Appendix M: Public Survey

Nantucket Town Facilities Public Survey

This survey is being conducted by a group of students from Worcester Polytechnic Institute (WPI), called the WPI TMO Team, to determine public opinion regarding issues with town facilities, and to determine what the public thinks can and/or should be done to address these issues.

1. Which of the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?
   Please note that Nantucket Bylaw 46-4 "Acquisition of Land for Town Offices" requires town functions to be downtown, unless otherwise approved at the Town Meeting.
   Please select one option per function.

	Stay in town	Indifferent	Relocate
Assessor			
Courthouse			
Energy Office			
Finance			
Human Resources			
Human Services			
Procurement Office			
Registry of Deeds			
RMV			
Tax Collector			
Town Administration			
Town Clerk			
Visitor Services			

2. Which town functions currently located out of town should move into town, or should remain out of the downtown area?
   Please select one option per function.

	Move into town	Indifferent	Remain out of town
Fire Department			
Health Department			
Information Technology & GIS			
Natural Resources Department			
Planning and Land Use Services			
Police Department			
Wannacomet Water			

3. Please explain your choices if you think any departments should be relocated.

4. What town facility do you visit most frequently?
   Please select one.

__ Department of Public Works Administration
__ Finance Building
__ Fire Station
__ Harbormaster Building (including bathrooms)
__ Memorial Airport
__ Natural Resources Department
__ NRTA
__ Nursing Home (Our Island Home)
__ Planning and Land Use Services (PLUS)
__ Public Safety Facility
__ Saltmarsh Senior Center
__ Town Building
__ Visitor Services

5. Please rate this building on the following attributes on a scale of 1 (Poor) to 5 (Excellent).

__ Parking
__ Nighttime lighting
__ General aesthetics
__ ADA compliance
__ Cleanliness
__ Bathroom quality
__ Meeting space
__ Waiting space

6. What is another facility you visit frequently?
Please select one.

__ Department of Public Works Administration
__ Finance Building
__ Fire Station
__ Harbormaster Building (including bathrooms)
__ Memorial Airport
__ Natural Resources Department
__ NRTA
__ Nursing Home (Our Island Home)
__ Planning and Land Use Services (PLUS)
__ Public Safety Facility
__ Saltmarsh Senior Center
__ Town Building
__ Visitor Services

7. Please rate this building on the following attributes on a scale of 1 (Poor) to 5 (Excellent).

__ Parking
__ Nighttime lighting
__ General aesthetics
__ ADA compliance
__ Cleanliness
__ Bathroom quality
__ Meeting space
__ Waiting space

8. What is another facility you visit frequently?
   Please select one.

__ Department of Public Works Administration
__ Finance Building
__ Fire Station
__ Harbormaster Building (including bathrooms)
__ Memorial Airport
__ Natural Resources Department
__ NRTA
__ Nursing Home (Our Island Home)
__ Planning and Land Use Services (PLUS)
__ Public Safety Facility
__ Saltmarsh Senior Center
__ Town Building
__ Visitor Services

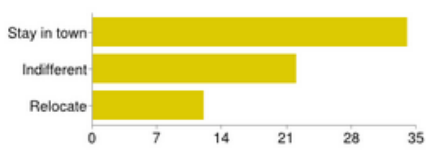
9. Please rate this building on the following attributes on a scale of 1 (Poor) to 5 (Excellent).

__ Parking
__ Nighttime lighting
__ General aesthetics
__ ADA compliance
__ Cleanliness
__ Bathroom quality
__ Meeting space
__ Waiting space

10. What else concerns you about this facility/these facilities?

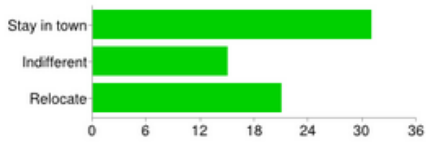
Appendix N: Town Employee Survey Results

Assessor [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



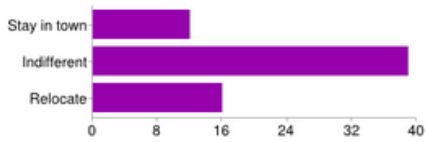
Stay in town	34	49%
Indifferent	22	31%
Relocate	12	17%

Courthouse [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



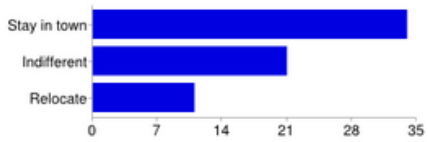
Stay in town	31	44%
Indifferent	15	21%
Relocate	21	30%

Energy Office [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



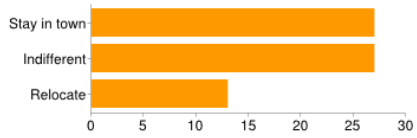
Stay in town	12	17%
Indifferent	39	56%
Relocate	16	23%

Finance [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



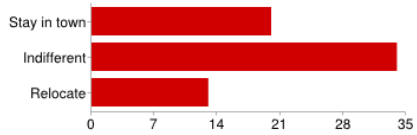
Stay in town	34	49%
Indifferent	21	30%
Relocate	11	16%

