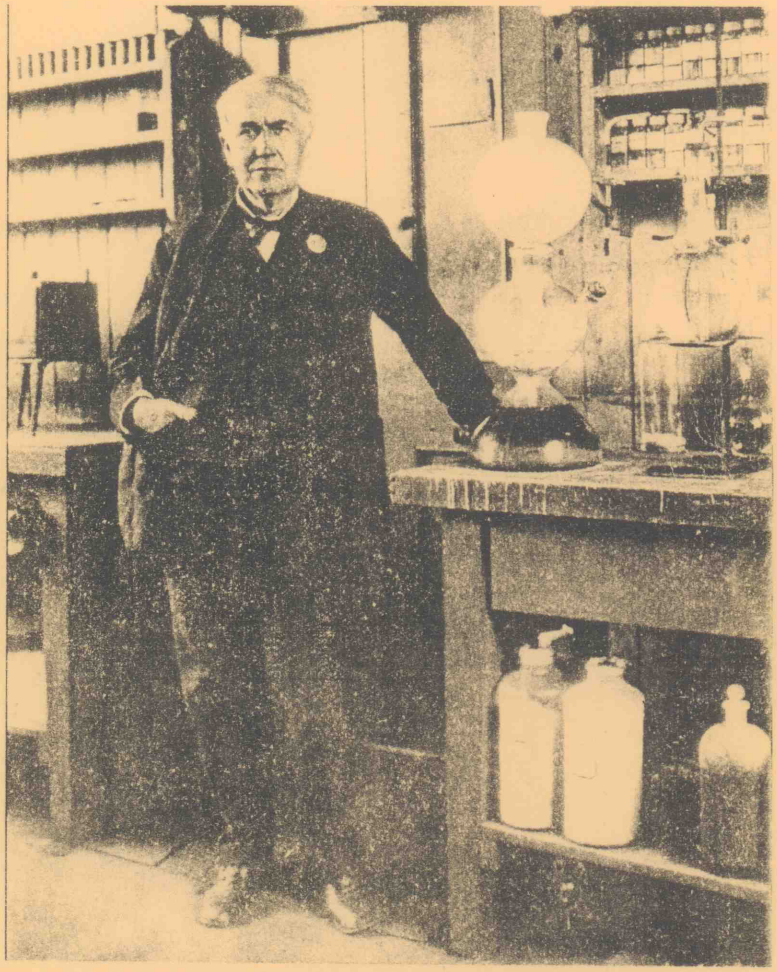
DEVELOPMENT CONCEPT/ENVIRONMENTAL ASSESSMENT

EDISON NATIONAL HISTORIC SITE

West Orange, New Jersey



Prepared for:

The National Park Service

January 1998

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1. SUMMARY

Introduction

At the 1997 conference "Interpreting Edison", which coincided with the 150th anniversary of the inventor's birth, a common theme, the reevaluation of Edison as an inventor, businessman and father, tied together many of the presentations. The myth of Thomas Edison, "The Wizard of Menlo Park", is being reconsidered by experts from a wide range of disciplines. Industrial historians, sociologists, business historians and many others are all taking a closer look at Edison, his life, and his accomplishments. This incredible range of interest is more than just academic curiosity. There is a particular relevance in who Edison was, what he did, and how he did it , to our world today. In an era where technological innovation and changes occur almost daily, many people look back on Edison's work with the telegraph, the phonograph, and the storage battery as something far removed from our era of cellular phones, compact disc players and photovoltaics. It was Edison's method of invention and his desire to formalize the process into a business, however, that is as compelling a story today as it was to the world at the turn of the century.

The Edison National Historic Site, which incorporates both Edison's West Orange laboratory as well as his private home "Glenmont", offers an unparalleled opportunity to relate this story to a modern audience. The completeness of the site; buildings, furnishings, artifacts, documents, and personal papers; places this site in a position to interpret Edison for the public in a way that no other site in the world can possibly match. The site's wealth has been recognized since it first became part of the National Park system in 1956, only 25 years after Edison's death. How to take advantage of this wealth, has been discussed in a number of plans and studies in the past forty years.

This report is the summary of a new initiative aimed at updating the architectural and interpretive designs for the site and laying the groundwork for developing an implementation plan. The scope of the current effort was to focus on pre-design and feasibility study services that would provide guidance for the next stages of the project and to be utilized as part of a dedicated effort to raise the funds necessary to carry out the work. The design team that was assembled for this project included architects, engineers, landscape architects, interpretive designers, exhibit designers, museum specialists, materials conservators and marketing specialists. The objective of the team was to develop, in conjunction with the National Park Service, a shared vision for the future of the Edison National Historic Site. As part of this process the team collectively assembled their thoughts and created the following vision statement to guide their effort.

Edison National Historic Site- A Vision for the Future

For 44 years, from 1887 to 1931, Thomas Edison's laboratories and factories in West Orange, New Jersey, were a dynamic expression of the spirit of American enterprise. Edison, the self-made man, was a hard-working, imaginative optimist, who working with a talented staff, took calculated risks, persevered in the face of failure, and achieved notable successes at the West Orange site. The inventions and products that were developed here laid the technological foundations of the twentieth century. This site was a new kind of place, a business dedicated to the science of invention, the prototype for what we now know as a "Research and Development Center". This site, these buildings, these rooms are where ideas led to experiments, experiments to prototypes, and prototypes to the manufacture of a vast array of products that transformed the lives of people throughout the world.

Recently listed as one of America's most endangered historic properties, the Edison National Historic Site is on the brink of a new era, with the opportunity to become vital and vibrant once again. However, this time the site will not produce inventions, but will involve and excite a growing local, national, and international audience of school children, families, scholars, and individuals. Visitors will explore the site, buildings and exhibits, learning by doing, becoming actively engaged in the process of discovering and understanding Edison, his work, and the processes of creativity, invention and innovation.

The site will be a lively mixture of the old and the new. The historic buildings and the site will be carefully preserved and new technologies, many of them descended from or related to Edison's work, will be used in exhibits and education programs to help visitors experience and comprehend the enormous excitement and impact of Edison and his work. Key spaces of the historic laboratory buildings, such as Edison's library and the Chemistry Lab, will remain virtually unchanged, retaining the feeling that the "old man" just walked out of the door. Other spaces will utilize displays and exhibits to tell the incredible stories of the site, from the creation of the motion picture industry to the people who stood at the machines and turned out the products. A new building, the Thomas Alva Edison Resource Center, will provide much needed space for preserving and studying the priceless collections, visitor amenities and services, exhibits, and educational facilities. Edison's nearby home, Glenmont, will offer expanded programs and the opportunity to focus on his less well-known, personal life. The site will once again have a world-wide impact, this time through programs and services disseminated via the Internet and other communication technologies.

Visitors will discover Edison the boy, the man, the husband and father, the great inventor, the holder of 1,093 patents. They will understand the forces that shaped his life and work, and how his work shaped the lives of people around the world. This will be accomplished by using the magic that comes only from being in the real place where real people achieved great things. Not a stage set, this site is

rich with the atmosphere of Edison's genius; the objects, the inventions, the prototypes, and the machinery are all here. The 300,000 objects and 5 million pages of paper in the collection will be opened to the public through traditional exhibits as well as through computer databases and CD-Rom technologies.

With a combination of the new facilities and historic spaces, programs and exhibits, laboratory and grounds, the Edison National Historic Site will become a time machine that opens doors to the past, present and future. Visitors will discover not just Thomas Edison and his inventions, but will learn about their impact on our lives then and now. Inspired by the content and technologies of the exhibits and educational programs, visitors will adopt Edison's adventurous, inquisitive, creative, can-do spirit.

Findings

The following is a summary of the findings and recommendations included in this report. The list is organized following the chapter format of the report.

1. An extensive amount of research and various studies have been produced in the past thirty years regarding the Edison National Historic Site. Most of this information is still valid and should be used as a basis for the ongoing work.

2. A space needs analysis of the Edison site indicates that approximately 60,000 gross square feet of space is needed to meet the needs of the staff, visitors and the collection. This number assumes no increase in staff or collection.

3. The current Edison site represents a small portion of what was once the West Orange facility. While the core of the historic laboratory is intact, the visual characteristics of the site have been altered due to the loss of most of the surrounding manufacturing buildings.

4. The outdoor spaces, between and around the laboratory buildings, is visually out of context with the interpretation of the building interiors. The lack of interpretation of the outdoor spaces is a lost opportunity to heighten the visitor experience and to strengthen the interpretation of the entire site. Options are available including a "clean" site, period restoration, and adding an interpretive layer, that can be used individually or in careful combinations as warranted over the entire site.

5. The key historic buildings, both at the laboratory site and at Glenmont, are in good physical condition. The building systems (heating, cooling, plumbing, electrical, fire protection) include elements that date to the original construction at the site as well as a variety of additions and

modifications. Any development at the site will require upgrade and modifications to the building systems.

6. The existing buildings, due to space needs at the site, are used for non-public uses that are not compatible with the building construction. Offices, research areas, archival storage and general storage are located throughout the complex, limiting the potential for accessibility for the public.

7. Visitors are not oriented to the site as they were during the period of significance. The traditional entry to the site for visitors, the gate on Main Street, is used only on special occasions.

8. Key historic spaces, including the Music Room and the Precision Machine Shop, are not open to the public due to accessibility limitations. A key goal of any development should be to open as much of the historic buildings to the public as possible, which will mean the installation of an elevator(s) in Building #5.

9. Space, accessibility and budget/staffing restrictions currently limit the interpretive options at the site. The range of information that could be offered is almost limitless. The interpretive scope of the site should be expanded to take advantage of the site resources to increase visitation, and to make the site relevant to as wide a range of visitors as possible.

10. The ability to open the historic elements of the site to the public will rely on a new piece of construction to house staff offices, archival storage, research facilities, visitor amenities and some exhibits. The new building should be located on the lab site, along Alden Street, and should serve as a visual barrier to close off unwanted vision corridors off the site. The new building should be compatible with the historic buildings but should clearly be a new element within the construction history of the site.

11. While a number of building types still exist at the lab site they do not represent the full range of buildings that comprised the West Orange facility at the height of its activity. Building #11, which was moved to the Greenfield Village Museum in Dearborn, Michigan, in the 1940s is available for relocation back to West Orange. This wood-framed building should be brought back and reassembled on its original site.

12. Most of the resources at the site are related to the period of significance of the site, 1887-1931. Two non-contributing elements are the large storage vault, Building #12, and the recreation of the Black Maria, Building #13. The storage vault should be removed, which will allow the courtyard and site to be reconstructed more in keeping with the period of significance.

The Black Maria can still serve as a teaching tool, but should be relocated to the east end of the site, closer to the original site of the Black Maria.

13. The proposed development of the site will require modifications to historic buildings, sub-surface disturbance, and new construction on the historic site. All work must be done in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties and coordinated with Section 106 of the National Historic Preservation Act.

14. A successful development of the site should result in some degree of increased visitation, which will put an increased level of risk on the historic fabric. Increased visitation will also offer greater educational opportunities and will be beneficial to the downtown business district of West Orange.

15. The industrial history of the site and the surrounding area suggest a need for precaution regarding the presence of hazardous materials, particularly below grade. A Phase 2 hazardous waste investigation should be completed for areas that will be disturbed during construction.

2. PREVIOUS STUDIES

Introduction

Since 1966 there has been an ongoing effort to study, document, analyze and develop recommendations for the future of the Edison National Historic Site. Over the past thirty years there have been shifts in the approach of the National Park Service, advances in the field of historic preservation and new approaches to museum/interpretation design. Some of the studies built on earlier work, while others started fresh, looking at the issues from a different perspective.

This study was undertaken with the understanding that the wealth of material already available should serve as a resource for this new work. A great deal of well researched, useful information was already available for the team to use as groundwork. The following is a brief synopsis of the past studies which were utilized. The studies are listed in chronological order.

Synopses of Pertinent Studies

1966 - The Master Plan, Edison National Historic Site

22" x 36" format, 27 pages.

The first comprehensive analysis and plan for the site includes narrative sections on objectives, management programs, resource management plan, visitor use plans, schedules, development analysis, historical information and other topics.

While some of the information is outdated, this document does contain good basic information regarding the existing buildings, the site and their other resources. The plan includes both the Laboratory Unit and Glenmont.

The development plan is particularly interesting, calling for a new building to house a visitors' center, administrative offices and a maintenance facility located to the north of Vault #12, and parking located across Main Street. The proposed visitor entrance to the site is located on Alden Street with a conducted tour making a circuit through virtually all of the existing buildings, but limited to the first floor.

April 1977 - Final Master Plan

8" x 10-1/2" format, 62 (plus) pages

An updated version of the 1966 document covering much of the same material.

There is much emphasis on documentation and analysis with limited space devoted to the description of future developments. The section on *Future Plans* lists six items that need to be undertaken, including four studies. As with the 1966 Master Plan there is information about the projected uses for the individual buildings, and not much discussion of the outdoor spaces.

December 1989 Building Use and Operational Space Analysis.
8-1/2" x 11" format, 34 pages.

This study evaluated the existing space use of the site and projected future use needs based on the recommendations of a 1986 Operations Evaluation Final Report.

The total estimated floor space at the laboratory site was listed as 64,323 square feet. The total estimated future office space needs was 6,096 square feet, and collection storage requirements was 10,129 square feet.

Of particular interest at the end of the report are cost estimates for undertaking the recommended improvements. The total cost, including construction and fees was estimated at $950,000.

There are two aspects of this report which bring the conclusions into question. First the future space needs appear to be low, having left out secondary spaces such as mechanical, storage etc. Secondly there is no correlation between projected space needs and how that fits into the existing buildings, if at all.

1990 - Statement for Management - Review
8-1/2" x 11" format, 33 pages

Incorporates some information from previous studies. The goal of the report is to summarize the management objectives at the site as they relate to the resource.

May 1991 - Interpretive Prospectus — Review for cost info on exhibits
8-1/2" x 11" format, 38 pages.

Assembled by the Division of Interpretive Planning in Harper's Ferry. This study followed up a 1990 Interpretive Issues Conference hosted at the site. The conference focused on long-term goals and planning. The prospectus presents specific recommendations for interim development to complement the long term plan.

The prospectus addresses both the Laboratory Unit and Glenmont and explains the nature of the entire site, interior and exterior. **Projected costs are included for exhibits, audio visuals, furnishings and conservation work.**

August 1992 - Strategic Planning Draft
8-1/2" x 11", 4 pages

An outline summary of the goals and visions regarding the site. The goals are strategic in nature and do not deal with specifics of the site.

February 24-25, 1993 - Management Objectives Workshop Revised
8-1/2" x 11", 7 pages

A synopsis of a two-day workshop to develop management objectives for the site. Issues covered included cultural resources, development and visitor services.

October 1993 - Space Needs Projections
8-1/2" x 11" format, 8 pages
11" x 17" format, 11 pages

Prepared for use in a two-day design charrette to be held at the site. This document updated the space needs projections from 1989. Also included were adjacency bubble - diagrams.

The space needs projections are questionable for the same reasons as the earlier effort. The bubble diagrams were critical to understanding how the staff felt the site should be organized.

1993 - Charrette Summary Document
8-1/2" x 11" format.

The results of the two-day design charrette included three site plan options. In each a new visitor center was shown, one was across Main Street, the second at the northwestern corner of the site, and the third in the former Storage Battery Building across Lakeside Avenue. The plans were used as a starting point for discussing the design options that should be explored by our team.

June 1994 - Personal Vision Statements, Edison Site Staff
8-1/2" x 11" format, 16 pages

Site staff were asked to write vision statements about the site. While the

statements varied in length and style, two themes were paramount: the visitor's experience, and preserving the resource.

January 1995 - Specifications for Window Painting and Repair, Masonry Repair, and Roofing Replacement

8-1/2" x 11" format. Review

Prepared by the Building Conservation Branch, Lowell, Massachusetts. The specifications include useful information regarding the exterior materials and conditions of the older laboratory buildings.

April 1995 - Edison Laboratory HSR, Outlines: Research Notes

8-1/2" x 11" format, 264 pages

Compiled by the Building Conservation Branch. The outline focuses on documentation regarding the construction and modifications at the laboratory site. It utilized some primary and some secondary documents as sources. It is an excellent source for gaining a quick understanding of each building's history, with some materials information also included.

May 1995 - Visitor Services Project

8-1/2" x 11" format, 2 volumes

Produced by the Cooperative Park Studies Unit at the University of Idaho. The report is the result of a visitor survey conducted August 7-13 1994. This is the best source for information regarding visitor demographics and views regarding various aspects of the site. Not surprisingly, many of the visitors liked the site, but wanted to see and do more.

1995 - Historic Furnishings Report, Edison Laboratory

8-1/2" x 11" format, 2 volumes, 768 pages

Prepared by the Division of Historic Furnishings, Harpers Ferry Center. The report is an exhaustive, well documented study of the laboratory buildings. It includes construction history, information on Edison employees and many photographs. These two volumes are an invaluable resource for grasping the historical background of the laboratory site in both written and graphic format.

May 1996 - Cultural Landscape Report for the Laboratory Unit. Review

8-1/2" x 11" format, 120 pages.

Prepared by the Olmstead Center for Landscape Preservation. The report is a

detailed record of the history of the site, and serves as a companion piece to the Historic Furnishings Report. One of the most valuable elements is the series of chronology drawings which illustrate how the site was developed.

Written and graphic documentation also fill in the void regarding the appearance of the outdoor spaces, which had not been addressed in previous studies.

July 1996 - On-Site Education Program Evaluation Report

8-1/2" x 11" format, 19 pages.

Prepared by the Cooperative Park Education Unit, Lowell, Massachusetts, the purpose of the study was to assess an on-site education program, in this case "Idea to Product: The Edison Way". The report's findings were that this program was successful on many levels and that similar educational programs should be developed.

Other documents relating to the Edison site have not been included because they were not germaine to the current effort. The studies that were utilized covered the entire range of issues: site planning, interpretation, new construction, preservation, etc. The information available through the documents listed above was critical to beginning this study on firm footing.

3. SPACE USE NEEDS ASSESSMENT

Introduction

The following space use program summarizes the program needs of the Laboratory Unit of the Edison National Historic Site. This program was developed after reviewing previous program documents, visiting the site to review current space use, and meeting with the Edison National Historic Site staff to review each division's staffing levels and space needs.

Prior to this project two programming documents were compiled which were used as a starting point for the current effort. A 1989 study titled *Edison National Historic Site: Building Use and Operational Space Analysis* compiled a comparative analysis of space use and staffing at that time with "long-term" space use needs. A brief analysis was included of uses of each of the existing buildings. The final chapter of the 1989 report is a budget cost estimate for implementing the findings of the study.

In 1993, in preparation for a two-day design charrette at the site, an updated program was developed by Mr. Herb Nolan of the National Park Service Office in Boston (now the New England Systems Support Office). This updated program was developed in conjunction with the Edison NHS staff and included a set of bubble diagrams illustrating adjacency requirements for certain program elements. Unlike the 1989 study, however, no budget cost estimates were included in the 1993 study.

Tabulation of Spaces

The following breakdown summarizes the space use needs as determined by the National Park Service and the project team in 1997. These figures are not location specific. They do not anticipate what, if any, of the projected need can be accommodated in the existing buildings, and what new construction may be required.

	Quantity	Net sq.ft. each	Sub-total	
1. Park Management				
Offices				
Superintendent	1	240	240	
Deputy Superintendent	1	180	180	
Secretary	1	90	90	
Other				
Reception	1	90	90	
File Storage	1	90	90	690

2. Park Administration				
Offices				
Administrative Officer	1	180	180	
Administrative Technician	1	120	120	
Other				
Mailroom/Copier/Fax	1	500	500	
Computer Room (Network)	1	120	120	
Receiving	1	135	135	
				1,055
3. Interpretation				
Offices				
Division Chief	1	180	180	
Supervising Park Ranger	1	120	120	
Park Rangers	10	90	900	
Other				
Work Area (shared)	1	120	120	
				1,320
4. Museum Services				
Offices				
Supervising Museum Curator	1	180	180	
Collections Manager	1	120	120	
Registrar	1	90	90	
Museum Technicians	3	90	270	
Archivist	1	120	120	
Processing Archivist	1	120	120	
Archives Technician	1	90	90	
Research Archives Technician	1	90	90	
Temp. Archives Technicians	2	60	120	
Sound Recording Curator	1	120	120	
Other				
File Storage	1	250	250	
Examination Room	1	300	300	
Processing Office	1	540	540	
Examination Room	1	300	300	
Research Library	1	1,000	1,000	
Recording Studio	1	400	400	
Photo Lab	1	400	400	
Clean Shop	1	400	400	
Fabrication shop	1	500	500	
				5,410

5. Edison Papers Project				
Offices				
Project Director	1	180	180	
Assistant Editors	6	90	540	
Other				
Examination Room	1	300	300	
				1,020
6. Protection				
Offices				
Supervising Park Ranger	1	120	120	
Security/Enforcement	3	90	270	
Other				
Secure Storage	1	30	30	
Security Room	1	150	150	
(Monitors/Alarms)				570
7. Maintenance				
Offices				
Chief of Maintenance	1	180	180	
Other				
Conference Room (10 people)	1	250	250	
Locker Room (10 people)	1	250	250	
Storage	1	2,000	2,000	
Shop	1	500	500	
Garage	1	1,500	1,500	
Loading Dock	1	200	200	
				4,880
8. Archives/Artifacts Storage				
Manuscripts	1	2,000	2,000	
Artifacts	1	5,000	5,000	
Sound Recordings	1	750	750	
Film and Photographs	1	540	540	
				8,290

9. Shared Facilities				
Staff Library	1	400	400	
Conference Room (20 people)	1	500	500	
Staff Rest Rooms	1	200	200	
Staff Locker Room/Showers (45)	1	1,000	1,000	
Staff Lunchroom/Kitchenette	1	500	500	
Staff Mailboxes	1	80	80	
				2,680
10. Visitor Program				
Bookstore - Display	1	400	400	
Bookstore - Storage	1	150	150	
Bookstore - Office	1	150	150	
Information	1	75	75	
Ticket Sales	1	75	75	
Public Telephones	1	75	75	
Public Restrooms	1	400	400	
Theatre/Lecture Hall	1	3,400	3,400	
Multi-function Rooms	4	700	2,800	
Catering Kitchen	1	250	250	
Orientation Exhibit	1	700	700	
Exhibit	1	5,000	5,000	
First Aid	1	150	150	
				13,625
11. Educational Program				
Classroom (30-35 people)	1	900	900	
Lunchroom	1	1,000	1,000	
Restrooms	1	300	300	
				2,200
			TOTAL (Net)	41,740 SQ.FT.
If we assume a ratio of 65% (Net)/35% (Circulation Mechanical)			TOTAL (Gross)	64,215 SQ.FT.
70% (Net)/30% (Circulation Mechanical)			TOTAL (Gross)	59,625 SQ.FT.