Human Resources [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



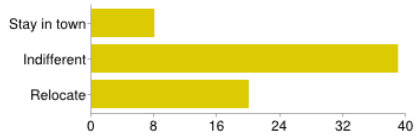
Stay in town	27	39%
Indifferent	27	39%
Relocate	13	19%

Human Services [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



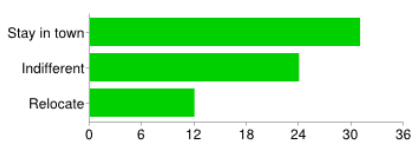
Stay in town	20	29%
Indifferent	34	49%
Relocate	13	19%

Parks & Recreation [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



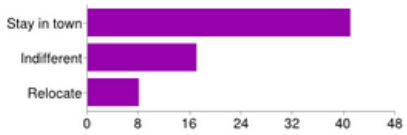
Stay in town	8	11%
Indifferent	39	56%
Relocate	20	29%

Procurement Office [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



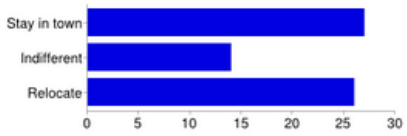
Stay in town	31	44%
Indifferent	24	34%
Relocate	12	17%

Registry of Deeds [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



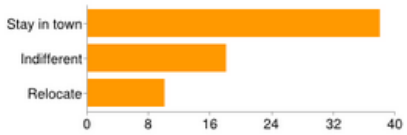
Stay in town	41	59%
Indifferent	17	24%
Relocate	8	11%

RMV [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



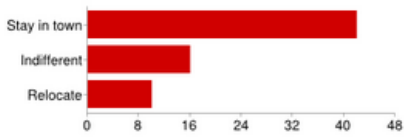
Stay in town	27	39%
Indifferent	14	20%
Relocate	26	37%

Tax Collector [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



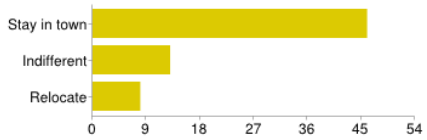
Stay in town	38	54%
Indifferent	18	26%
Relocate	10	14%

Town Administration [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



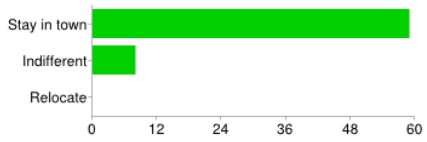
Stay in town	42	60%
Indifferent	16	23%
Relocate	10	14%

Town Clerk [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



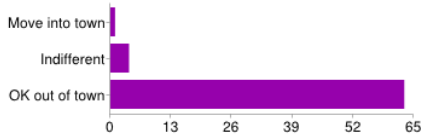
Stay in town	46	66%
Indifferent	13	19%
Relocate	8	11%

Visitor Services [7. Which the town functions currently located downtown should remain downtown, and which should be relocated elsewhere?]



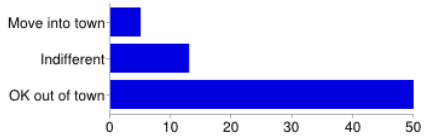
Stay in town	59	84%
Indifferent	8	11%
Relocate	0	0%

Fire Department [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



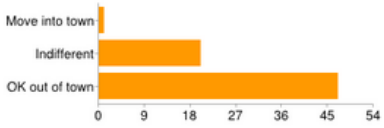
Move into town	1	1%
Indifferent	4	6%
OK out of town	63	90%

Health Department [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



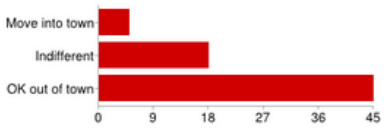
Move into town	5	7%
Indifferent	13	19%
OK out of town	50	71%

Information Technology & GIS [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



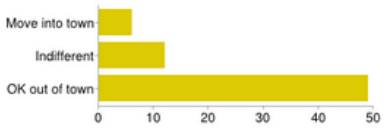
Move into town	1	1%
Indifferent	20	29%
OK out of town	47	67%

Natural Resources Department [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



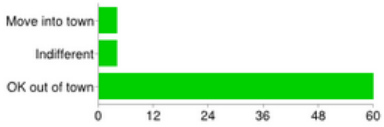
Move into town	5	7%
Indifferent	18	26%
OK out of town	45	64%

Planning and Land Use Services [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



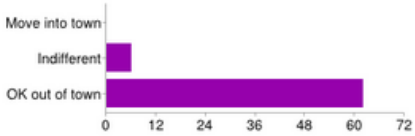
Move into town	6	9%
Indifferent	12	17%
OK out of town	49	70%

Police Department [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



Move into town	4	6%
Indifferent	4	6%
OK out of town	60	86%

Wannacomet Water [8. Which town functions currently located out of town should move into town, or are okay to be out of the downtown area?]



Move into town	0	0%
Indifferent	6	9%
OK out of town	62	89%