When evaluating these numbers the following issues must be taken into account.

1. Staffing is not projected to increase from current levels.
2. Shared use of spaces between divisions may result in space savings.
3. Some space needs may be adjusted to coordinate with available space within an existing building. (This could result in either an increase or a decrease).

4. SITE ANALYSIS, USE & INTERPRETATION

Introduction

The current 5.78-acre Laboratory Unit of Edison NHS is composed of the original 2-acre Edison Laboratories property, plus a parcel of land formerly part of the National Phonograph Company immediately adjacent to the laboratory site to the north, plus a non-historic parcel of land located across Main Street to the west. The non-historic parcel accommodates parking for staff and visitors, as well as two buildings which house NPS maintenance facilities. The historic parcels across Main Street contain the six original laboratory buildings constructed in 1887, as well as seven structures subsequently added to the site. Located about a mile west of the Laboratory Unit is Glenmont, Edison's Llewellyn Park home. Together, these two sites comprise the Edison National Historic Site.

A field reconnaissance, archive review, study of previous reports, and reading of the *Cultural Landscape Report for the Edison National Historic Site: Laboratory Unit, Part I: Site History*, have revealed that changes have occurred to the Laboratory property and its surroundings, both during and after Edison's tenure there. While the core structures of the Laboratory remain intact, over time buildings were both constructed and demolished, various experiments left their mark, and changes were made to the structures and landscape as the Laboratory property was transformed into a historic site for public visitation. Both change and continuity bring us to the existing conditions. Together the historic record, the existing conditions and the proposed uses of the Laboratory property all contribute to a site analysis, exploration of site interpretation directions and overall site plan alternatives that are explored in this chapter.

A. Historic Context and Character

Context

The core of the Laboratory Unit of Edison NHS is composed of the remaining buildings and features of the "Edison Laboratories," the research and development arm of Edison's many industries. Substantially intact today, the Edison Laboratories were once surrounded by a busy industrial zone of about 22 acres of Edison manufacturing facilities, collectively known as the "West Orange Plant." These facilities were generally massive, multi-storied concrete structures, dwarfing and surrounding the smaller Laboratory facilities. (Figure 1)

When, in the decades following Edison's death, many of the industrial buildings of the West Orange Plant were torn down, the Laboratories lost an important contextual framework. Today, the Edison Laboratories stand predominantly alone, in a light industrial and commercial area, which has little of the historic character of the original

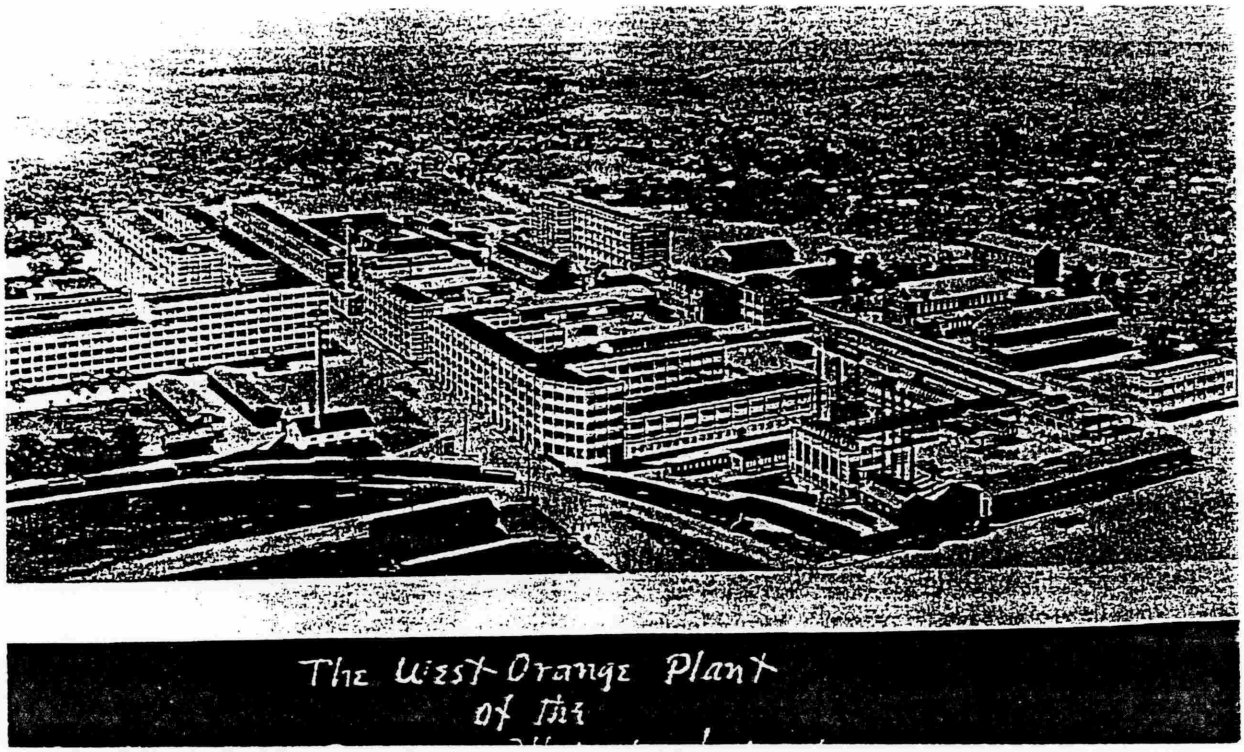


Figure 1
A rendering of the West Orange Plant, ca. 1917. This is how the plant looked after reconstruction due to the fire in 1916. (EDIS archives, photo 10.380/25)

West Orange Plant. The large Storage Battery Factory still stands across Lakeside Avenue providing a remnant of the former scale relationship and context. However, within this diminished physical context, the key role of the Laboratory Unit as the source of the inventions being manufactured by a large industrial complex, is not immediately evident to the visitor.

The other historic contextual linkage is between the Edison Laboratory and the Edison home, Glenmont. Edison is said to have walked to work through his Lewellyn Park neighborhood to reach the Laboratory and the rest of the West Orange Plant. Lewellyn Park is a historically significant subdivision and Edison's Glenmont, encompassing about twelve acres, is a gracious, landscaped estate. There is a relatively short distance between the Laboratory complex and Lewellyn Parks' Glenmont. The tangible connection between Thomas Alva Edison's home and work place remains in that Glenmont is the companion unit to the Laboratory parcel in the Edison National Historic Site.

Enclosure

The loss of the complex of manufacturing facilities around the Laboratories and of some elements of the Laboratory complex itself has also affected the physical perception of the property. This is perhaps most strongly manifested in the altered sense of enclosure on the Laboratory property. Once surrounded by tall industrial buildings, the Laboratory area originally possessed a strong sense of physical enclosure; the courtyard area appeared almost as a canyon at the heart of a dense landscape of taller industrial buildings. (Figure 2) Because many of the surrounding industrial buildings were demolished, the Laboratory site now lacks the vertical boundaries of these walls and the sense of physical enclosure.

Inside the Laboratory, the loss of four small buildings at the north end of the court, including the Garage and Garage/Experimental Studio, (Figure 3) altered the functional relationships and enclosure along the north side of the Laboratory complex. The building of the Storage Vault, after Edison's death, placed a low mass in the same general area as these four buildings. The Storage Vault also served to change the scale, massing and appearance of courtyard enclosure.

Appearance/Character

The historic character of the Laboratory site, as seen in historic photographs, was utilitarian, with spaces alongside and between the buildings filled with equipment, supplies, debris, bicycles, demonstrations or experiments in progress. (Figure 4) One imagines that historically, the Edison Laboratory site was a world with distinctive sights, smells, and bustling activity.

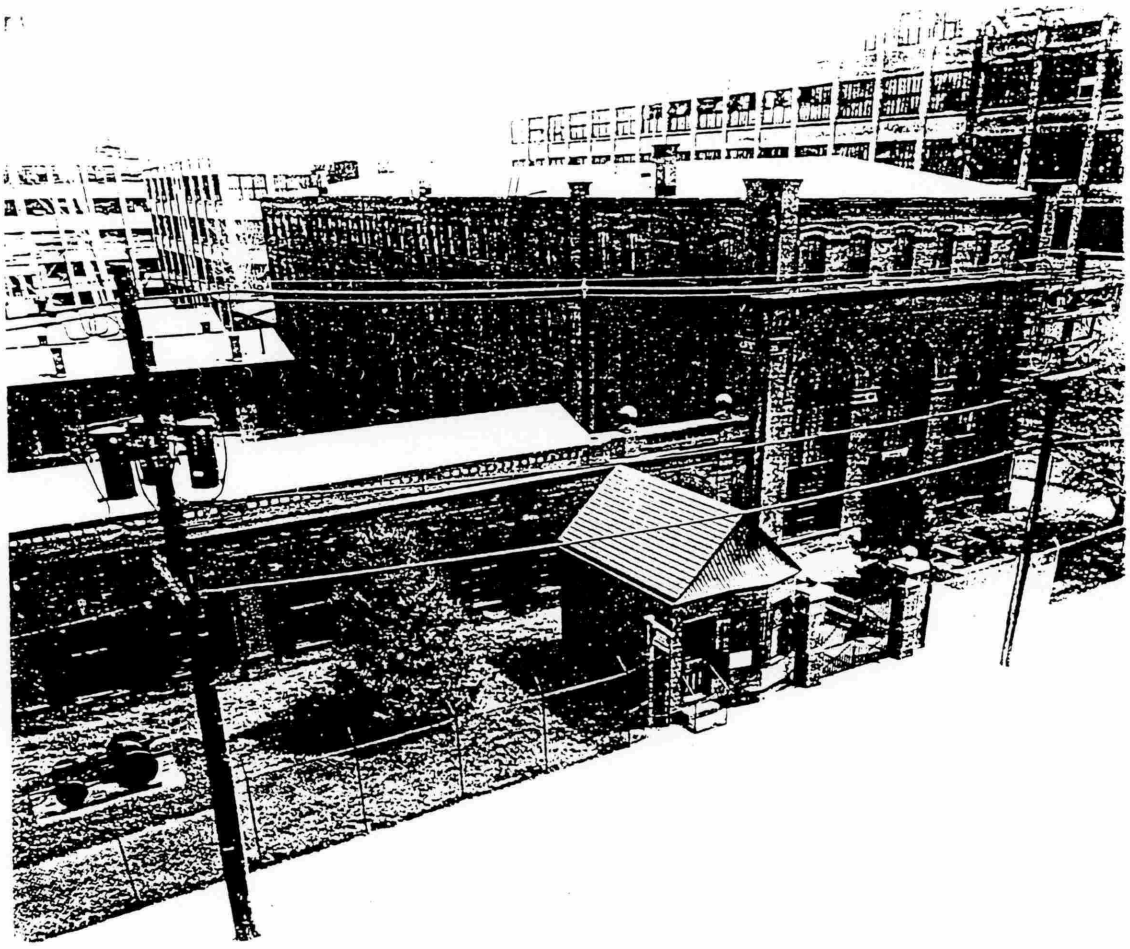


Figure 2
A view of buildings #1, #5 and the gatehouse from across Main Street showing the sense of enclosure once offered by the surrounding manufacturing buildings.
(EDIS archives, photo 12.450/50)

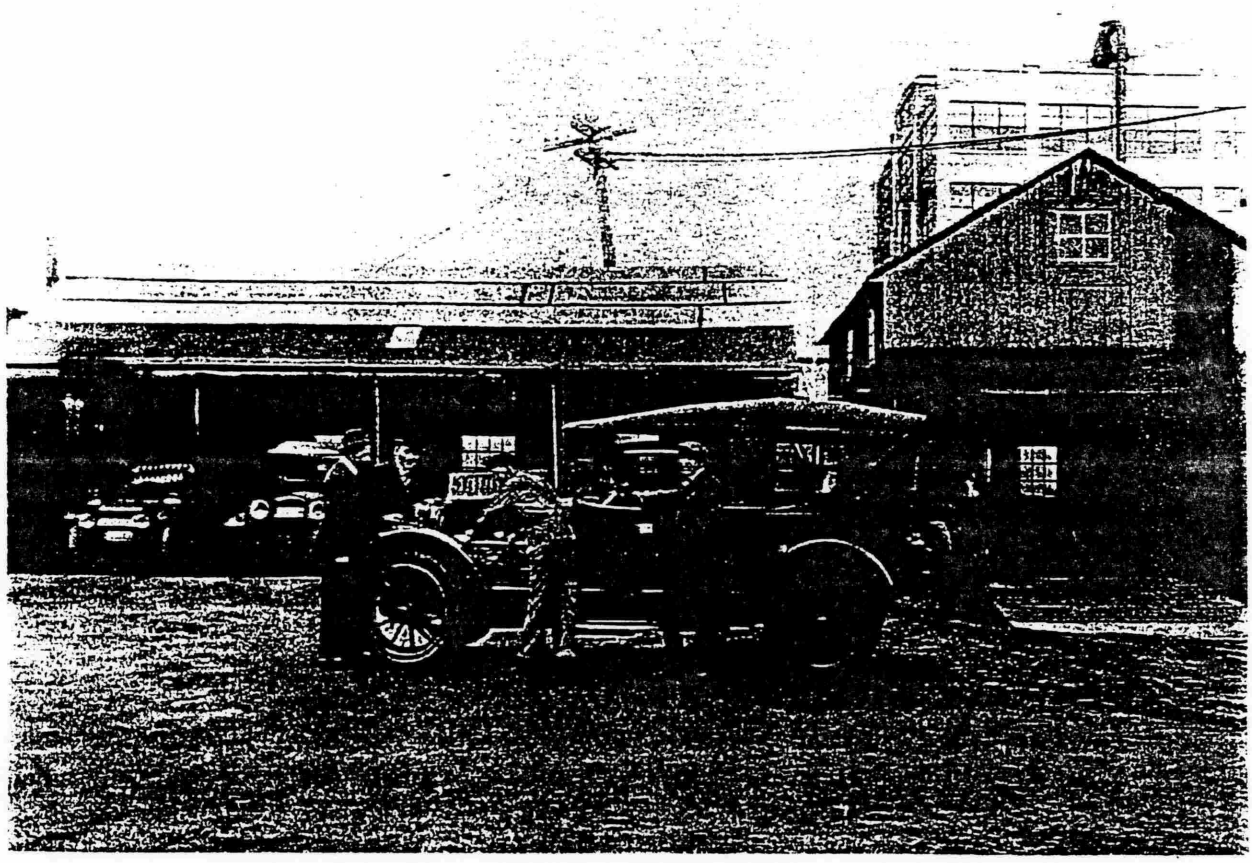


Figure 3
The north edge of the courtyard enclosed by building #10 (garage) and building #11 (garage/ experimental studio), 1917. Behind building #11 the upper floors of the phonograph works building are visible.
(EDIS archives)

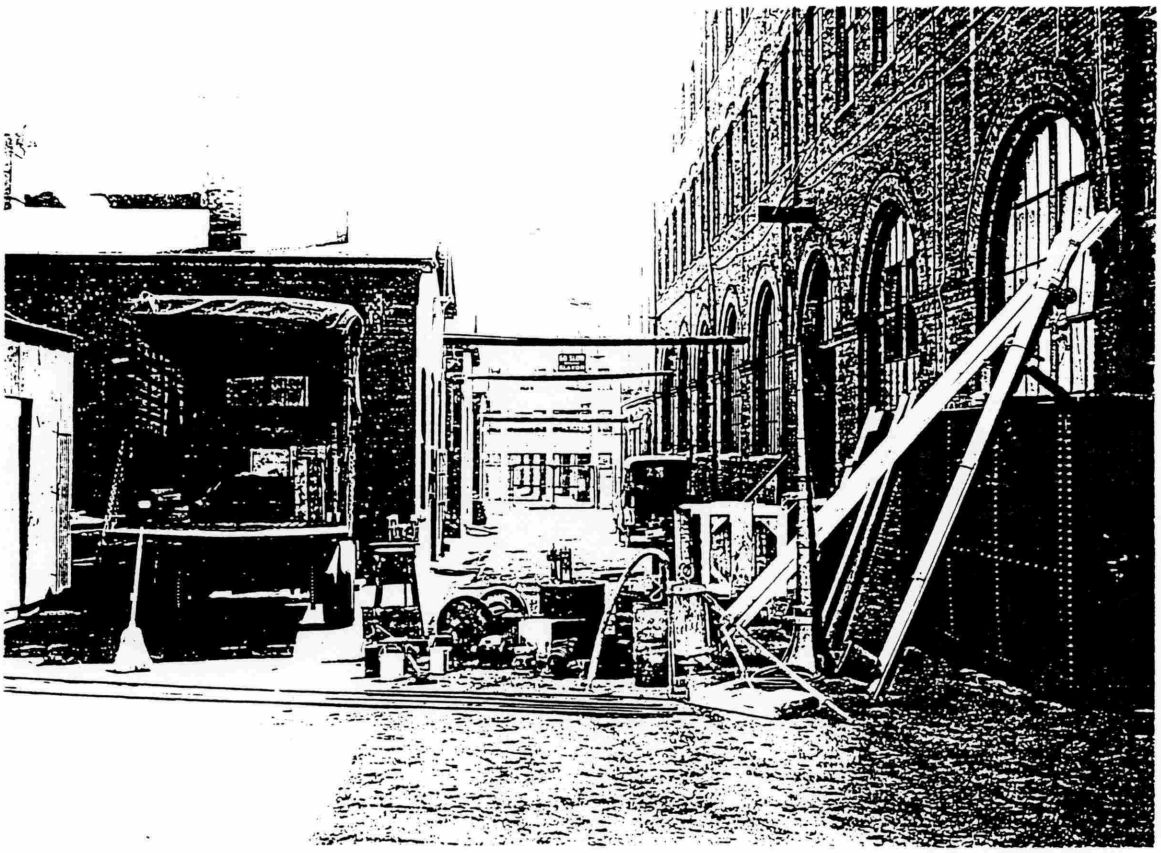


Figure 4
Equipment and trucks in the courtyard, August 19, 1917.
(EDIS archives, photo 10.380/27

The current appearance of the site is swept clean and bare with paved surfaces predominating in most areas. However, the courtyard interior is quite "park-like," with maintained lawns and foundation plantings, especially around the Storage Vault. This green, well-tended appearance contrasts strongly with the utilitarian character of the exterior spaces prior to 1931. Today the space exterior to the buildings is used for little other than transit; and it is not until you get inside the historic buildings that contain original artifacts that the Laboratory complex takes on some of the appearance and character of its active years.

Entry Sequence

One currently enters the Edison National Historic Site through Building 6, off Lakeside Avenue. Although this building houses the Visitor Center, where an orientation to the site is provided, entering from this building feels as if one is entering through a back door. That visitors do not use the Main Gate to enter the site is a missed opportunity in conveying to visitors how it must originally have felt to enter Thomas Edison's research realm.

Laboratory to Glenmont Relationship

Although the Laboratory Unit is located quite close to Glenmont, Edison's home in Llewellyn Park, the connections between the two units of the Edison NHS are not particularly strong. This is partially due to access restrictions required by the residents of Llewellyn Park. Glenmont provides a number of additional, Edison-related interpretive themes that may appeal to a particular group of visitors. Currently the two properties are not integrally linked. Glenmont, as the embodiment of Edison's family and home life could be another opportunity to open the Edison's world to the visitor. Addressing restrictions to visitor access of Llewellyn Park and more fully integrating the Glenmont property into the visitor experience at the Edison NHS should be explored.

B. Landscape Preservation Issues

Because Edison NHS is a federally-owned historic property listed on the National Register, actions proposed in the development of the site must meet the standards for treatment of historic properties as determined by the Secretary of the Interior. Two major issues arise when considering these standards- period of significance and appropriate treatment.

Period of Significance

Some thought should be given to the most relevant and appropriate period of significance for the Laboratory complex site, structures and features. The management objectives workshop cites 1910-1920 as appropriate dates for the restoration of selected historic interiors for the laboratories. The significance of the Laboratory complex could be thought to begin with initial construction in the 1880s and end with Edison's death. Capturing a broader range of dates for the period of significance, such as 1887-1931, would include the concept of property evolution through over four decades. This approach will likely favor the later years as the site evolved. It would provide the greatest number of interpretive opportunities in addressing the physical aspects of the historic property (as opposed to new exhibits).

However, with such a broadly defined period, care must be taken to avoid anachronistic settings, where adjacent areas might be treated in a manner that never existed in history. Potential anachronisms between the exterior and interior settings will require careful consideration, given changes within the site.

As indicated in the *Cultural Landscape Report: Site History, Existing Conditions, and Analysis*, during the Edison stewardship period from 1914 to 1931 the busy site was an active experimental and manufacturing complex. Buildings created enclosure on all sides. Dominant images were the pavement between the historic buildings and the green wall of Boston Ivy contrasting with materials and colors of the buildings. The site was cluttered with debris, bicycles, cars, and experiments. Only a few vegetation elements were present, with Boston ivy creeping along building walls, and one Mazzard cherry tree growing near the front gate. In addition, a row of American arborvitae to the northeast of the Laboratory property and several clusters of common privet shrubs along the Main Street area were located on the property. The lawn along the Main Street boundary was also broken by two railroad car elements, which were surrounded by a ground cover. As planning proceeds, the character, enclosure, and vegetation found on the property during this period should provide the basis for preservation treatment.

Appropriate Preservation Treatment

Based on previous ENHS planning studies and discussions with the project team, it would appear that Rehabilitation, as opposed to Preservation, Restoration or Reconstruction, is the appropriate way to describe the treatment of the property. Since Rehabilitation is defined as sensitive change to accommodate contemporary uses, the proposed increased visitation and altered administration, curatorial and maintenance functions direct the project toward the selection of Rehabilitation as the most appropriate treatment. Within a Rehabilitation treatment, preservation of all extant historic features is assured while contemporary uses are accommodated.

C. Historic Laboratory Site Development & Interpretation

The development of the site must address functional issues, such as the locations of support facilities and the movements of vehicles and pedestrians to, in, and around the site. In addition, the proposed development of the site is dependent on and should contribute to the interpretation of the themes outlined in the Interpretive Programming section of this document. And, based on the Site Analysis above, any proposed development of the site should address the following:

1. Visitors should enter the site through the main gate reinstating the historic entry sequence;
2. Interpretive and, when possible, physical, connections between the Laboratory Unit and its remaining and lost contextual elements should enhanced. This might include revealing or marking the foundations of missing buildings on NPS property; developing new buildings in a manner that helps to reinstate the original enclosure of the Laboratories; improving interpretive connections to Glenmont and providing contextual references to the extant Battery Storage Building;
3. To the extent possible, the site of the historic Laboratory property should more closely reflect its character and appearance during the period of significance. During this era the exterior spaces were utilitarian and served active functions associated with the research activities. A shift away from trimmed lawns and plantings would be appropriate, as would recapture of enclosure and a sense of site activity.

Range of Approaches to Site Interpretation

Currently the site serves as basically clean, open movement space with a modest level of interpretation provided by some recently installed, illustrated wayside. Thought should be given to the purpose of the *site itself*. The tendency is to focus on the purpose of the buildings--as historic structures that house artifacts and exhibits. Currently, the site provides access to the buildings, implying that the buildings are where things really happen (and happened). However, historical photos reveal a high level of site activity--lots of things happened outside. A number of questions help to frame the issue: Should the site, like the buildings, house artifacts (such as cars, bicycles, experimental set-ups boxes, materials, debris, etc.) as seen in historic photos? (Figure 5) Are there exhibits, wayside, lifesize photographs or other devices to interpret the site as a vibrant component of the Laboratory property? Are the buildings the artifacts that the site holds? Does the site, therefore, interpret the building exteriors as an Edison architecture sub-theme? How could the exterior of the site be made more interactive? Are the outdoor spaces visitor orientation zones that introduce, complement or depart from what happens in the buildings? Should we

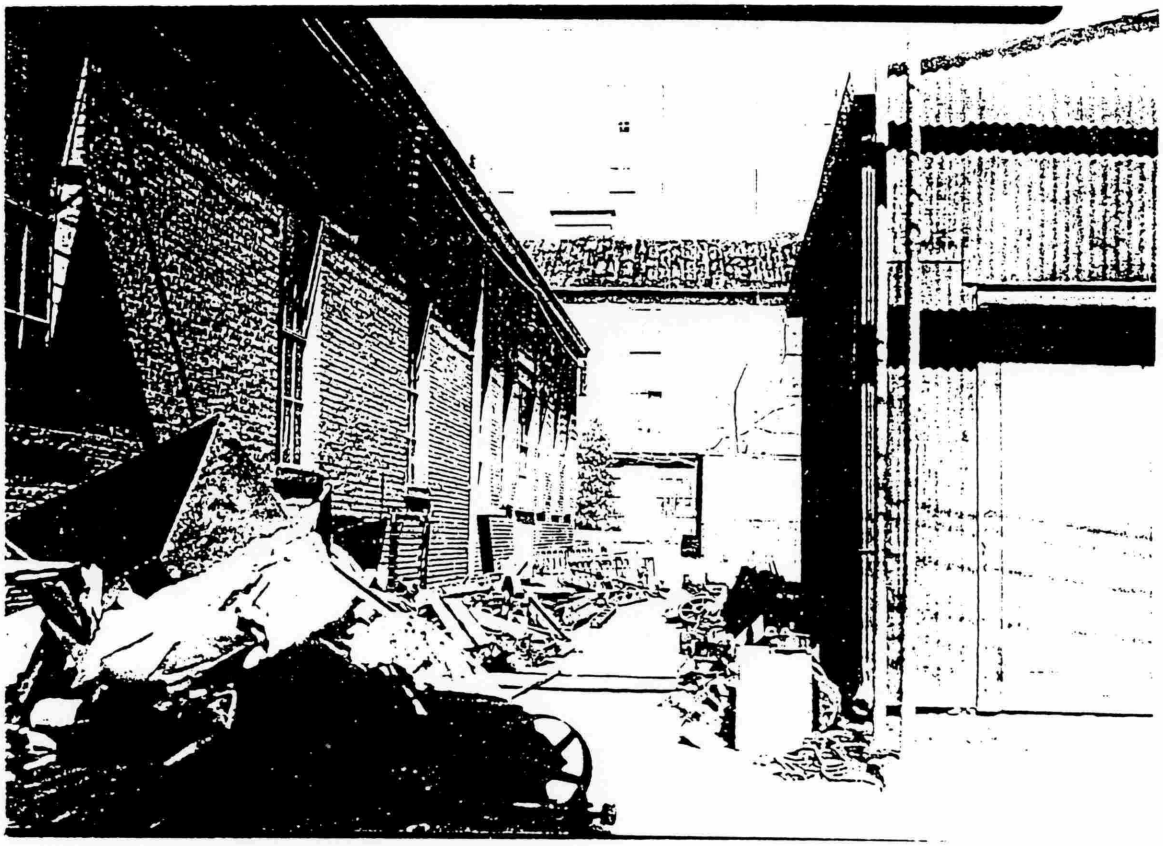


Figure 5
The alley adjacent to building #2 illustrating how the exterior spaces were utilized historically.
(EDIS archives, photo 10.380/27)

tie exterior site interpretation into interior site interpretation, or not? Out of these questions two directions arise--the need to develop a range of site interpretation approaches and select the one most appropriate, and, the need to clarify the relationships between site and buildings. In response to these questions, three potential interpretive approaches to the site are described as follows:

1. The "Clean" Site

In this simple, clean approach, similar to the current approach to the site, the site's non-historic elements would be removed, leaving empty extant historic spaces to "speak for themselves." Features such as the courtyard lawns and plantings, which give a false sense of green, tended landscape to the site, would be removed, and replaced with historically appropriate pavements without lawns or plantings. However, no historical site "props," such as Edison vehicles or experimental set-ups, would "furnish" the exterior spaces. In other words, the remaining physical features of the site would be made clearly evident to visitors, but no attempt would be made to add lost historic elements or a sense of activity to the site as it existed historically. This approach would direct visitors to imagine for themselves what the site would have been like during its periods of major activity. Discreet waysides with text and historic photographs could aid in this process.

The major advantages of this type of approach is that speculation about the historical condition of the site is avoided, while extant historic features are preserved and inappropriate areas are made more congruous. Maintenance would be focused on relatively simple, clean spaces that would be managed for continued preservation. The major disadvantage of this modest approach is its low level of impact on visitors. The site would essentially remain vacant and serve as movement space to access the historic buildings where a "furnished" history would be presented.

2. Recapturing Historic Character

In this approach, an attempt is made to recapture the historic character of the site, so that the visitor may "travel back in time" to a site which looks and feels as if Edison and his muckers have just disappeared, but will return momentarily. Non-historic elements would be removed from the site, and many objects would be added to convey the feeling of the former experimental activity. As they appear in historic photographs, employees' bicycles would be leaned up against the wall, one of Edison's storage battery electric cars might be parked in the courtyard, and piles of experimental materials would be located around the buildings. Experimental set-ups would be sited in various areas. The pavement test would provide another location of experimental interest. Taped sounds of laboratory and industrial activity might also be added to the scene, so that visitors' impressions could involve as many senses

as possible. Waysides or other modern interpretive devices would not be used; the site itself would convey its information, perhaps aided by live interpretation of various areas.

The major advantage of this approach would be its immediate and visceral effect on visitors. Its major disadvantage, is that, like a large "period room," refurnishing the site would require intensive research and work to make it both appear "real" and be historically accurate. Available period documentation may only allow a partial refurnishing of site spaces, in the manner of vignettes rather than a consistent whole site approach. In addition, maintenance of the furnished site, because of the furnishings themselves, would be greater than it is now.

3. Adding an Intensive Interpretive Layer

In this approach, non-historic elements would be removed from the site and an intensive and dynamic interpretive layer, clearly dating to the current day, would be added. These interpretive elements might include exterior exhibits, experimental set-ups, life-size photographic images or silhouettes of figures or possibly high-tech elements such as projections of images. The site itself could be a major orientation point for visitors on self-guided visits, with bold signage directing them around the site and informing them of its history. Groundplane embedded directional markers, interpretive panels or other devices could provide another vehicle for site interpretation, as might an exterior sound tape. Such increased exterior interpretation could create a "seamless" interpretive experience for visitors as they move from building to site to building, creating a perception that the entire property was the "invention factory." In a sense, the goal of this approach would be to make a site once enlivened by experimental objects and supplies now enlivened by a layer of interpretive exhibits. In other words, the bustling activity of Edison invention would be replaced by the bustling activity of visitors learning about the site.

In this intensive interpretive approach historical documentation could also be used to create selected areas of historic period treatment. For example, good photographic documentation of specific areas adjacent to the laboratory buildings, shows experiment materials and debris. These areas present opportunities to portray the historic site in a tactile, three-dimensional manner that represents the historic period. These exterior historic exhibit area would be interpreted through text and images as a wayside or brochure or live interpreter explanation to inform the visitor. The use of selected areas of historic period settings could be coupled effectively with other inventive interpretation images, text, sounds, etc. to present a blend of historic and contemporary interpretive elements. This approach, blending period settings

with contemporary exterior exhibits, would directly parallel the approach proposed for the interior of the historic buildings, which would be a combination of period rooms and exhibits.

The major advantage of the intensive interpretive approach is that it provides for interpretation of the site, while bypassing many of the historical authenticity and accuracy issues involved in a period furnishing of the site. The interpretive layer would be of the current era, and would help visitors distinguish between the historic resources of the site and new features. However, its disadvantages lie in the area of increased maintenance for exterior exhibitry, and a possible limitation of use during inclement weather.

C. ENHS Laboratory Site Plan Development

While improving interpretation is an important aspect of the site development program, functional and space concerns are equally important and address the areas in Edison NHS ownership beyond the historic Laboratory core. Based on the desire for increased public visitation and access to additional buildings and entry into the site from the historic main gate, several implications need to be considered in developing a fully functional site plan.

The approach to ENHS site development chosen in this project addresses four site zones within the property under NPS ownership, as shown on the *ENHS Property Zones Plan*: (Figure 6)

1. Visitor and Staff Parking and Pedestrian Access
2. Historic Laboratory Complex
3. Landscape Interpretation
4. Resource Center, with Visitor Services, Support and Management

These four areas comprise the site. Based on these, selected option site issues are addressed for each area in the following sections.

1. Visitor & Bus Parking, Pedestrian & Handicapped Access

Current parking is inadequate for increased visitation. Additional parking areas for visitors, buses and staff will need to be developed, and a bus drop-off location for school groups may also be appropriate. The number of desired parking spaces should be assessed, along with the number of spaces available via on-street parking. Using a 250,000 to 500,000 annual visitation level, half-day length of visit and a three person per car occupancy, about 120 parking spaces would be required for an average day, with over 500 spaces required for peak use days. Maximizing parking on current Edison NHS property would be prudent. Considerable on-street parking is also

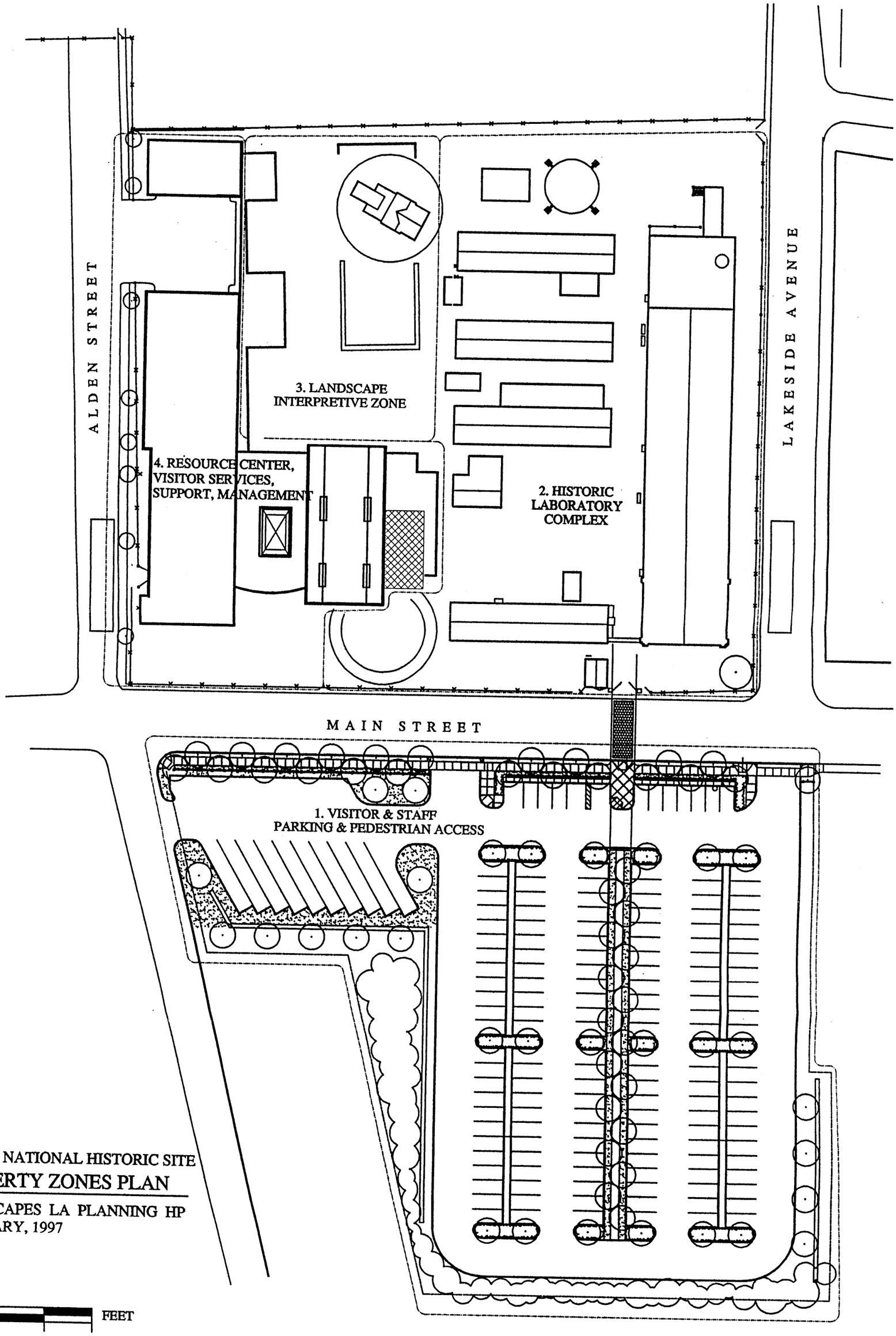


Figure 6
4-14

EDISON NATIONAL HISTORIC SITE
PROPERTY ZONES PLAN

LANDSCAPES LA PLANNING HP
FEBRUARY, 1997

available nearby. In addition parking agreements on nearby properties should be investigated to accommodate peak use and special event parking demand. The parking lot east of the Water Tower, the one adjacent to the Storage Battery Factory or the one serving the supermarket to the north are all nearby parking areas that could be considered for shared use agreements.

Current parking arrangements afford only two bus spaces in the small visitor lot. Due to the use of the Lakeside Avenue entrance, buses now drop-off and stand near that entrance. The proposed site plan shows visitor and bus parking across Main Street and visitor entry through the historic Main Street gate. This approach shows 10 bus parking spaces and groups arriving by bus would therefore follow the same entry sequence as visitors arriving by private car. Two alternative bus drop-off locations, one each on Lakeside Avenue and Alden Street, are also shown on the *ENHS Site Development Plan.* (Figure 7) Safe, direct pedestrian access is provided from the parking area to the main gate entry at a marked crosswalk that aligns with the main gate.

2. Historic Laboratory Complex

Within the historic core of the property movement patterns between buildings will be clear and easy to follow. The grade relationships around the historic laboratory buildings are relatively flat and can easily accommodate handicapped access to the site itself. However, several buildings have floor elevations that are above the surrounding grades by a modest or substantial distance. Access directly into historic buildings from the site will need to be studied individually. Significant impacts to either the historic buildings or the site should be avoided in developing building access solutions.

Within the historic Laboratory complex any of the three options for site interpretation-- clean, historical period or new interpretive- could be applied. The clean approach leaves the story of the Laboratory complex to the interior period rooms and exhibits. The historical period approach may be possible only as vignettes due to incomplete documentation. One important aspect of the historic zone is the pavement test circle which provides the remains of an authentic Edison experiment. The favored approach is the new interpretive layer because it will bring the site into a functional role that enlivens the areas around the historic buildings.

3. Landscape Interpretation Area

The zone between the historic laboratory complex and the new Edison Resource Center has been termed the landscape interpretation area because it provides a series of spaces that can be put to more or less intensive uses for visitors. The area functions as movement space to access the Center but also as a place for an outdoor classroom which is shown as a low, "U" shaped, seating wall facing the Black Maria.

The reconstructed Black Maria itself is proposed to be moved to this location, to be as close as possible to its original site while remaining on NPS property. In addition, this relocation removes it from its current placement over the top of Edison's experimental pavement circles which are original and present another opportunity for site interpretation. The outdoor classroom space is large enough to accomodate sizable groups for orientation, specific lessons, experiment demonstrations, or even a picnic lunch. In addition, to provide a spatial sense of the lost elements of the site, former building wall outlines, for those buildings that are lost, are proposed to be shown through the use of a different paving material. Waysides with site photographs or drawings could accompany these partial building outlines to explain the site. Additional interpretive materials, including three-dimensional, interactive objects such as experimental set-ups, could also be located within this zone, either temporarily or as more permanent elements.

The grade relationship across the landscape interpretive zone, between the historic buildings and the proposed Edison Resource Center, appears to be able to be made accessible within a 5% or 8% slope, in accordance with disabled access guidelines. Each of the areas within the landscape interpretive zone should be fully accessible. As the site slopes uphill toward Alden Street, especially in the eastern corner of the property, grade relationships need to be studied and planned for as site development proceeds.

The clean site or historic period approach do not apply particularly well to this zone. An intensive interpretive layer would be most suitable to address the historic experimental pavement circles, lost building outlines, Black Maria and other interpretive elements.

4. Resource Center, with Visitor Services, Support and Management

The grade relationship between the historic buildings and the proposed Edison Resource Center can be made accessible. The grade relationships will need to be studied and planned for as site development proceeds and will influenced the finish floor elevation of the proposed building.

The north side of the site will house the Thomas Alva Edison Resource Center which will include exhibits, visitor services, archives, research spaces, offices and maintenance areas. The placement of this new structure primarily as a linear mass along Alden Street, is appropriate in relation to the site history. Former buildings provided enclosure along this frontage and, from the upper floors, a bird's eye view back over the Laboratory complex. The proposed building will provide these functions of enclosure and vista effectively without confusing the new building with lost historic ones. Access to the maintenance area on the eastern end of the building is provided by a walled courtyard.

Recapture Overall Site Character

As shown in a general manner on the ENHS Site Development Plan, all the functional needs of the historic site are intended to be met. As parking, access and site relationships are upgraded, the site should also recapture its historic character. In the future the site should return to a more industrial character. As described earlier, the character of the area during the Edison stewardship period was of an active experimental and manufacturing complex, with materials, debris, bicyles, cars and experiments all contributing to site clutter. Only a few vegetation elements were present, the most obvious of which was the Boston ivy covering many building walls. New techniques for the growing of vines on supports, rather than directly on building walls have been tested in recent years at historic sites where vines were a character element. This approach of using vines on the buildings, without promoting building material deterioration, should be considered at ENHS. The goal is to recapture the feeling and association of the site as it existed during its heyday. All the elements of site character that contribute to these qualities should be considered as planning proceeds.

Glenmont Planning Options

In another context Glenmont, as the home of a nationally and internationally important historical figure, would be a major attraction. Glenmont is comparable to the properties such as Sagamore Hills, the Long Island home of Theodore Roosevelt and Springwood, the Hyde Park of home of Franklin Delano Roosevelt as well as a number of other historic homes of nationally significant persons. Glenmont is also the gravesite for Thomas Alva and Mina Miller Edison, as Springwood is for Franklin Delano Roosevelt. However, as an adjunct to the ENHS Laboratory property, located within the exclusive and visitor restrictive neighborhood of Llewellyn Park, Glenmont does not create the draw for visitors its importance warrants.

As the Laboratory property has changed over recent decades, so have the landscape and structures of the Glenmont property. While detailed research has not been undertaken, a cursory comparison of historic surveys to the existing conditions reveals losses and additions to trees and shrubs, loss of the skating pond and changes to the garden area. Future historic research, condition documentation and analysis could provide a basis for the preservation treatment of the Glenmont landscape and a more complete presentation of the estate grounds to the public.

Extensive historical documentation on Glenmont exists. While the current visitor experience focuses on a house tour, this historic data could contribute to a broader presentation of the Glenmont house and landscape. Possible themes for Glenmont include:

- the lives of the Edisons at Glenmont,
- Mina Miller Edison's management of the household,
- the Edison children growing up at Glenmont
- events, notable visitors and entertaining at Glenmont.

Without dependence on increased staff or tour guides, additional information could be presented in a brochure or waysides for a self-guided tour. The Glenmont story could also be accessible at the Edison Resource Center in the form of a film, scripted slide show or exhibit. A range of more intensive and staff dependent approaches are also possible. Glenmont presents an opportunity to broaden the visitor offerings at ENHS which should be pursued as a part of the goal of increased and repeat visitation.

5. BUILDING ANALYSIS

The following chapter will review the existing buildings at the Edison National Historic Site with regard to their current condition, deficiencies, and potential reuse. The chapter is divided into four sections; Building Use Analysis, Building Materials Survey, Structural Survey, and Mechanical/Electrical/Plumbing/Fire Protection Survey. Two recently executed documents, the 1996 "Cultural Landscape Report for the Laboratory Unit" and the 1995 "Historic Furnishings Report: Edison Laboratory" have been utilized for information regarding historic uses and appearances of the various buildings.

The goal of this analysis is to develop an understanding of the physical character of the existing buildings and how they can contribute to telling the story of Edison. Most importantly this chapter will identify physical limitations and/or deficiencies which may guide potential reuse.

A. Building Use Analysis

Glenmont

The Glenmont Unit includes five primary buildings: the Edison Home (building #10), (Figure 8) the Gardener's Cottage and Potting Shed (building #11), the greenhouse (building #14), the barn (building #16) and the garage (building #15). Visitation to this site is limited through a covenant with the Llewelyn Park Board. The need for additional facilities at the Glenmont Unit does not currently exist.

At present the Edison Home is open to the public as part of a guided tour that includes the first and second floors. The home has retained the layout, finishes and many objects which date from the period of significance, allowing it to be interpreted as a house museum.

The following comments are aimed primarily at increasing the public use of the existing buildings to broaden the interpretative scope of the Glenmont Unit.

Edison Home (Building #10)

Historic - The house was constructed prior to Edison's ownership, but the story of its construction is quite interesting and is typically incorporated into the interpretative program. The house remained in the ownership of the Edison family after the deaths of Thomas and Mina, and was donated directly to the Federal Government.

Current - The house is opened to the public, on a limited basis, and exhibited as a traditional house museum with guided tours with Park Staff. The tour includes the first and second floors. The building is

Figure 8
Mr. Edison reading on the front lawn of Glenmont.
(EDIS archives, photo 14.220/046)

generally in good condition, although deferred maintenance has allowed some minor damage to occur.

Future Use - The house should continue to be exhibited as a house museum, interpreting the private/family portion of the Edison story. The majority of primary spaces are already open to the public and should continue to be made available. Extending the tour into other areas of the house could further enrich the visitor experience, but may not offer a significant return for the cost of upgrades required for life-safety and accessibility..

Gardener's Cottage and Potting Shed (Building #11)

Historic - Constructed during the Edison residency these buildings were used by the staff responsible for the upkeep of the site and landscape.

Current - The building is not open to the public.

Future Use - The building is of interest not only because it dates from the Edison period, but it also constructed of concrete, one of the Edison companies. Incorporating this building into the interpretative program may be beneficial, but may not require access for visitors.

Greenhouse (Building #14)

Historic - Related to the Gardener's Cottage.

Current - Not used as part of the visitor program.

Future Use - Will continue to serve as a work space for Park staff.

Barn (Building #16)

Historic - Dates from the Edison period, if not earlier.

Current - Used for storage, not part of the visitor program.

Future Use - Will most likely continue to function as it does currently.

Garage (Building #15)

Historic - Dates from the Edison residency. Was constructed to house a group of automobiles owned by Edison. The building is constructed of Edison concrete.

Current - The garage still houses Edison owned automobiles that relate to both the Glenmont site and the lab site. It also houses lawn mowers and other equipment used to maintain the Glenmont property. The building is not open to visitors.

Future Use - As with the Gardener's Cottage this building is of interest due to its use, and its relationship to the Edison family lifestyle, but also because of its construction. Incorporating this building into the interpretative program may be beneficial, but may not require full access for visitors.

The Laboratory

The Laboratory Unit currently includes fourteen structures that can be divided into four basic categories.

- Historic structures - from the period of significance (Type 1)
  Buildings 1, 2, 3, 4, 5, 6, 9

- Historic structures - from the period of significance (Type 2)
  Buildings 7, 8, 32, 33, 34

- Historic structures that post date the period of significance
  Building 12

- Replicas of historic buildings
  Building 13

The focus of the following analysis will be on the primary historic structures that date from the period of significance. These structures will be the historic elements that will require heaviest use in the interpretation and exhibits within the historic boundaries of the property. Some of the other structures will also be incorporated into the visitor experience, but will play a secondary role. The analysis will start with the secondary buildings.

Replicas of Historic Buildings

The Black Maria (Building #13)

Historic - The existing building is a replica, constructed in the 1950s. The location on the site is incorrect, the original building having been located southeast of the existing water tower on land that is not currently owned by the National Park Service.

Current - The Black Maria is used as part of the interpretative program and is a strong visual presence on Main Street. The building condition is good, however, it must be remembered that the design was not necessarily intended to produce a "permanent" building.

Future Use - While the building is not "original" it is a good educational device and represents a building type that was historically common: structures built to serve a short-term need that were dismantled or destroyed when the need passed. The location is inappropriate and should be evaluated in the context of the entire site development.

Historic Structures which post-date the period of significance

Storage Vault (Building #12)

Historic - Built as a secure vault in 1941 by the Edison Company. The vault was constructed specifically to house key company documents, including some of Edison's papers and notebooks, and safeguard them from damage. The structure was designed to support a building on its top, dedicated to Edison, which was never constructed.

Current - The vault still serves as one of the primary archival storage locations on site. An inner vault contains some of the most valuable objects such as Edison's lab books. The building is solidly built but does show evidence of water penetration. It doesn't meet typical standards for archival storage space.

Future Use - Having been built after the period of significance the vault does not contribute to the interpretation of the Edison story between 1887 and 1931. The vault also visually compromises one of the key exterior spaces, the main courtyard. If proper archival storage space is constructed as part of the site development this building will have no functional reuse. Removal of this building will allow the exterior spaces to be reconfigured to more closely resemble the historic appearance.

Historic Structures - from the period of significance (Type 2)

These structures are components of the historic landscape, but are not typically open to visitors.

Blacksmith's Shop (Building #7)

Historic - The existing building is believed to date from 1919, when an earlier structure was modified and moved. A limited amount of information is available about the historic use of this structure.

Current - The shop is interpreted with a wayside sign, but is not furnished to interpret a historic period. The building is rarely, if ever, open to the public.

Future - This building is important in displaying the range of building types and activities that were taking place on the site. With increased activity around the site and in the pattern-making shop more visitors will come in contact with this building.

Small Storage Vault (Building #8)

Historic - Constructed in 1912 of reinforced concrete. The structure was designed as a fireproof building to hold film stock for the Edison Educational Films project.

Current - Utilized for archival storage, a less than ideal use.

Future Use - Located within the main courtyard this structure is important as part of the historic landscape and as an interpretative tool. At less than 200 square feet there is no logical adaptive use for the building.

Storage Vault (Building #32)

Historic - Constructed in 1915 to store disc records. The vault has two levels and is located adjacent to Building #4.

Current - Utilized for limited storage.

Future Use - A contributing element to the historic landscape. It is large enough for visitors to enter and could be used as an interpretative tool if a compelling story can be developed. Reuse of this building might be redundant with building #33.

Blue Amberol Vault (Building #33)

Historic - A twin of Building #32, this vault was constructed to store blue amberol cylinder phonograph record molds.

Current - Within the past few years this building was still used for archival storage.

Future Use - Due to the building's prominent location it could play a key interpretative role. It is large enough for visitors to enter and could house exhibits.

Water Tower - (Building #34)

Historic - Constructed in 1926 to supply water for emergencies.

Current - The structure is not used for water storage, but is maintained.

Future Use - This 132 foot tall structure serves as a built-in billboard, with the Edison name painted on the tank. It also serves to reinforce the industrial image of the site.

Historic Structures - from the period of significance (Type 1)

These structures serve as the focus of the visitor experience and form the core of the laboratory site.

Physics Laboratory (Building #1)

Historic - The second building completed in 1887 this one-story brick building faces Main Street and the courtyard. Its use as an electrical laboratory fitted out with highly sensitive equipment was short lived. By 1892 the new trolley line along Valley Road compromised the use. After that the building was utilized for various business related tasks.

Current - The building houses administrative offices, a conference/meeting room, and a small room that is part of the public tour where Edison's development of the phonograph is discussed.

Future Use - The building's location, adjacent to the main gate and the courtyard, place it at the very heart of the site. The interior has been radically altered from its appearances during the period of significance, but documentation is available showing the interiors at various periods. As a one story building access for the disabled is not a problem.

Chemical Laboratory (Building #2)

Historic - Also completed in 1887 this building was divided into a larger room

at the front and a smaller room at the north end. The interiors were relatively intact when the National Park Service assumed control of the property in 1955. Both spaces have been furnished based on historic documentation to appear as it did during Edison's stewardship.

Current - An important part of the public tour.

Future Use - This space is one of the most evocative on the site and should continue to serve as a period room. Access for the disabled is not a concern in this one story building, but unsupervised visits are due to the equipment that is within easy reach.

Pattern Shop and Chemical Storage (Building #3)

Historic - Also completed in 1887. The building was divided into two equal sections. The south end was used for chemical storage, the north end as a carpenters' shop.

Current - The carpenters' shop, including the belt driven machinery, is mostly intact. Recent repair and conservation work allows some of the machines to be utilized for demonstrations. The room is only open on certain special occasions and is not part of the regular tour. The chemical storage area was retrofitted by the National Park Service to house public restrooms, staff lockers and a staff eating area.

Future Use - The carpenters' shop should be retained and made more available to the public. It is important in conveying the full range of activities that were part of the process at the laboratory. The chemical storage area could serve a better public use. Access for the disabled is not a concern in this one story building.

Metallurgical Building (Building #4)

Historic - The last building completed in 1887. Originally devoted to Edison's work in the field of mining, separating metals from their ores and refining. This use changed when Edison's mining work proved unsuccessful.

Current - One of the primary archival storage areas at the site. A large portion of the building houses flat files and filing cabinets for paper documents. The rear portion of the building houses an extensive collection of prototype phonographs.

Future Use - If more appropriate archival storage space is developed this building could be utilized for a public use. Modifications over the years have compromised the interiors, allowing some leeway for how they would be treated in an adaptive re-use. Access for the disabled is not a concern in this one story building.

Main Laboratory (Building #5)

Historic - The first building constructed in 1887 and the focal point of the site. The two primary spaces in the building were the heavy machine shop and Edison's personal library/office. Other important uses included the precision machine shop, the stock room, the Music Room, the engineering department and the photography dark room. All of the spaces were modified to some degree between 1887 and 1931, depending on the needs of the Edison companies and specific experiments.

Current - The first floor, including the library, stock room, and heavy machine shop, form the core of the public tour. The upper two floors, which are accessible only by stairs, are utilized for staff offices and storage. The Edison Papers Project also has offices on the second floor.

Future Use - Many visitors, in surveys, have expressed frustration at not having access to more of the historic buildings. The main lab building, with so much early fabric still intact, should be utilized to tell a greater part of the Edison story. This will require insertion of at least one elevator. Upgrade of the mechanical systems will also be required for visitor comfort and conservation of objects on display. Intact features should be kept in place and incorporated into the interpretative plan.

Power House (Building #6)

Historic - Constructed concurrently with the Main Laboratory. The building originally housed a boiler room and an engine house. The power center for the complex Edison also ran power lines from this building to Glenmont and other houses in Llewellyn Park.

Current - The equipment was moved out when it was no longer needed. The space has been retrofitted to serve as the visitor center with displays, a small theatre and a gift ship. There is also a boiler room which still feeds the heating system for the historic site.

Future Use - Without the original boilers and engines this space is of limited

interpretative use. It can be adaptively reused to meet functional needs so long as the exterior envelope remains essentially intact.

Gate House (Building #9)

Historic - Constructed in 1890 at the main gate on Valley Road (Main Street) to control access due to the number of visitors to the laboratory site. Located outside the fence that surrounded the laboratory, it continued to serve as a security/control point even after 1931.

Current - While the building continues to serve as a security post its relationship to the site entry has been lost. Visitors enter the site through building #6 on Lakeside Avenue. The Gate House is where the central alarm control panels are located, but signage directs visitors away from this entry point.

Future Use - Even though the main entry to the site is on Lakeside Avenue the Gate House and main gate are still a visual cue on Main Street. If visitor entry to the site is redirected to the main gate the Gate House will serve as a part of the entry experience, even though visitors will not enter that building. It can continue to serve as a security/information center as visitors approach the site.

All of the buildings and structures listed above currently exist on property controlled by the National Park Service. In the course of reviewing the building and site documentation gathered in other sources information regarding one other building, no longer located in West Orange, also was reviewed.

Garage/Experimental Studio (Building #11)

Historic - Constructed by 1911 on the northern edge of the courtyard between buildings #1 and #2. This wood framed building served as a garage, laboratory space and other uses as needed. A portion of the building caught fire in 1911. In 1912/13 the building was used as the "burning building" in an Edison Laboratories fire drill. In 1941, to make way for a new vault (building #12), building #11 was slated for demolition. Henry Ford's museum, Greenfield Village, offered to disassemble the building and reconstruct it in Dearborn, Michigan, as part of their exhibit on Edison.

Current - Located in Greenfield Village the building is not actively interpreted. At the time it was moved the curators at Greenfield Village believed it to be a Menlo Park Building, which is the focus of the exhibit at Dearborn. As it was never part of Menlo Park it does not fit into the

interpretative story of Greenfield Village.

Future Use - Discussions have taken place between the National Park Service and Greenfield Village regarding the return of Building #11 to West Orange. If it is returned there is clear documentation regarding its original location. Building #12 would have to be removed for Building #11 to be reconstructed on its original location. If it is brought back it can serve as a site element to create closure in the courtyard. It would also serve as an example of the wide range of building types which were once located on the Edison site.

B. Building Materials Survey

The following is a brief survey and analysis of the materials conservation issues that must be addressed in any further work.

Glenmont Unit

In December 1996 and January 1997, Building Conservation Associates (BCA) conducted a preliminary assessment of the buildings at the Glenmont Estate. This chapter contains findings of the preliminary assessment, and describes considerations regarding the conservation and restoration of the exterior elements. Interior spaces were not inspected as a part of this survey; however, some exterior treatment are given priority because of the effect they are having on interior elements. The grounds of the Glenmont Estate have changed considerably from the original layout. Currently, the estate is composed of five structures which include the Edison home as well as the surrounding garage, barn, gardener's cottage and greenhouse. The general conditions of each building are noted followed by recommendations for conservation of exterior elements.

Edison Home (Building #10)

Exterior: Assessment

A preliminary assessment of the Glenmont Estate reveals that the Edison home is the most well maintained of the five structures. The residence is an eclectic Queen Anne style house constructed of wood, brick and stone. The structure is in sound overall condition. An initial inspection revealed that several items regarding the building's exterior need to be addressed and several maintenance issues are presently in the process of repair.

Drainage issues are problematic in several areas. Connections between the cast iron boots and leaders are unsound or missing in several locations. Several drain outlets have no leaders connected to them, allowing rainwater to spill directly to the ground below. Moisture-related damage to wood is visible in cornice soffits at drain outlet locations, indicating that there is water leakage occurring at these outlets. The roof of the exterior porch at the north entry suffers from leaks in the gutters directly above this space. However, it has been reported that leaks are less frequent since a recent patching of visible

deteriorated places on the roofs. In addition, damage at the roof drip edge at the rear of the building has apparently caused water to infiltrate to the fascia, and deterioration of wood elements is visible. Some specific areas of water infiltration are visible from the interior. Evidence of water running down walls in the basement at several locations indicates that leaks have occurred at the joint between slab and foundation walls. Evidence of water infiltration was also apparent at the wall of the bedroom adjoining the low den roof.

All of the sloped roofs on the building are slate; all of the flat roofs are painted flat-seam sheet metal. The majority of the slate tiles are in good condition; several areas of loose and broken slates were noted. Deterioration of the paint coating and corrosion of the metal beneath is a typical condition of the flat roofs throughout the building. Tears and open joints are apparent at some seams. According to Charles Magale of the National Park Service, the flat roofs of the Edison House will be coated with a liquid-applied rubber membrane in the Spring of 1997.

The stained glass in the low den roof of 1884 has been covered on its exterior with flat seam sheet metal roofing; the condition of the roofing is poor. Other leaded glass windows are in good condition with minor bowing in some areas. Interior finishes problems such as flaking paint had no immediate discernible cause.

The front porch exhibits evidence of insect damage. Portions of the woodwork are severely damaged. Several balusters are missing.

Open joints and efflorescence occur in the brickwork at and near the tops of each of the chimney.

Exterior: Recommendations

- Evaluate the current drainage systems, to include the perimeter of the building as well as sizes and quantities of existing gutters and drain outlets. Assess whether or not drainage is sufficient throughout the building. Implement repairs recommended as a result of the assessment.
- Replace missing leaders. Waterproof loose connection points and drain outlets.
- Install new drip edge at rear low roof. Repair adjacent wood fascia.
- Implement maintenance program including the following items: broken slates, clogged drains and leaks around the hatch of the high roof.
- Repoint open and deteriorated joints at chimneys.
- Investigate sources of insect damage at front porch. Determine appropriate course of action to eradicate infestation and implement program. Restore woodwork at front porch.
- Survey all windows and doors. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Remove roofing from stained glass clerestory. Survey area to determine restoration needs at stained glass. Restore glass as required.

Garage (Building #15)

Exterior: Assessment

The two-story poured concrete garage was built in 1908. During the inspection, the roof was inaccessible; however, drainage problems at this level were apparent from the condition of cornice elements. Severe cracks are present in the cornice and there are several large sections of concrete in the cornice that appear to be in danger of detaching and falling from the building. The damage extends in some instances into the upper wall surfaces. Water staining is also visible in and around these failing areas.

Rotting wood sills and bottoms rails of windows are a typical condition throughout the building.

Exterior: Recommendations

- Immediately restrict access to locations below deteriorated sections of the concrete cornice.
- Perform a close-up conditions survey of the cornice to assess the extent of damage. Perform emergency repairs as needed. Develop and implement a scope of the work for the restoration of the cornice.
- Investigate condition of roof and roof drainage to determine sources of water infiltration. Determine if drainage is sufficient. Develop and implement repairs to roofing and drainage.
- Survey all windows. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.

Greenhouse, Potting Shed and Gardener's Cottage (Buildings #14 and #11)

Exterior: Assessment

The gardener's cottage is a 2-story concrete building which maintains a similar roof and cornice to the garage. These buildings were completed by 1909. There is less visible damage at the cornice level of the gardener's cottage than at the garage. However, cracks, spalls and other signs of water-related problems are present. Sections of concrete in the soffit of the cornice has spalled, exposing corroded reinforcing steel. This indicates infiltration of water from above.

The greenhouse and potting shed are constructed of a concrete base surmounted by a steel frame and wood muntins supporting the fully glazed structure. Failing putty and rotting wood muntins are a typical condition throughout the greenhouse and potting shed. The greenhouse is situated beneath the gardener's cottage and therefore vulnerable to the poor condition of the concrete cornice. If any portion of the cornice were to fall off the building, it would cause damage to the wood and glass elements below.

Exterior: Recommendations

- Immediately install temporary supports to stabilize areas of loose concrete in the cornice of the gardener's cottage and/or install protection on the sections of glass below these areas.

- Investigate condition of roof and roof drainage at gardener's cottage to determine sources of water infiltration. Determine if drainage is sufficient. Develop and implement repairs to roofing and drainage.
- Survey all elements of greenhouse in order to determine conditions throughout the structure. Perform emergency repairs as needed, including stabilization or replacement of badly deteriorated wood elements, replacement of broken glass, and reglazing. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.

Barn (Building #16)

Exterior: Assessment

The wood barn is divided in two sections. A one-story structure sits perpendicular to the two-story building. The roof is constructed of slate and appears to be sagging at the one-story section. The slate appears to be thicker and newer than the slate which is present at the larger structure. This sagging may indicate that the weight of the thicker slate is too great for the wood roof structure. The slate on the two-story section is almost all deteriorated. Extensive biological growth is present at all elevations of both buildings.

Exterior: Recommendations

- Perform structural assessment of roof structure to determine whether or not it is adequate for current load. Implement repairs if required.
- Perform comprehensive survey of slate. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Assess reasons for prolonged damp conditions and biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey and assess condition of wood siding. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program if required.

Laboratory Unit

In January of 1997, Building Conservation Associates (BCA) undertook a preliminary assessment of building conditions and conservation treatments of the 13 buildings of the Edison Laboratory. The exterior of each building was examined in order to identify conditions, materials, and elements requiring more attention, research, and investigation. The interior of the buildings were surveyed in order to locate elements which should be considered integral to the interpretation of the site. This chapter contains findings of the preliminary assessment, and describes considerations regarding the conservation of the Edison Laboratory buildings. After an overview of the recurring conditions meriting maintenance or conservation, the report is organized by building. The general conditions of each building are noted followed by recommendations for conservation of exterior elements. A list of significant interior elements are given.

Overview

Several recurring conditions found in most or all of the buildings of Edison Laboratory which should be addressed in a master plan for the site are given in this overview. With only several exceptions stated below, the roofing and brickwork of all of the structures are in good to excellent state of repair, and require only routine maintenance and inspection procedures. Other recurring issues related to the conservation of the buildings will require additional treatment or maintenance considerations. These include water drainage around the buildings; biological growth on building surfaces; deterioration of the stone window sills; the treatment of windows; and maintenance of wood and metal elements of the buildings, such as electrical fixtures. In addition, there are many cracked or missing window panes throughout the different buildings of the Edison Laboratory. The patterned glass of these window panes affect the overall appearance of the buildings. Sources of appropriate glass to replace missing and cracked panes should be researched. It is recommended that all recent and future work carried out at Edison Laboratory be documented and that the records be kept in a central location for use in later years.

Physics Laboratory (Building #1)

Exterior: Assessment

Building One is a one story brick structure. The decorative details on the Main Street (west) elevation are in excellent condition, including the stone window sills and keystones, molded brick courses, and parapet wall. The parging on the bottom two courses of brick on this west elevation has detached in some areas, indicating problems with drainage and/or rising damp. Drainage is also an issue on the other elevations. On the east elevation there is only one leader and it has a broken leader shoe. In addition, efflorescence is visible on the brick, and the stone sills on this elevation are spalling. Bird guano has also accumulated below areas on which birds can perch, such as the patterned openings in the brick below the eaves. The roof of Building One is a built-up roof not more than 10 years old, and it appears to be in good condition.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey all stone window sills and determine causes for deterioration noted. Design and implement repairs to damaged stone window sills.
- Investigate openings and attachments where birds rest. Design and implement repairs if required.
- Investigate area directly behind the parapet on the west elevation to make sure that water is being shed from the roof adequately. Design and implement repairs if required.

Interior: Assessment

Building One is presently used for housing exhibitions, administrative offices, and

an auditorium. The office area contains new partitions and moldings. The exhibition area has painted brick walls, new louvered blinds, and new furnishings which are used to display phonographs. There are no significant original finishes or furnishings in Building One.

Interior: Significant Elements

- No significant elements.

Chemical Laboratory (Building #2)

Exterior: Assessment

Building Two is a one story brick building similar to Building One but without a decorative facade. There is also a wood-frame lean-to with corrugated metal siding attached to the east side of the structure. Typical of the brick structures in Edison Laboratory, most of the brickwork is in fairly good condition and the stone sills are cracked and delaminating. However, the brick chimneys of Building Two are also in poor condition, having spalled surfaces and empty mortar joints. There is biological growth on the west elevation below the first floor windows, indicated on-going presence of moisture. There is no bio-growth on the east elevation, where a concrete drain runs the length of the building. Guano accumulation and efflorescence on some areas of the brick walls is also a problem on Building Two. An additional problem is the deterioration of the cementitious patching compound used to seal the gap between the metal window frames and the exterior brick jambs. This deterioration is a general condition which occurs on many of the window openings in the complex. The built-up roof of Building Two is relatively new and does not have any obvious problems.

The corrugated metal siding of the lean-to is painted red and the paint is peeling in many places. Peeling occurs between the paint and the metal substrate, indicating that the surface was not prepared properly prior to the application. The lean-to has a new roof which should not present a problem in the near future.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey all stone window sills and determine causes for deterioration noted. Design and implement repairs to damaged stone window sills.
- Investigate openings and attachments where birds rest. Design and implement repairs if required.
- Analyze and assess cementitious patching mortar at window jambs. Design and implement a long term solution to replace the existing patching compound.
- Determine rate of absorption and structural integrity of the brick at chimneys. Design and implement repairs if required.

- Remove paint coatings from lean-to. Prepare surface, prime, and repaint.

Interior: Assessment

The interior of Building Two retains a significant amount of its decorative integrity and should be given particular consideration in the conservation of the site. The brick walls are painted off-white, with a blue dado. The paint is in sound condition, except near the radiators where it is blistering. The furnishings in this building, most of which are removable, are extremely important artifacts, including the cabinets against the side walls containing glassware and chemicals and the tables where other equipment for conducting chemistry experiments is displayed. There is a beaded board partition near the rear of the building which creates a back room. The other walls of this back room are covered with the same beaded board paneling and the jambs of the window openings are stuccoed. This stucco is detaching and efflorescence is visible, indicating a problem with the seal between the window frames and the brick openings. Both rooms in Building Two have a tongue-and-groove beaded ceiling, although they are of different designs. Some of the joints in the wooden board ceiling are separating. The wooden ceilings and paneling should be cared for and preserved as part of the historical integrity of the structure. Efforts should be made to minimize potential harm to the interior walls from the radiators and window openings.

Interior: Significant Elements

- Beaded board partition and paneling.
- Tongue-and-groove beaded ceiling.
- Cabinets, tables, and other laboratory furnishings.

Pattern Shop and Chemical Storage (Building #3)

Exterior: Assessment

Building Three is of the same construction as Buildings One and Two and is in a similar state of conservation. The accumulation of guano and efflorescence, and deterioration of stone sills and window jambs are issues which need to be addressed. The major conservation consideration of Building Three is the poor drainage of water away from the building. The ends of the leaders are ineffective in some cases, and bio-growth is visible around the building. In addition, an electrical connection between the power lines and the
building is detached from the brick wall. Building Three has a sound, relatively new built-up roof.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey all stone window sills and determine causes for deterioration noted. Design and implement repairs to damaged stone window sills.

- Investigate openings and attachments where birds rest. Design and implement repairs if required.
- Analyze and assess cementitious patching mortar at window jambs. Design and implement a long term solution to replace the existing patching compound.
- Survey and assess condition of wood and metal attachments. Implement repairs as required. All wood and metal attachments to the buildings in the Laboratory complex should be catalogued and their conditions assessed as part of the master plan for the site.

Interior: Assessment
The front section of Building Three is currently used as offices and public restrooms. There is a lowered ceiling and new partitions and flooring, making the interior historically insignificant. The rear half of the building is a 'period' room, with architectural elements and furnishings dating from the site's period of significance.

Interior: Significant Elements
The rear half of the building contains a significant amount of historical finishes which should be maintained and preserved.

Metallurgical Laboratory (Building #4)
Exterior: Assessment
Building Four, a one story brick structure, possesses the same type of deterioration problems typical in the previously described buildings: accumulation of guano and efflorescence, deterioration of stone window sills, and damage to lower brick courses because of poor drainage. In addition, the gap between the metal frames and the sills of several of the windows on the east elevation of Building Four have been sealed with a putty which does not allow moisture egress. The built-up roof is relatively new and sound.

A small metal lean-to attached to the north elevation of Building Four and another attached to the west elevation have peeling paint and problems associated with drainage.

Exterior: Recommendations
- Evaluate drainage at the walls and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey all stone window sills and determine causes for deterioration noted. Design and implement repairs to damaged stone window sills.
- Investigate openings and attachments where birds rest. Design and implement repairs if required.
- Analyze and assess cementitious patching mortar at window jambs. Design

and implement a long term solution to replace the existing patching compound.

- Remove paint coatings from lean-to. Prepare surface, prime, and repaint.

Interior: Assessment

Building Four is used to house wooden artifacts and paper archives. New partitions, paneling, flooring, and ceiling have been installed for this purpose. Only the bare inside of the corrugated metal lean-tos and metal pipe frames are historically significant.

Interior: Significant Elements

- Pipe framing and corrugated metal of lean-to.

Main Laboratory (Building #5)

Exterior: Assessment

The three story main laboratory building is brick with stone accents on the west and south elevations. The brick is in good condition over most of the exterior wall surface. An exception to this is the spalled brick of the large arched window openings on the first floor. Efflorescence occurs in conjunction with the spalling. Some of the spalled areas are under air conditioner units in second floor units, but some are not and there does not appear to be a direct cause-and-effect relationship. Rusting of the metal window frames and sash is most visible on the first floor windows of Building Five as well. The effects of rising damp are evident on the west elevation where one stone unit in the water table course has spalled dramatically. The spalling brick and stone and efflorescence indicate that the drainage of water away from the walls and foundations of Building Five should be investigated. Just below the new built-up roof of Building Five is a course of tinted mortar similar to the cementitious patching compound used in between the metal frames and brick of the other laboratory buildings. This mortar course is cracked in a number of locations.

A number of wooden and metal attachments are located on the north elevation of Building Five. They are found on other elevations and on other buildings, but are the most visible on the north elevation. These items, such as fire alarms, hoists, and electrical boxes, appear to be somewhat neglected. They are deteriorated, with severe splitting in the case of the wood attachments and a lack of protective paint coatings in the case of the metal items.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Survey all stone window sills and determine causes for deterioration noted. Design and implement repairs to damaged stone window sills.

- Investigate openings and attachments where birds rest. Design and implement repairs if required.
- Analyze and assess cementitious patching mortar at window jambs. Design and implement a long term solution to replace the existing patching compound.
- Survey and assess condition of wood and metal attachments. Implement repairs as required. All wood and metal attachments to the buildings in the Laboratory complex should be catalogued and their conditions assessed as part of the master plan for the site.
- Perform close-up inspection of mortar course below roof to determine cause of cracking. Implement repairs if required.

Interior: Assessment

The interior of Building Five is used as exhibit, office, and storage space. It contains a significant amount of its historical finishes which should be maintained and preserved. The woodwork in the library, on the western end of Building Five, is in excellent condition. Most of the other areas of the building also contain important wood paneling, ceilings, and columns. The second and third floors contain partitions and openings that date from the period of significance. Other elements, such as the metal cages, built-in racks and shelves, and elevator cab and screen are significant to the interior of the main laboratory building. All of these features should be given full attention in a conservation and maintenance plan of the site.

Interior: Significant Elements

- Wood paneling, ceilings, partitions, and columns on all floors.
- Built-in racks and shelves on all floors.
- Metal cages, elevator cab, and screen.

Power House (Building #6)

Exterior: Assessment

Building Six is a one story brick structure. Two conditions of the building merit further investigation: a mortar course below the roof eaves similar to the course on Building Five and spalled and cracked stone at the visitor's entrance to the building on the Lakeside Avenue (south) elevation. There are many cracks in the mortar course; the extent of related water damage or infiltration is unclear. The spalling and cracking of the stone near the entrance is most likely related to deicing salts put on the steps during the winter. A material visually similar to the mortar used below the roof is also used as a patching material around some of the altered openings on the north elevation of Building Six. The built-up roof is in good condition.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building, particularly at

areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.

- Assess stone steps. Design and implement repairs to damaged stone steps and columns at entrance.
- Perform close-up inspection of mortar course below roof to determine cause of cracking. Implement repairs if required.
- Assess nature and long-term durability of patching material used around altered openings.

Interior: Assessment

The interior of Building Six has been significantly altered for use as the visitor's center. New partitions, flooring, and furnishings have been inserted to suit this purpose.

Interior: Significant Elements

- No significant elements.

Blacksmith Shop (Building #7)

Exterior: Assessment

Building Seven is a one story corrugated metal structure which is painted red. The problem of peeling paint from the corrugated metal, common on all of the metal structures, exists here as well. The corrugated metal roof is suffering the same type of deterioration.

Exterior: Recommendations

- Remove paint coatings from walls and roof. Prepare surface, prime, and repaint.

Interior: Assessment

The interior of Building Seven was not examined.

Small Storage Vault (Building #8)

Exterior: Assessment

Building Eight is a one story concrete vault. A parging material applied over the poured concrete is detached in some areas, especially near the ground. The concrete is spalling and cracking in several areas, including the stepped cornice. The spalling appears to be related to corroded iron elements. The new gravel roof is not a conservation concern.

Exterior: Recommendations

- Evaluate drainage at the walls and foundation of the building. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Investigate nature of the parging material and repair if appropriate.

- Survey and evaluate damage to concrete. Design and implement repairs if required.

Interior: Assessment
Building Eight contains new shelving and the concrete walls have been plastered over. There is little evidence of the original interior of the structure.

Interior: Significant Elements
- No significant elements.

Gate House (Building #9)
Exterior: Assessment
The Gate House is a shingled one story wood frame structure. The shingles and window trim are cracking and the paint on the building is in poor condition. The slate roof was not examined during the preliminary survey. The prominence of The Gate House near Main Street and its unique appearance among the laboratory buildings justify continued maintenance and conservation for Building Nine.

Exterior: Recommendations
- Survey walls: Determine number of damaged and missing shingles. Perform necessary repairs to restore appearance of structure.
- Prepare and paint shingles and wood trim.
- Perform inspection of slate roof. Implement repairs if required.

Interior: Assessment
The one-room interior of Building Nine, used as offices, contains important beaded tongue-and-groove paneling and ceiling, and moldings. These elements are in good overall condition, and should be given care.

Interior: Significant Elements
- Wood paneling, ceilings, and moldings.

Storage Vault (Building #12)
Exterior: Assessment
Most of the concrete structure of Building Twelve is below grade. The flat roof deck and cornice of the vault are exposed, and part of the walls at the two entrances are also visible. The concrete roof of Building Twelve is cracked in several places. Some of the cracking has been covered with poured asphaltic material. The cracking is most likely related to water which is collecting under the roof cornice in several locations. There is also biological growth and spalling of the concrete wall just below the cornice in the areas where water is collecting. There is no drainage from the top of the roof other than directly over the cornice.

Exterior: Recommendations
Any work on this building should be coordinated with the development plans for the site.

Interior: Assessment
The interior of Building Twelve was not examined.

Black Maria (Building #13)
Exterior: Assessment
The Black Maria is a frame structure covered with tarpaper. Some of this tarpaper is cracking, and may need replacement. Exterior wooden elements are cracked and deteriorated.

Exterior: Recommendations
- Assess condition of tarpaper siding. Perform repairs/replacement as needed.
- Inventory and assess condition of wood and metal attachments.

Interior: Assessment
The interior of Building Thirteen is painted and is in relatively good condition. Because the Black Maria is a complete reconstruction, none of the interior elements date to Edison's lifetime. They should be maintained, but can be replaced if necessary.

Interior: Significant Elements
- No significant elements.

Storage Vault (Building #32)
Exterior: Assessment
Building Thirty-Two is a concrete vault, similar in construction to Building Eight but with an additional floor of storage. Conditions similar to Building Eight relate to the drainage at the base and from the roof of the structure, the detachment of parging from the exterior surfaces, and the cracking of the concrete walls. In addition, the biological growth was noted near the cornice.

Exterior: Recommendations
- Evaluate drainage at the walls, roof, and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Investigate nature of the parging material and repair if appropriate.
- Survey and assess cracking in concrete walls. Design and implement repairs if required.

Interior: Assessment
The interior of the building has new shelving and wall surfaces which are not historically significant.

Interior: Significant Elements
- No significant elements.

Blue Amberol Vault (Building #33)
Exterior: Assessment
Building Thirty-Three is identical to Building Thirty-Two and shares the same conservation concerns: drainage of water, detachment of parging, and cracking of concrete. The new gravel roof is not an immediate conservation problem.

Exterior: Recommendations
- Evaluate drainage at the walls, roof, and foundation of the building, particularly at areas of biological growth. Make recommendations for repair, restoration, and long-term maintenance. Implement restoration program.
- Investigate nature of the parging material and repair if appropriate.
- Survey and assess cracking in concrete walls. Design and implement repairs if required.

Interior: Assessment
The interior of Building Thirty-Three is also similar to Building Thirty-Two, except that Vault Thirty-Three contains the original electrical switches and fixtures which are significant.

Interior: Significant Elements
- Electrical fixtures

Water Tower (Building #34)
Exterior: Assessment
According to facilities personnel, the Water Tower contains no water and was painted within the last eight years. As viewed from the ground, it appears to be in good condition. A concrete platform directly below the center of the tower should be repainted however, as its condition has deteriorated.

Exterior: Recommendations
- Prepare and paint concrete platform below water tower.

Additional structures
Arch between Building One and Building Five
Exterior: Assessment
An arch spans the passageway between Building One and Building Five, stretching

from the roof of Building One to the first floor of the Main Laboratory building. Several conditions of the east face of this arch indicate that water is not draining away from the arch: biological growth near Building Five, brick face bulging out, and efflorescence. The western face is in relatively sound condition, and it appears that some remedial work was recently carried out on this side of the arch. The existing problem may be poor drainage from behind the parapet wall on the roof Building One, an area which should be inspected as stated above.

Exterior: Recommendations

- Investigate drainage on top of arch and from areas directly behind the parapet on Building One and from Building Five. Design and implement repairs if required.

Gateway

Exterior: Assessment

Near the Gate House are two brick and concrete gate posts. These posts are in poor condition; the concrete is spalled and cracked and the brick is covered with efflorescence. Like the Gate House, they are one of the visitor's first views of the site and should thus be given consideration in the maintenance and conservation of the site.

Exterior: Recommendations

- Design and implement a restoration program for the brick and concrete in gate posts.

C. Structural Evaluation

The following is an overview of the buildings at the Edison National Historic site with regard to their structural conditions. The engineers performed a visual survey only, did not remove any material to inspect subsurface conditions and did not perform any load calculations. The objective of the exercise was to determine how any proposed work may impact the existing structural systems and to note any buildings and/or locations where significant upgrades may be required.

Glenmont

The structural systems in the Main House at the Glenmont Estate were upgraded in the 1970s to increase load carrying capacity and to stabilize certain areas. The majority of this work took place on the upper floors and the attic, away from the areas open to the public The condition of the existing structure appears to be good, but should be re-evaluated if additional mechanical equipment is installed in the attic or if public access is increased to the upper floors.

Laboratory Unit

Physic's Laboratory (Building #1)
No apparent structural problems were observed. The existing system should be adequate for the intended use as a museum/interpretive space. Some minor structural upgrades may be required for the installation of HVAC equipment.

Chemical Laboratory (Building #2)
Similar to Building #1. If the attached shed is utilized and opened to the public the framing will have to be upgraded to eliminate some of the wood posts that have been inserted to support the roof and the remaining framing will have to be closely surveyed. The concrete slab floor will have to be replaced.

Pattern Shop and Chemical Storage (Building #3)
Similar to Building #1. The suspended structural elements in the Pattern shop should be checked in more detail for load rating.

Metallurgical Building (Building #4)
Similar to Building #1.

Main Laboratory (Building #5)
Crawlspace: The masonry piers, according to a 1916 drawing, have bottom of footings 8 feet below the top of the ground floor slab. The crawlspace height decreases from approximately 6.5 feet at the connection to Building #6 to 3.5 feet at the far end. It also varies in the transverse direction where pipe columns on concrete pads or pedestals have been added, presumably to provide support for local equipment loads. Maintenance of piping and other equipment in this area would be improved by removal or trenching some fill material. Since the depth of the pipe column foundations are not known, however, some exploration would be required. In some locations first floor beams have developed horizontal cracking and wood posts have been installed as supplemental shoring. Many areas are not accessible due to pipe congestion, low clearances and equipment storage. At a future date a comprehensive condition survey should be performed when full access is available.

First Floor: In the heavy machine shop some vertical cracking in wood columns and horizontal cracking in second floor beams were observed. This is particularly evident at the column and beam near the existing open elevator. Further inspection is recommended in the shop area and in the storage area when better lighting is available. The existing stairway outside the library has a noticeable outward tilt away form the wall. This may be due to longtime deflection of the supporting members, settlement of the foundations, or both. The support system should be investigated to determine how the loads are transferred, i.e. floor-to-floor or top-to-bottom. There is no special support observed in the crawlspace. Jacking does

not appear to be a practical solution since it might result in peripheral damage. The stair treads and risers should be carefully removed and the framing inspected to determine if it can be reinforced and shimmed to level. If not it may be necessary for the entire stairway to be removed and rebuilt. In any case it is recommended that additional shoring be provided in the crawlspace below the stairway, or that additional beam(s) be installed to pick up the loads.

Second and Third Floors: No areas of structural deterioration were observed, however lighting was limited. Additional inspection is recommended when the design is developed and lighting is available.

New Elevator: The insertion of a new passenger elevator within the footprint of Building #5 is feasible, however, space is required for an elevator machine room and a pit is required in the crawlspace. The pit will require local re-routing of utility lines in the crawlspace.

Power House (Building #6)
Most of the building structure is not visible. The projected use for this area includes a new stair and elevator. This new construction may intersect with the existing chimney and its foundation. As the design is developed a detailed survey of the existing foundation will be required to determine how the two will interface.

Blacksmith's Shop (Building #7)
No apparent structural problems observed.

Storage Vault (Building #8)
No apparent structural problems observed.

Gate House (Building #9)
No apparent structural problems observed.

Black Maria (Building #13)
No apparent structural problems observed. A close inspection should be performed before it is moved.

Storage Vault (Building #32)
No apparent structural problems observed.

Blue Amberol Vault (Building #33)
No apparent structural problems observed.

D. Mechanical/Electrical/Plumbing/Fire Protection Evaluation

The following is an overview of issues involving the mechanical, electrical,

plumbing and fire protection systems at the Edison National Historic Site. The impact on each of these existing systems will depend a great deal on the future development of the site. Each subject is reviewed for the overall site, with specific comments for individual buildings included where appropriate.

Mechanical (Climate Control)

The primary heating system for the existing buildings at the Laboratory Unit is a perimeter hot water radiation system. Parts of this system are original to the buildings. Modifications have been made to accommodate changes in use and occupancy, particularly since the property has been in the care of the National Park Service. Additional heating units have been added to the existing hot water loop as well as heating units that are independent. Cooling is handled on a limited basis with individual window units. With the exception of special self-contained storage units which house certain parts of the collection none of the buildings has a climate control system which deals with temperature humidity.

Any new system that is designed and installed must design to accommodate three key elements:

-Visitor and user comfort
-The collection (exhibits and storage)
-The historic buildings

Recent efforts in the field of climate control systems for museums at historic sites has shown that these three elements can not always be satisfied with a single design. An acceptable climate for a particular artifact may be less than ideal for a visitor and may pose the threat of damaging the fabric of the historic building in which it is housed. The design process at the Edison site, including both the Laboratory Unit and Glenmont, will require careful planning and analysis to develop an understanding of which element is critical in any one building or room. The system must then be designed to meet that need. Of critical importance will be the operations of the system once it is installed. If variations are required building-to-building or room-to-room, the staff must be made fully aware of this to make certain that the system is operated as intended.

The existing buildings offer a challenging environment in which to create a modern museum. The design team developed the following list of observations that will serve as a basis for future design work:

1. Existing Construction

The existing buildings, particularly the lab buildings, are very utilitarian in design and have little, if any insulation. The large metal windows are single-glazed and the wall sections have little or no cavity space available for

inserting insulation. Modifying these architectural features to increase the insulating capacity of the envelope is virtually impossible without negatively impacting the historic fabric.

2. *Modifying the Environment*

The existing buildings have stabilized over their lifetimes within the parameters of the existing climate control systems. Insertion of a new system with tightly controlled temperature and humidity controls could have a significant impact on the envelope of the existing buildings. Moisture, in the form of condensation, could be created in wall or ceiling cavities and within wall thicknesses causing hidden damage. Condensation analysis should be performed in any areas where new systems are to be installed.

3. *Locating New Equipment*

The location of new equipment must take into account the visual impact on the site, noise, structural capabilities of the buildings, and maintenance. If possible it may be sensible to create a central plant, similar to what currently exists for the heating system to minimize the impact of new equipment on the individual buildings.

4. *Inserting Piping and Ductwork*

The construction of the existing laboratory buildings offers very little space for running new piping and ductwork out of sight. Installation of chases, soffits and other enclosures to hide new systems will impact the historic fabric. An alternative approach is to expose the new systems, as the mechanical systems have traditionally been dealt with in these spaces. This will require sensitivity in the design of the system components, their location, and the installation.

5. *Environmental Parameters*

Balancing the climate control needs of the users, the collections, and the buildings will likely require offering less than ideal conditions for one group. The best candidate for this is the user group. The users (visitors and staff) will be transitory. The buildings and the collection are "permanent" and should be a higher priority. Users may be required to accept a wider temperature range than is standard in a museum. This range must be studied and identified.

6. *Micro-climates*

For particularly sensitive objects that are to be displayed in the historic buildings one option is to create exhibit cases that create a micro-climate that is designed just for that object. This allows the space to have an environment that is not compatible with the preservation of the object yet still display the object in the space. This approach, however, adds to the cost of the installation and is also an ongoing maintenance issue.

7. *New Construction*

The construction of the existing buildings is not sympathetic to use as administrative offices or archival collection storage. A new building, equipped with proper spaces and systems, is the ideal solution for dealing with these programmatic needs.

Electrical

The existing service will be inadequate if the site is developed extensively. Additional loads from new construction, exhibits, and mechanical equipment must be taken into consideration to design the upgraded service. Power distribution and new construction, exhibits, and mechanical equipment must be taken into consideration to design the upgraded service. Power distribution and new receptacle locations will require coordination with the historic building fabric to minimize the visual impact. Traditionally electrical systems were installed exposed in the laboratories and rerouted as needed when spaces were modified or new projects undertaken. This historical approach may be one way to deal with the installation of new systems.

Lighting at the site has not been upgraded significantly since the time the buildings functioned as part of an industrial complex. The use and design of each space will determine if the lighting will require upgrading. If additional lighting is incorporated it can be visually downplayed, hidden light sources, that are utilized to highlight a feature, or it can be treated as an object that is independent of the original fabric. Design decisions will be made on a space by space basis.

Plumbing

The existing plumbing is adequate for the site use at the laboratory. The plumbing at Glenmont is adequate for the majority of events although some special events have strained the waste line capacity. Upgrade of the plumbing will be based on the site development plan. Municipal water service should be adequate for any potential increase in water supply needs.

Fire Protection

The existing sprinkler systems in the laboratory buildings, portions of which date to 1916 and the tragic fire at the complex, appear to be in good condition. The staff indicated that the systems are still operable and are maintained with the assistance of the original manufacturer. There are two limited areas of building #5, the library and a portion of the third floor that are protected with a halon system.

Any fire protection systems that are designed for the site must take into consideration both the issue of life-safety for the users and preservation of the buildings and the collection. Reuse of the existing sprinklers is appropriate philosophically, preserving fabric that is indigenous to the site. However the system must also be evaluated from a performance standpoint. If it is deemed to be inadequate it should either be replaced or augmented with new elements. Areas that are to house artifacts from the collection must be carefully studied to offer the proper level of protection.

6. INTERPRETIVE PROGRAMS: ANALYSIS AND PLAN

Introduction

Interpretive planning for the next phase of development at the Edison National Historic Site has involved many people, it would be impossible at present to acknowledge or even identify the specific sources of the many ideas that have been suggested both by individuals and collectively. The following is a combination of ideas from previous studies, the site staff, and the design team.

Goals

The same planning process which has generated so many useful interpretation strategies has generated a number of goal statements. As an overall goal, the statement of purpose issued as part of the "Edison National Historic Site Management Objectives Workshop" report (February 24-25, 1993) serves very well: "to preserve and protect Thomas A. Edison's West Orange laboratory, home, and collections, and to interpret for the education and inspiration of people worldwide the revolutionary technological and industrial contributions, and continuing global significance of this creative genius and unequaled inventor."

Principles for Interpreting the Edison Site

Within this general goal framework, the following "interpretive principles" are proposed:

1. The Edison site retains to a marvelous degree a strong sense of history, a patina which seems to indicate that Edison has just stepped away from the laboratory, what one staff member calls "the history rush." The interpretation plan should balance the preservation of this patina of history with the need to update existing interpretation strategies.

2. In keeping with the spirit of Edison's own innovative career, interpretive technology should involve modes which are the logical outcome of many of Edison's own inventions: audiovisual devices, CD-ROM, holograms, touch-screen computers, in short, any technique that supports and utilizes the latest technology.

3. The existence of original laboratory buildings, millions of archival items, hundreds of thousands of artifacts, and Edison's own home, Glenmont, allows a wide range of interpretive techniques. A mixture of guided tours, self-guided tours, two-dimensional and three-dimensional exhibits, demonstrations, audio-visual programs, computer-delivered learning,

interactive exhibits and hands-on learning opportunities will best serve the site's diverse audience.

4. Children will relate to the site differently from adults, and will require some interpretation areas set aside for them alone. Adults will come to the site with at least a vague sense of Edison's accomplishments and a willingness to be moved and inspired by their visit. A child, however, will not only most likely not have heard of Edison, but will not even know what a phonograph is. Specially targeted interpretive areas will be necessary for effective interpretation for children, and these areas should be available for use by visiting school groups.

5. The interpretation plan should provide for a comprehensive outreach program which would loan traveling "Invention Factory" kits and curriculum-based teaching and pre-visit materials to schools both within and beyond the site's immediate market area.

6. All interpretive methodologies, and each individual interpretive unit, should undergo thorough pre-testing before installation, to ensure maximum educational value.

Issue: Historic time frame

Edison's involvement at the West Orange laboratories covers 44 years (1887-1931), during which time the site underwent continuous and extensive physical changes. At different times, the plant manifested different priorities. For example, the early history of the site is associated with the development of the phonograph, while later periods were concerned more with the formation of Edison's business empire, with its associated manufacturing function. Some inventions could be interpreted to a specific time period, but more often, a given invention or business enterprise had a long, evolving history at the site.

For that reason, it is not necessary to attempt to restore or interpret the entire site to any particular year of Edison's occupation. Interpretation of the various periods at the site should remain as broad as possible, to encompass the changing appearance and functions of the various laboratory buildings over time.

When it becomes necessary to focus attention on a narrower time frame, this can be accomplished without excluding elements from other periods. The wealth of interior photos which document the appearance of various areas of the lab site at different time periods will help to give the visitor a sense of change over time.

This strategy does not prevent certain discrete areas of the site from being interpreted as "period rooms" and restored to a single time period, if that focus best serves the overall interpretive purpose.

Issue: Staffing

Site administrators are unable to project future staffing levels that exceed the numbers currently available. It is unlikely that government funding will be available in the foreseeable future for more than the 38 employees (FTE) currently serving. Yet development of additional buildings and exhibits, when implemented should result in increased visitorship. It is of concern to the planning team that the effects of increased visitorship might quickly overwhelm the ability of the existing staff to handle visitor demands. This would be true even if the interpretive program were not upgraded, but with new programs, exhibits and activities in place, it is difficult to imagine how a staff of the present size might cope.

Some issues to consider: With current visitorship at less than 50,000 per year, what will be the effect on the site if the number should increase threefold or more? How will existing staff handle the increasing demand for school group programs? Exhibits based on high technology require a high degree of maintenance expertise. If the plan calls for "state-of-the-art" equipment, the maintenance staff must be "state-of-the-art" as well. And the need for basic visitor services can be projected to expand as well: more visitors will use the bathrooms, requiring more frequent cleaning. More visitors will make purchases in the gift shop, requiring more cashiers. Security needs will be heightened by the presence of many more visitors to the site.

Any improvements made to the site must be carefully considered in light of the impact they will have on visitation, and on the site's ability to serve the needs of the public. In the material that follows, an attempt has been made to identify separately the interpretive strategies that would of necessity require additional staffing. Of course, almost any improvement to existing conditions at the site may result in increased visitorship and its concomitant challenges. But in evaluating which interpretive strategies out of many possibilities to pursue at the site, it will be essential to consider the impact of each, and make choices based on a realistic assessment of staffing capabilities.

Current Interpretive Strategies

The main mode of interpretation for the general visitor to the Edison National Historic Site is the guided tour. Visitors enter the site through the Visitor Center and Museum located in the laboratory complex's former powerhouse. A small exhibit consisting of text panels, photographs and objects summarizes Edison's

significance. A large three-dimensional model of the site shows historical dimensions. Two audio-visual presentations are available in a small, 30-seat theater off the main visitor center gallery. One is a general introduction to Edison's career, and the other is the famous "Great Train Robbery," which was an early production of Edison's motion picture division.

Visitors are taken on a tour through the site which consists of the entrance hall of Building #5, Edison's office and library, the stock room, and the heavy machine shop. They then exit Building #5 to tour the Chemistry Lab (Building #2) and the phonograph room in Building #1, ending at the Black Maria. At the conclusion of the guided tour, visitors have the option of purchasing admission tickets for the tour of Glenmont, Edison's home. Less than half of visitors to the Laboratory Site go on to visit Glenmont. Those who do receive a guided tour of the house which is limited to 15 persons at a time.

School groups are accommodated at the rate of four per day during the school year. Prior to their visit they receive a package of materials prior to their visit for orientation and backgrond purposes. The presentation, called "The Edison Way," deals with the invention process, and involves a tour of the first floor of Building #5, but not the Chem Lab or other outlying buildings. The groups end up with a program in Edison's library.

Special events include two annual occasions when the heavy machinery shop is in full operation. Edison Heritage Days is held in the late spring and is the most popular event at the site, attracting upwards of 1,000 visitors per day. Machine Shop Day in the fall also attracts a good crowd, as does "Christmas at Glenmont," with the Friday after Thanksgiving being the busiest day of the year. The Curator of Sound regularly presents a radio show, "Mr. Edison's Attic," on WFMU, a local radio station, utilizing some of the thousands of original sound recordings owned by the site. The site maintains tapes of all the shows.

PROPOSED INTERPRETIVE STRATEGIES

Modes of interpretation

A wide range of interpretive modes is available to the Edison site. The choice will be limited mainly by the level of staffing that will be available to carry out each mode. Therefore, each mode of interpretation listed below is grouped according to the relative number of staff required for effective use.

I. Somewhat dependent on staffing levels

A. Self-guided tours

Visitors would roam the site at their own pace and direction. Staff members would be stationed at each important area of the site, for example, Edison's library, the stock room, the machine shop, to interpret the area for visitors. Wayside exhibits would interpret areas where staff was either not available, or deemed unnecessary. Acoustaguide tours (portable audio players with headphones which visitors can use for self-guided tours) complete with original Edison Lab sound effects could enhance the visitor experience.

B. Traditional two- and three-dimensional exhibits

By no means maintenance free, such exhibits do nevertheless free the staff from basic frontline interpretation duties. The site's extremely rich heritage of objects, photographs and archival material make possible exhibits on a wide range of Edison-related topics. Such exhibits should comprise a large component of the site's interpretation plan.

C. Audiovisual programs

Again, the site's rich trove of archival sights and sounds makes audiovisual programs a high priority.

1. Video programs
2. CD-ROMs and other computer-delivered learning
3. Audio headphones

II. Very dependent on staffing levels

A. Guided tour

Visitors tour the site accompanied at all times by a guide, who leads them through the site and interprets it for them. An effective tour group would number no more than about 20; length of tour should not exceed one hour. Assuming a possible seven tour time slots per day, and perhaps four tours running at one time, 560 visitors could be thus accommodated each day.

The guided tour has the advantage that each tour can be tailored to the specific needs of the group, either by prior arrangement, or as determined by the guide when he or she meets the group. Thus, a group of visiting

engineers will receive a completely different tour than would people mainly interested in the birth of the film industry.

B. Interactive exhibits

Interactive exhibits attract visitor interest and are particularly useful for encouraging visitors to think about what they are seeing. Simple devices which allow visitors to choose one answer or solution over another, or make comparisons between objects, are effective. On the other end of the scale are electronically operated exhibits which may involve the visitor in a more complex operation or activity. In either case, it is imperative that adequate staff is available to keep such exhibits functioning at their best. Interactives require constant vigilance, skilled maintenance abilities, and periodic updating of information.

C. Demonstration/role playing

Human contact remains one of the most effective interpretation modes if the interpreter is skilled. A demonstrator can involve the visitor interactively in ways that a simple interactive exhibit cannot, and is available to answer followup questions that may be stimulated by the subject matter. The Edison site is a particularly rich field for this, because so many of the inventions lend themselves to demonstration.

Role playing on the part of interpreters can have tremendous impact when well done. For example, a group of interpreters might reenact Edison's discovery of the long-burning carbon filament, or his first recording of "Mary Had A Little Lamb." This kind of interpretation is particularly effective when the "tableau" is staged, but not expected by the visitor. For example, a tour guide brings his group to a room, and opens the door to find Mr. Edison and his muckers just on the verge of an important discovery. For the visitor, such an experience can be unforgettable.

III. Critically dependent on staffing levels

A. Hands-on experimentation/invention workshop/mucker's lab

When the objective is to inspire creativity and self-directed learning, nothing is as effective as the opportunity for the visitor to engage in open ended experimentation with materials and some guidance provided. The technique is often targeted to children, but it is extremely effective with adults as well.

Because such experimentation is at least somewhat open-ended, interpreters in this context have to be highly skilled and very knowledgeable about their subject matter. They must be flexible and able to think on their feet. It is not a situation where an interpreter can be trained to present a set program (but of course that is never a good idea anyway).

Drawbacks include messes which must be cleaned up, and concerns for safety. But given adequate staff, hands-on experimentation can not only draw visitors, but can keep them returning for subsequent visits.

Space allocation

Renovation of the Edison site buildings, as well as the proposed new construction, will create new exhibit spaces and open previously unused space for interpretation. In addition, many spaces now used for interpretation will remain as such. Some currently unused space will have to be evaluated as to its suitability as interpretive space. The following list includes all **potential** space, whether or not feasibility has been determined at this time. Potential (and existing) interpretive areas at the site include:

Building #5, Lab Building, first floor (10,900 square ft.)
- Entry hall, library/office, stock room, heavy machine shop
- Former power house

Building #5, second floor (10,140 square ft.)
- Precision machine shop, former Engineering Department, offices on north side

Building #5, third floor (10,900 square ft.)
- entire, including "Music Room"

Building #1, Physics Lab (2,500 square ft. total)
- unspecified space within

Building #2, Chemistry Lab (3,475 square ft. total)
- unspecified space within, possibly entire

Building #3, Pattern/Woodworking Shop (2,500 square ft.)
- unspecified space within

Building #4, Metallurgical Lab (2,905 square ft.)
- unspecified space within

Black Maria reproduction
entire

New Visitor Center
unspecified space within

Glenmont

The Edison site is extremely rich in interpretive possibilities. Indeed, one could easily devise exhibits and programs to fill a space twice as large. Some of the interpretive themes are logically linked to specific spaces at the site, e.g., the Music Room would be ideal for the interpretation of the roots of the recording industry. Other themes are not necessarily location-specific within the site. They could easily be presented in "neutral space," and have no particular association with any part of the site.

In the proposed Interpretive Theme Outline that follows, exhibits that are logically and thematically linked to a particular location are so identified. Exhibits that are not thematically linked to a particular location could then theoretically be situated in any of the new, renovated or existing spaces that would become available.

Summary of themes

There are probably as many different ways to outline the Edison story as there are interpreters. What follows is simply one of many possibilities. It is based on several years of groundwork, research, conceptual thinking and brainstorming on the part of Edison site staff members and the many other professionals who have been interested in and committed to the site's future throughout the last two decades. (Note: titles are working titles only.)

In this outline, the Edison story has five parts, plus an orientation. The parts can be visited in any sequence; understanding one is not dependent on having seen any other part of the interpretation:

1. **Orientation.** In a nutshell, what is Edison's significance to the modern technological age?
2. **Edison the Man.** His biography.
3. **Invention.** Edison's inventions, the process of invention, and the consequences of invention
4. **Inventing Industry.** Edison's invention of the research and development process, his linkage of invention to manufacture, his marketing strategies, and his contributions to the invention of the modern corporation.

5. **Inventing a Workforce.** What it was like to work for Edison, and who were the members of his culturally and ethnically diverse workforce?
6. **Inventing our Lives.** The impact of Edison's inventions, both on daily life, and on society.

Proposed Interpretive Theme Outline

Orientation Center

The Orientation Center should be located in the new Visitor's Center, close to the visitor reception area.

1. **A small exhibit** would briefly address the importance of the West Orange site to the development of American technology, and establish it as a crucial link between the Industrial Revolution and the Age of Technology. Edison is introduced as one of America's (the world's?) great citizens.

2. **A three-dimensional model of the site** is displayed in the open and is touchable for the visually impaired. Sections of the model which fit together can be removed to represent different eras in the history of the site. Each section is color-coded and labelled with its date of construction and demolition. In its largest form, with all the pieces fitted together, the model represents the lab in its heyday. The core of the model, which cannot be removed, shows the buildings that exist today.

3. **An audiovisual theater** shows three tapes in sequence:

   - **An introductory video presentation** presents biographical information about Edison, and demonstrates his unique genius at making connections. It describes the national context into which Edison was born, describes his major contributions, and demonstrates the impact his work had on global society. The video is also suitable for broadcast.
   - **"The Great Train Robbery"** is edited and interpreted to tell the story of the birth of the film industry.
   - **A Glenmont tour.** This is intended to entice more visitors to the Edison home, to make it accessible to those who otherwise could not visit, and of course to further expand the Edison story. It is also suitable for broadcast.

Edison the Man.

This part of the exhibit is not thematically linked to any particular location on the site. It would, however, be very appropriate as a Visitor Center exhibit, and would serve as an excellent introduction to the rest of the site.

This part of the interpretation, which focuses on Edison himself, portrays him in seven different roles. The interpretive mode is traditional two- and three-dimensional exhibitry, with the possible addition of some computer-delivered learning.

1. **Edison the inventor.** Discusses his unique approach to the process of invention, and demonstrates his prolific output. What influences made him what he was? A CD-ROM offers access to a complete list of his 1,000+ inventions, with drawings and pictures of the models where available.

2. **Edison the entrepreneur.** Discusses Edison as part of a vital force of aggressive American business interests which were fundamentally and permanently altered the national economy. Describes his various business enterprises, and demonstrates his genius at marketing, merchandising and public relations.

3. **Edison the family man.** Describes his ancestry, his two marriages and his children. Discusses Glenmont, and how it reflects both the changes in daily life his inventions brought about, and the prominent social and economic position he was able to achieve as a result of his work.

4. **Edison the friend.** This should be a full-scale reproduction of one of Edison's famous camping trips, complete with roadster, tent, hammocks and servants. Two- or three-dimensional figures representing Edison, and his contemporaries Ford, Firestone and Burroughs highlight the era.

5. **Edison the celebrity.** Visitors of today may not be aware that Edison was considered the most famous person of his time. This part of the exhibit uses traditional and multimedia techniques to demonstrate his fame, including film clips, newspaper headlines, and photographs. The exhibit describes his lying in state at the time of his death.

6. **Edison the failure.** One of the most fascinating aspects of Edison's biography is his perseverance in the face of repeated failure. There is no lack of material for this topic! From his first invention, the ill-conceived and unwanted vote counting machine, to his stubborn resistance to recording any music he himself didn't approve of, to his bad judgment

regarding direct vs. alternating current, to his disastrous attempt at mining and processing ore, he never let discouragement stop him from continuing his quest for knowledge. To Edison, every failure was just another discovery.

7. **Edison the inspiration.** Edison's life as an inspiration and example, a discussion of what one staff member has said "typifies what America likes best about itself: hard work, self-reliance, self-assurance, 'Yankee' ingenuity." He was a man of humble origin, without formal education, and yet he was able to achieve greatness, and thereby serves as the prototypical American hero.

Invention

This is the "meat and potatoes" of the interpretation, where all modes are possible, and exhibit technique includes traditional, interactive, hands-on, multi-media and computerized. Some of the inventions have logical links to certain areas of the site, while others are related to many different areas. Further study, and assessment of available spaces will be necessary.

1. The Inventions

a. Depending on the type of space for this exhibit, **an Edison invention time line** either circles the room, or occupies some other appropriate space. In it, we see an array of Edison's entire lifetime output of inventions (or as many of the site's vast collection as is practical to show) arranged in chronological order and identified as to place of origin, and we learn of the great diversity of products invented and manufactured at this site and others.

b. **The major inventions** are interpreted. Using demonstrations and interactive exhibits, we discuss how the invention came about, who was involved, how it was manufactured, how it works. Some examples:

- **phonograph**. Several models can be exhibited, reflecting innovation in style and technical changes in recorded sound. Audio headphones allow the visitor to hear the sound quality of various machines, including those of Edison's competitors. Visitors make their own recordings. Advertising posters provide interesting and colorful graphics.

- **motion pictures.** The history of the motion picture camera and the role of Edison's laboratories in developing it. Various interactive exhibits demonstrate the principles behind the movie camera and allow visitors to make their own movies at various levels of complexity. A CD-ROM allows visitors to access early Edison movies.
- **light bulb/electrical distribution system.** The light bulb provides the perfect opportunity to discuss the idea that an invention is nothing without the proper marketing scheme. The story of Edison's struggle to illuminate Manhattan is told using artifacts and two-dimensional material.

2. The Process

a. **How Inventors Invent** discusses the role of scientists or specialists in the invention process, the origin of creativity, Edison's drive to make something practical from the technical, his commitment to making the necessary resources available to his researchers, and his belief that repeated failure was an intrinsic part of the discovery process.

b. **You, the Inventor** provides hands-on opportunities to attempt an invention. The visitor with an idea for an invention can use CD-ROM technology to explore the patent records for similar ideas. Another CD-ROM takes the visitor through the process, modeling all the steps, providing the tools, machines and materials with which to "create" an invention. If the invention survives, the visitor then has to perform market research and model the best way to turn his idea to profit.

3. The Consequences

A discussion of the positive, negative and debatable consequences of mankind's inventions. How can good inventions do bad things? And how do inventions with a destructive intent sometimes end up with positive consequences? Using Edison as an example, the visitor is made aware of the sometimes unintended result of a seemingly innocent innovation.

Inventing Industry

Inventing Industry is not linked with any particular location on the site, as the whole lab complex was devoted to this "invention." Interpretive modes mainly involve traditional exhibitry, but audiovisual resources could form a strong component as well.

Edison was a brilliant innovator in the development of American business, science and technology, and one of a number of inventors and entrepreneurs who invented an entirely new pattern of American industry. He created the West Orange Laboratory Complex at the very moment when invention was shifting from the shops of individual inventors to the modern industrial research laboratories of teams of scientists and engineers.

1. Edison invents **research and development** as a concept

   - the concept of **teamwork** to promote creativity
   - exploring **new materials**
   - building on **an existing body of knowledge**
   - Edison himself did not invent the phonograph, the light bulb or the movie camera, but his genius was in his ability to capitalize on the work of previous inventors.
   - keeping **meticulous records**

2. Edison **links invention to manufacture**
   - products intended for **distribution to a national mass market**

3. Edison **analyses the market**
   - **market research**
   - **merchandising techniques**
   - **publicity**

4. Edison invents the **modern corporation**

Inventing a Workforce

Of course, the workers at the Edison Laboratories are associated with every part of the site. However, locating this part of the interpretation on the second floor of Building #5 (if it proves feasible) would have several practical advantages. The area of the precision machine shop comprises a vital part of the history of the site. Because the machines are in situ as they were originally used, it does not seem advisable to remove them in order to utilize the space in other ways. Yet, there is some concern that to restore another machine shop, in addition to the fascinating and even more overpowering heavy machine shop downstairs, could be "overkill." Perhaps by that time all but the most motivated visitor may have seen enough machinery.

Because the story of the "common man" who worked at the Laboratories is such an important part of the Edison story, and because in their ethnic and cultural diversity they represent the very fabric of America, New Jersey and West Orange

at a critical point in our nation's history, it is suggested that several individuals (either actual documented Edison employees, or authentic composites of several) be portrayed as two- or three-dimensional models, each of them stationed at one of the precision machines as if hard at work. Each model employs a visitor-activated audio unit which allows the "employee" to describe who is he, where he came from, what his job is, and something about his lifestyle. Women, too, were valued Edison employees, and should be included. Thus the precision machines are put in context in an interesting way, and the story of the Edison workers is told quite dynamically.

1. **Working for Edison,** a traditional exhibit in a portion of the second floor discusses:

   a. **working conditions,** what it was like to work for "The Old Man"
   b. **labor** at the turn of the century
   b. Edison's **management style**
   c. typical **wages** during the period the lab was in operation
   d. **contributions** to Edison's work made by his employees

2. **Ethnic and cultural diversity of the workforce** (see above)

Inventing Our Lives

In many respects, this part of the interpretation is the most significant. Edison's inventions permanently altered not only daily lives, but society itself. The exhibit would utilize traditional and interactive exhibit techniques, as well as audiovisual and computer components.

1. **Edison changes lives**

2. **Edison changes the world**

Using the dissemination of electricity as an example, the exhibit explores the ways society changed as a result of the widespread availability of the electric light and other inventions.

- **social change**
- the creation of a **mass culture**
- **political change**
- simplification of everyday life leads to **reform**
- **economic change**
- the creation of a **culture of consumerism**

Location-specific interpretation

Some locations at the Edison site have associations that make them natural venues for specific topics, and others, such as the first floor of Building #5, embody the whole story of the site in such a way that they cannot be missed. Recommendations regarding these locations are as follows:

1. **Building #5, entry hall, library/office, stock room, heavy machine shop** This area works so well as a guided tour, that it is hard to imagine it any other way. The area is neither secure enough nor safe enough to allow visitors to travel through on their own, and precautions to mitigate these factors would irreparably harm the fabric of the interiors and take away their special atmospheric ambiance. Most likely some form of guided tour or guided interpretation will remain the interpretive mode of choice for this area.

   There are methods that would increase the dramatic sense of Edison's presence. Imagine the visitor's amazement if, in the middle of the guide's presentation, Edison himself, represented by a hologram appearing on cue in the back of the stock room, suddenly interrupts the guide and sets him straight on a point of fact. One can envision a tour of the grounds which is interrupted more than once by Edison's irascible, holographic presence.

2. **Black Maria.** Although specific recommendations have not been developed at this point for the Black Maria, it obviously not only lends itself to the interpretation of the history of the film industry, but is an artifact of that industry itself, although a scale model of the original.

3. **The Chemical Lab.** The Chemical Lab should continue to be interpreted as a fascinating "period room." As such it represents other labs which may not be restored in their entirety, and emphasizes Edison's personal interest, not only in chemistry, but in botany. Because it is so lavishly furnished and equipped, it again does not seem a likely venue for unaccompanied visitors. It could, however, be staffed by an interpreter, who would greet and educate visitors making their own way around the site.

4. **The Pattern/Woodworking Shop**, at least in part, could be restored. The stories there include demonstrating the process of pattern making; the idea that the complex was almost completely self-sufficient and could make anything that was needed; and the concept that objects, for example, phonograph cabinets, changed over time in response to marketing initiatives as well as common taste.

5. **The Music Room**, located on the third floor of Building #5, seems to be everyone's favorite. It is the ideal venue to tell the history of the sound recording industry. It could be restored, and still incorporate appropriate exhibits, which may need to be set in period-appropriate casework, etc. Of course, an audio library featuring many of the thousands of Edison recordings would be a requisite part of the exhibit.

6. **Glenmont**, Edison's home, exists in a context of several limiting factors, i.e., the covenant with Llewelyn Park which limits visitation, its inaccessibility to disabled visitors, and its distance (which is more psychological than actual) from the Lab site. It seems likely that it will continue to be interpreted as an historic house for the foreseeable future.

It would be desirable to enhance the didactic value of Glenmont in ways that will tie it strongly to the rest of the site. Such strategies could include demonstrations of Edicraft appliances, reinforcing the changes to every American household brought about in part by Edison's inventions, and providing audio reminiscences of persons associated with the house, either actual ones, or read by actors. Of course, the house will continue as an effective interpretation of Edison's personal life, as well as the tastes of the Gilded Age of the American domicile. The garage, barn, greenhouse and potting shed can also be developed and restored, each of them would then provide an important venue for further interpretation of the Edison story.

Other recommendations

1. Visitors to the site are often delighted and overwhelmed by the pure volume of material they are able to see. Some of these artifacts are collections of a single functional object, representing a long evolutionary history of type and form. In the phonograph collection, for example, both the phonograph cabinets, and the amazing variety of horns are good examples. Presumably, there are many other such examples in other types of object. If it proves feasible, a **system of open or "viewable" storage** for at least part of the collection would be a real asset.

2. Children are an important component of the site's visitor population, whether they come with their families or with school groups. It would greatly enhance the site's service to this segment of the population if an area could be set aside for children's programs. School groups would make use of the area during the week, and on weekends and holidays, the area could be made available to other young visitors.

It is recommended that an easily accessible space be devoted to a children's **Invention Factory**. Building No. 3 is an original building and is probably not a strong candidate for a complete restoration. It would offer adequate program space, which should include: a classroom/multipurpose room; a hands-on Mucker's Lab where children could unleash their creativity, and an exhibit intended specifically for children. The children's unit might also provide a specially-tailored, short orientation video that explores invention and what it means. It would serve an educational purpose, and in addition, many parents would welcome a quiet spot in which to rest and allow their overstimulated children to calm down.

Many different exhibit topics would meet the needs of the school program and still be appropriate for the family visitor. One example might be an evolutionary history of the phonograph, starting in the present with the familiar CD player, and working backward through tape cassette, LP record, and the various manifestations of the phonograph. Of course, audiovisual, computer and interactive components would be an integral feature of such an exhibit. The exhibit should be scaled, written and designed for children, and would serve not only educational purposes, but would also provide a place to bring younger children if other members of the party should wish to explore the rest of the site in more detail.

Summary

The range of topics, locations and target audiences at the West Orange site create a vast array of options for interpretation. As the design effort moves forward, however, the unique nature of this site and its collections should be taken into account. The end result will be a site that offers a unique experience to all visitors.

7. PROPOSED SITE DEVELOPMENT AND NEW CONSTRUCTION

Introduction

In previous sections of this report various aspects of the Edison National Historic Site have been documented and analyzed. These have included the site, the existing buildings, programmatic needs, and interpretive approach. The objective of this project was to bring all of these issues together to form a proposed development approach for the site. The following chapter is an outline of the team's vision for the site.

Design Alternatives

Recognizing that in the past thirty years many ideas have been developed regarding the future development of the Edison site our team reviewed the available information to learn from these efforts. The 1966 Master Plan included a Visitor Center, located in the northern portion of the laboratory site, adjacent to vault #33. This plan did not include any information regarding the size or footprint of the new building. Site access was shown from Alden Avenue. The proposed site tour included all of the existing buildings, with limited access to the upper levels of Building #5.

This design approach remained intact, with minor modifications in later studies, until the design charrette in 1993. This two day design effort was intended to start fresh, looking at all of the options available at the laboratory site. With only two days available to the team the designs were limited to concept level site plans, showing the location of new construction, new parking, and giving a sense of how a visitor would experience the site. The product of the charrette was three concept options:

1. Visitor Center across Main Street
   A new building located directly across from the main gate would house exhibits and administrative space. It would act as a gateway between the visitor parking and the site. A new maintenance building and curatorial center would be located on the site of the existing parking lot. The historic site itself would not be greatly modified.

2. Visitor Center located on the historic site
   Following the design approach that was shown in the earliest master plan studies, this concept shows the new building at the northern edge of the courtyard, extending out to Alden Street. The plan does not indicate the height of the building. Access to the site is available at both the main gate as well as further north on Main Street , directly into the new building. The site across Main Street is utilized for parking.

3. Visitor Center located in the Storage Battery building
The last remaining manufacturing building, located across Lakeside Avenue, would house the visitor center, administrative offices, and curatorial space. The existing parking lot would be expanded to include the site of the current maintenance building. The historic site would not be greatly modified.

The starting point for the current design effort was a review of the concept plans developed in the 1993 charrette. The design team, in coordination with the National Park Service, analyzed these designs taking into account additional information made available from the current documentation. Critical evaluation criteria included the following:

Plan must stay within the boundary of the park

The Storage Battery Building is not a viable option for use by the National Park Service because it is located outside the legislated boundary of the park. This option was rejected from further study.

Design must meet the programmatic needs of the users

The space needs analysis performed as part of the current project showed a requirement for a substantially larger new building than previously assumed.

Circulation is a critical component of the visitor experience

Access locations to the site for visitors are a critical factor in the perception and experience of the site. The main gate, which historically is how all visitors entered the West Orange facility, should be reincorporated into the visitor experience.

Open the historic buildings to the public

Many visitors to the site express frustration at having access to only a small portion of the historic buildings. This is particularly true at the Laboratory site. The use of key historic spaces for storage and administrative uses denies the visitor the opportunity to experience the full richness of the site.

Reactivate the site

The West Orange plant was historically a place of great activity and energy, both indoors and outdoors. This sense of energy is missing and needs to be incorporated into the design and use of the site.

Take advantage of expanded interpretive opportunities

Interpretation of the site is currently an indoor activity, the outdoor spaces are under- utilized. The visitor experience should be as seamless as possible once the visitor is within the bounds of the historic site and should take advantage of exterior as well as interior spaces.

Utilize new construction to the historic site's advantage

The buildings that currently constitute the laboratory site are only a fraction of what existed in the first decades of the 20th century. The visual experience of the site today is radically different than during the period of significance. There is an opportunity to utilize any new construction to meet not only a programmatic need, but to strengthen the visual experience at the site.

Adequate parking must be incorporated into the design

Public visitation to the site is not negatively impacted by the limited visitor parking currently available. Development of the site should increase visitation, particularly for school groups, so expanded parking for cars and busses should be incorporated into the design.

Analysis of Design Alternatives

The following is a preliminary analysis of the design alternatives utilizing categories found in a typical environmental assessment.

A. No Action Alternative

For comparative purposes a no action alternative is included. In this option the assumption is that the park will be operated as it is currently, with funding maintained at current levels.

Site Boundaries and Topography

There will be no modifications to either the site boundaries or the topography.

Vegetation

The landscape will continue to be maintained in its current state, which is out of context with the period of significance for the site.

Hazardous Materials

Any subsurface contaminants will remain undisturbed. Remaining contaminants above ground will be mitigated as they are encountered.

Historic Buildings

The historic buildings, and much of the collection, will continue to be put at risk due to age and environmental conditions. Existing funding levels are not adequate for required repairs and upgrades, much less cyclical maintenance.

Cultural Landscape

No modifications to the landscape will be made, leaving the exterior spaces of the laboratory site out of context with the interior spaces. At Glenmont missing landscape features that might enhance the visitor experience will

not be recreated.

Archaeology
Subsurface historic resources will not be disturbed.

Visitor Use and Experience
Limited access for the visitor will continue at both the laboratory and Glenmont. Key historic spaces, such as the Music Room, will continue to be closed to visitors and the collection will continue to be largely inaccessible to the public and researchers. The visitor experience will continue to be constrained by the requirement that all tours of the site be guided by NPS staff.

Visual Environment
The juxtaposition of historic and non-historic will still be evident. Unsympathetic construction both on site (building #12) and off-site (the adjacent shopping center) will continue to interfere with the visitor's visual experience of the laboratory site.

Socioeconomic
Visitation to the site will stay approximately at current levels, particularly due to limits in place on daily visitation by school groups. While this will add no additional load to local infrastructure it will also offer no added benefit to the local economy.

B. Alternative Design: Visitor Center Located in Storage Battery Building
As stated above this option was rejected from further consideration as it anticipated the use of property outside the legislated park boundary. No analysis of the design's impact was performed.

C. Alternative Design: Visitor Center Located across Main Street from Laboratory
In this option all new construction, as determined by the program analysis, would be located on the site of the existing maintenance building and parking lot. This site was never part of the Edison West Orange plant.

Site Boundaries and Topography
The site boundaries would remain unchanged. The topography of the historic sites would not be affected.

Vegetation
Modifications would be made to the laboratory site to remove inappropriate vegetation and to add plantings that are appropriate for the period of significance,

Hazardous Materials
Subsurface disturbance would be limited to the site across Main Street, which housed an automobile showroom and garage in the early 20th century. There is a potential that some soil contamination may exist that would have to be mitigated as part of the construction process. Any subsurface contaminants on the historic site will remain undisturbed. Remaining contaminants above ground will be mitigated as they are encountered.

Historic Buildings
Inappropriate uses will be removed from the historic buildings and moved into the new construction. The historic buildings will be upgraded to better conserve the resource and to improve visitor access. Unsympathetic construction will be removed and building #11 will be repatriated to the site.

Cultural Landscape
The exterior spaces of the laboratory site will be modified to be in harmony with the interior spaces and to reintegrate the entire site.

Archaeology
The subsurface historic resources of the historic sites will not be disturbed. Study and or mitigation on the site across Main Street, while never part of the Edison West Orange plant, may be necessary.

Visitor Use and Experience
The historic buildings at the laboratory site will be fully accessible to the visitor, dramatically improving interpretation of the site. The historic Main Gate will be utilized for access to the site, providing proper orientation for the visitor. Appropriate storage for the collection will allow for improved access and display for both the regular visitor and researchers.

Visual Environment
While the laboratory site will be improved the site will remain visually open to the north and northeast. Visually intrusive elements such as the shopping center across Alden Street will still impede on the visual experience of the site. The new construction will be a large block directly across Main Street. The volume of the new building would be unusual for this location along Main Street and would compete visually with the historic site. Meeting the programmatic needs for the new construction and improving parking will be difficult on the Main Street site.

Socioeconomic
Development of the site should increase visitation which will increase the burden on the local infrastructure, but should also offer added benefits for

Visitor Use and Experience
The historic buildings at the laboratory site will be fully accessible to the visitor, dramatically improving interpretation of the site. The historic Main Gate will be utilized for access to the site, providing proper orientation for the visitor. Appropriate storage for the collection will allow for improved access and display for both the regular visitor and researchers.

Visual Environment
Placement of the new construction on the historic site will be utilized to recreate the sense of containment that historically existed on the site and to cut of inappropriate view corridors to adjacent properties.

Socioeconomic
Development of the site should increase visitation which will increase the burden on the local infrastructure, but should also offer added benefits for the local economy.

Preferred Design Option

Based on the above analysis the design team and the National Park Service determined that the preferred option would place the visitor center on the laboratory site. The following is a narrative description of the development of this concept plan.

Site Design

Section 4 of this report is an analysis of the laboratory site with concepts for its development. Based on the above information the key elements of the site development include: (Figure 9)

-Parking for both visitors and staff across Main Street. Maximizing this site for parking could be phased in as the need develops.

-Visitor access to the site will be through the historic main gate. A pedestrian crossing of Main Street will be coordinated with the design of the parking area to funnel visitors to the Main Gate. The crossing will likely require some sort of signilization.

-The historic laboratory site can be divided into three zones. The southern portion of the site consists of the core laboratory buildings which date primarily from the initial period of construction at the site. The northern portion of the site, along Alden Street, which is now mainly open space should be utilized for new construction. Construction in this area will close off a view corridor from the historic core that is inappropriate. The third area is in the middle, between the northern and southern areas. This zone can be utilized as an area for interpretation, both indoors and outdoors.

SITE DEVELOPMENT

Figure 9
Proposed Site Developme
Edison NHS- Lab Unit

-Relocate the replica of the Black Maria to the eastern edge of the site, in the "interpretive zone". This will still allow the building to be utilized as an interpretive tool but will downplay its visual presence. It will also close off a view corridor from the historic site to the east that is inappropriate.

-Energize the outdoor spaces, particularly the courtyard, with displays, objects and activities. The visitor experience should be continuous once they have entered the site and not be limited to just indoor spaces. Bring building #11 back from Dearborn, Michigan and reassemble it at its original location. This will add variety and life to the courtyard.

Reuse of Existing Buildings

One of the key design goals set by the team is to open the historic buildings to the visitor as much as possible. This goal must be balanced with the space needs developed in the programming process and an evaluation of what, if any of the future space needs can or should be located in the historic spaces. Most of the required uses, such as archival storage and visitor services, would require extensive alterations to the existing buildings which would negatively impact the historic fabric. The only use that could be placed in the historic buildings without severely altering their construction would be offices. Most of the required offices, however, should be in close proximity to the other activities, such as archival and curatorial spaces. The most efficient and logical organization would place virtually all of the programmatic needs into a single new building while utilizing the historic buildings for exhibits and interpretive uses.

With the construction of a new building incorporating the visitor services, administrative offices, and archival/curatorial space needs, the existing buildings can be utilized as follows: (Figure 10)

Building #1
With the primary point of entry for the visitor through the historic main gate, the south door to building #1 will be the first entry door a visitor will encounter. All visitors will be guided into this building. Approximately half of the building (1250 square feet) will be used as an **Orientation Center**. Visitors will be greeted by site staff who will review the available options for visiting the site, answer questions, and register the visitors. The primary exhibit in this building will be a site model and interactive computer stations which will describe the site and tour options. The remainder of the building will be used for office space for the NPS staff who work primarily in the historic area of the site.

Building #2
The **Chemistry Laboratory** will remain essentially as it is today, a period room. As most of the visitation of the site is intended to be through self-guided tours, however, security will be a concern in this space. The shed addition on the east side of the building will be renovated to allow self-guided visitors to learn about the Chemistry Lab through exhibits and interactive displays. They will be able to view the lab through the existing windows

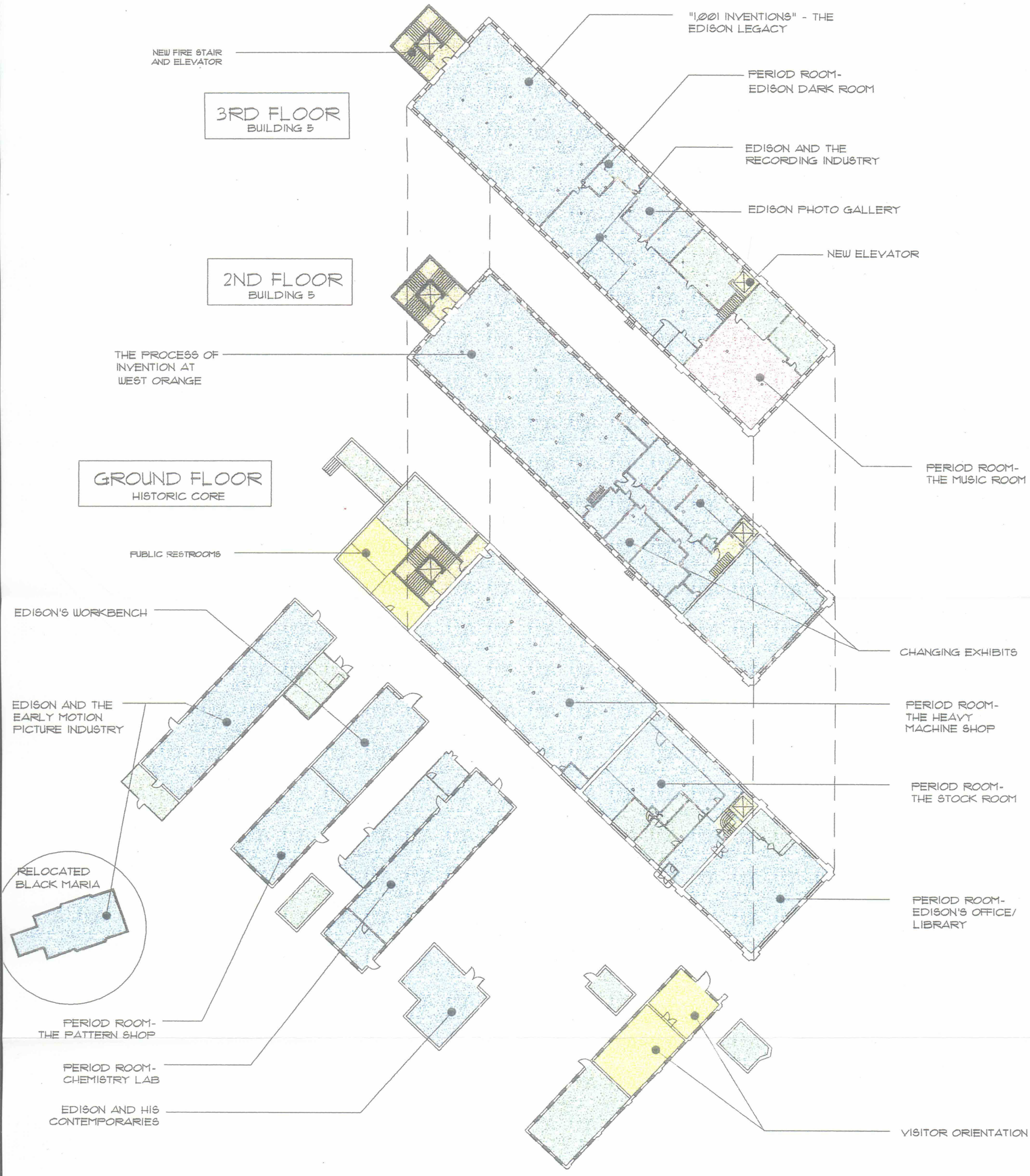


Figure 10
Proposed Space Use
Historic Buildings
Edison NHS- Lab Uni

located in the brick wall. Additional views may be afforded with closed circuit cameras. If a visitor wants to visit the lab space itself they can join a guided tour given at regularly scheduled times.

Building #3
The northern half of this building, the **Pattern Making Shop**, (Figure 11) will be conserved and exhibited as a period room. Visitors will be allowed access to just inside the door, which will offer them a full view of the room. On special occasions some of the equipment will be in operation.

The southern half of the building will be fitted out as **Edison's Workbench**, (Figure 12) an experimentation room for all visitors, but especially children, to learn about the basic concepts of many of Edison's most important inventions. This will be a hands on space, with work tables modeled after the work stations that existed in the various laboratory spaces.

Building #4
One of the most modified of the original buildings on the interior the entire building will be devoted to new exhibits. At 2500 square feet and only 25 feet wide it is likely that the exhibit will be devoted to one subject. The **invention and development of the motion picture** are a critical part of the West Orange site's history. Building #4 will be devoted to this story. Locating the replica of the Black Maria adjacent to this building will allow the two to be combined as part of one exhibit.

Building #5
As the largest of the lab buildings #5 naturally is a focal point of the site. With over 30,000 square feet of space it can accommodate a range of activities. As the only multi-story building on the site it also poses the greatest challenge for opening the entire building to the public. The existing stair, near the west end of the building, is steep and has settled to one side. It should, however, remain in use as a means of vertical access. This will require some rebuilding and reinforcement. A new fire stair and elevator can be added at the east end of the building, outside the existing footprint, to provide emergency egress and a vertical access for the disabled. A second elevator can be added adjacent to the existing stair (the space on the first floor is currently an office). While this will require removal of historic fabric it will offer the greatest flexibility for visitors to move through the building, with all visitors offered the same circulation options.

The first floor will remain as it is currently organized, with the **Library**, the **stock room** and the **heavy machine shop** interpreted as period rooms..

The second floor will include new exhibits. The precision machine shop will be devoted to **"The Process of Invention at West Orange"**. The existing equipment will be kept in place with the new displays layered in and around the space. The remainder of the floor that is currently used for office space will be available for **changing and special exhibits**. One option in this area would be to fit out the one space which was known to be **Mr.**

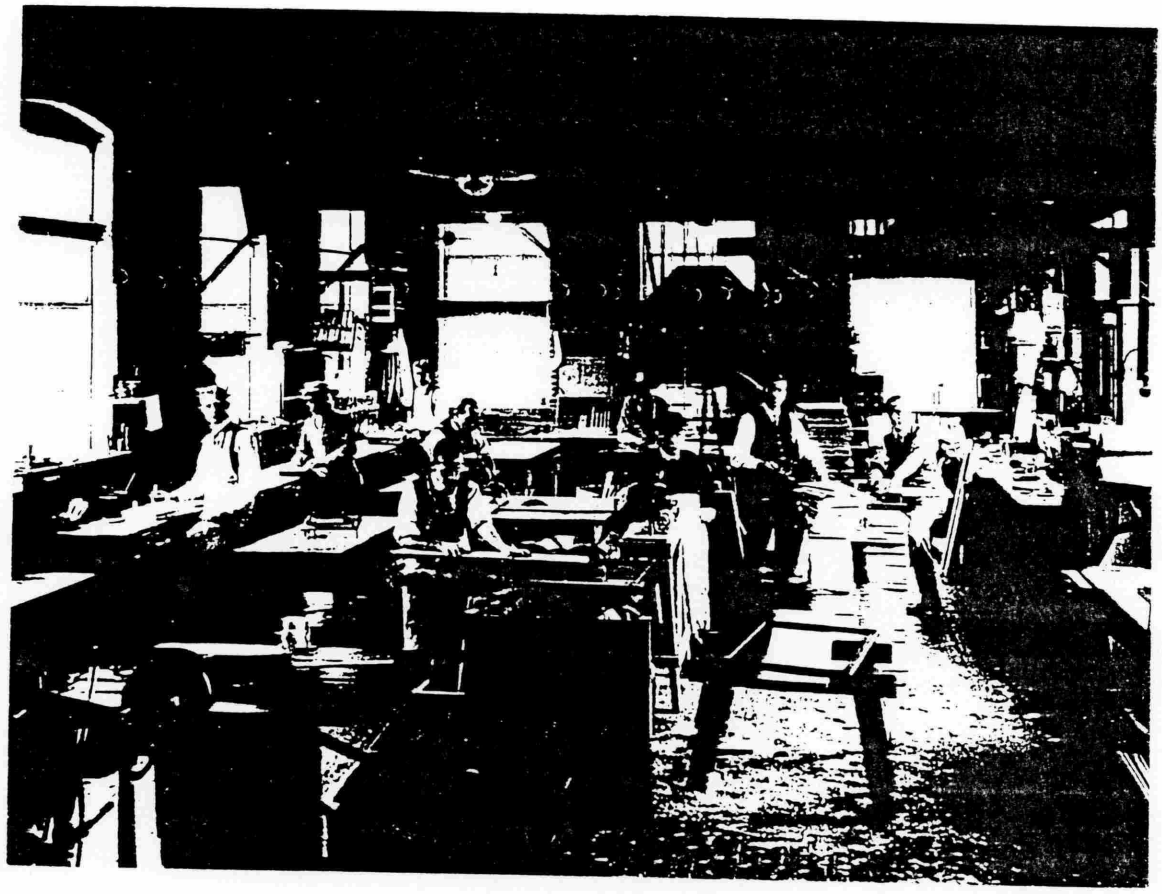


Figure 11
The pattern-making shop, building #3, January, 1917.
(EDIS archives, photo 10.382/3)

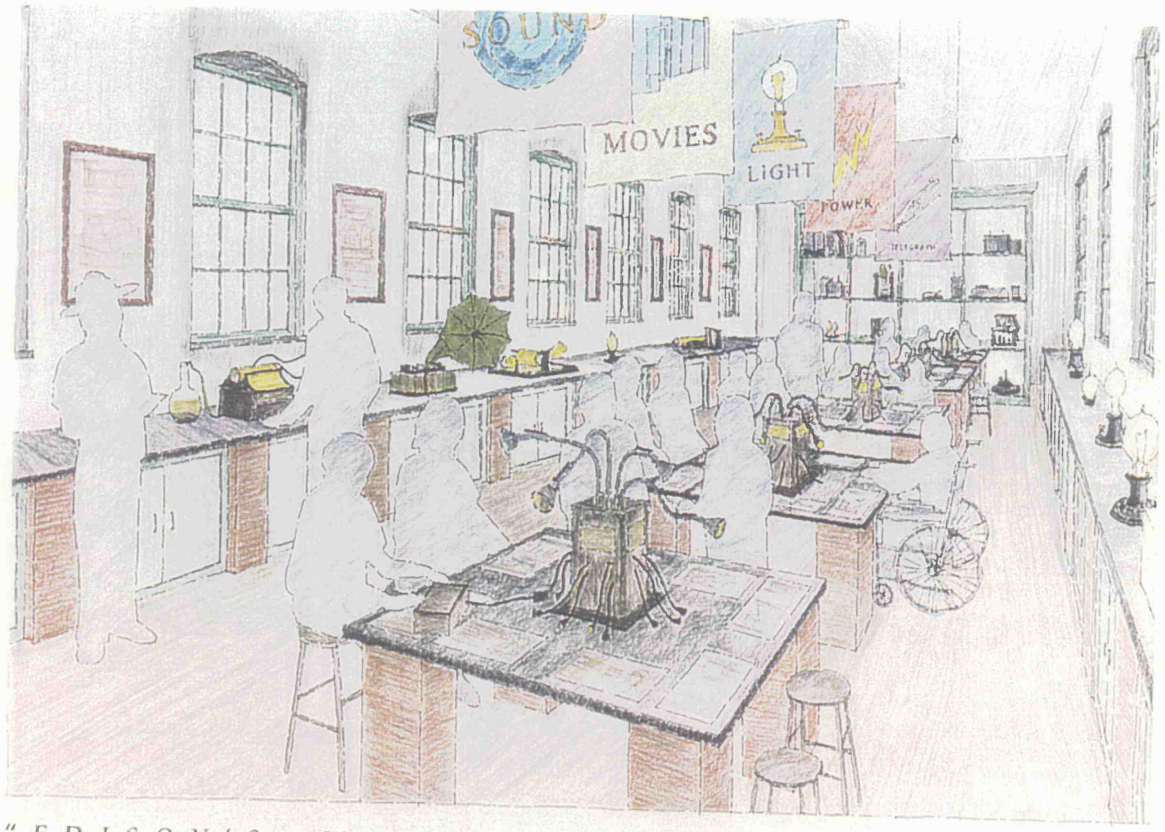


Figure 12
Rendering of the proposed interactive exhibit area, "Edison's Workbench", to be located in building #3.

Edison's personal lab space as a period room. This would be pursued only if clear documentation of the room's period appearance is available.

The third floor experience will start at the west end with the **Music Room**. (Figure 13) This space is one of the most evocative, yet is almost never made available to the visitor due to its location. Excellent documentation is available to interpret this space as a period room, but it will also be utilized for demonstrations of recording on Edison equipment, an activity that takes place currently that is very popular. The area outside the Music Room will be devoted to exhibits on **"Edison and the Early Recording Industry"**. Further down the floor the darkroom will be left in place with stations available for visitors to access the collection of photographs in the archives, similar to the access currently available at the Edison NHS web-site. The remainder of the floor, currently used for storage, will have an exhibit on **the Edison legacy**. (Figure 14) This exhibit will display the full range of Edison's inventions, fit them into the context of the period, and show their relevance to our current world.

Building #6
The former powerhouse will be impacted by the construction of the elevator/stair tower described for building #5. The insertion of this element will leave a U-shaped space that can be adaptively used for mechanical space and public restrooms.

Building #7
The Blacksmith's Shop will be conserved and furnished with appropriate equipment. It will not typically be open to the public, but can be utilized on special occasions for demonstrations.

Building #8
This storage vault will be left in place as an object, but will not be open to the public.

Building #9
The Gate House will form part of the ensemble as the visitors enter through the main gate. It can serve as an information station, but will not be open to the public.

Building #11
Brought back from Dearborn, Michigan, the primary function of the building will be to create enclosure at the north end of the courtyard. An exhibit in the building will explore **Edison's circle of friends**, including Henry Ford, who had the building moved to Dearborn in homage to Edison.

Building #12
The storage vault will be removed.

Building #13
The replica of the **Black Maria** will be relocated to the east edge of the site, closer to the original building's actual location. This will also divorce the building from the paving test

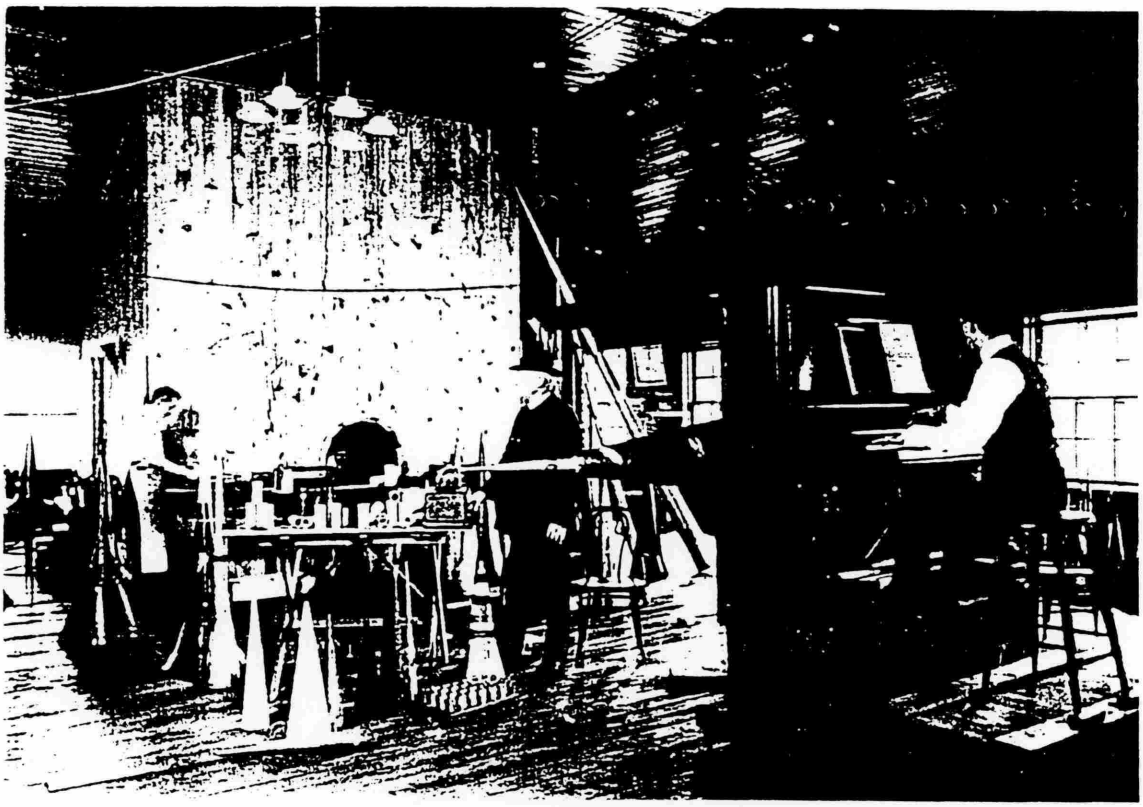


Figure 13
One of a number of available historic photographs showing the music room in use, 1904-1905.
(EDIS archives, photo 29.430/3)

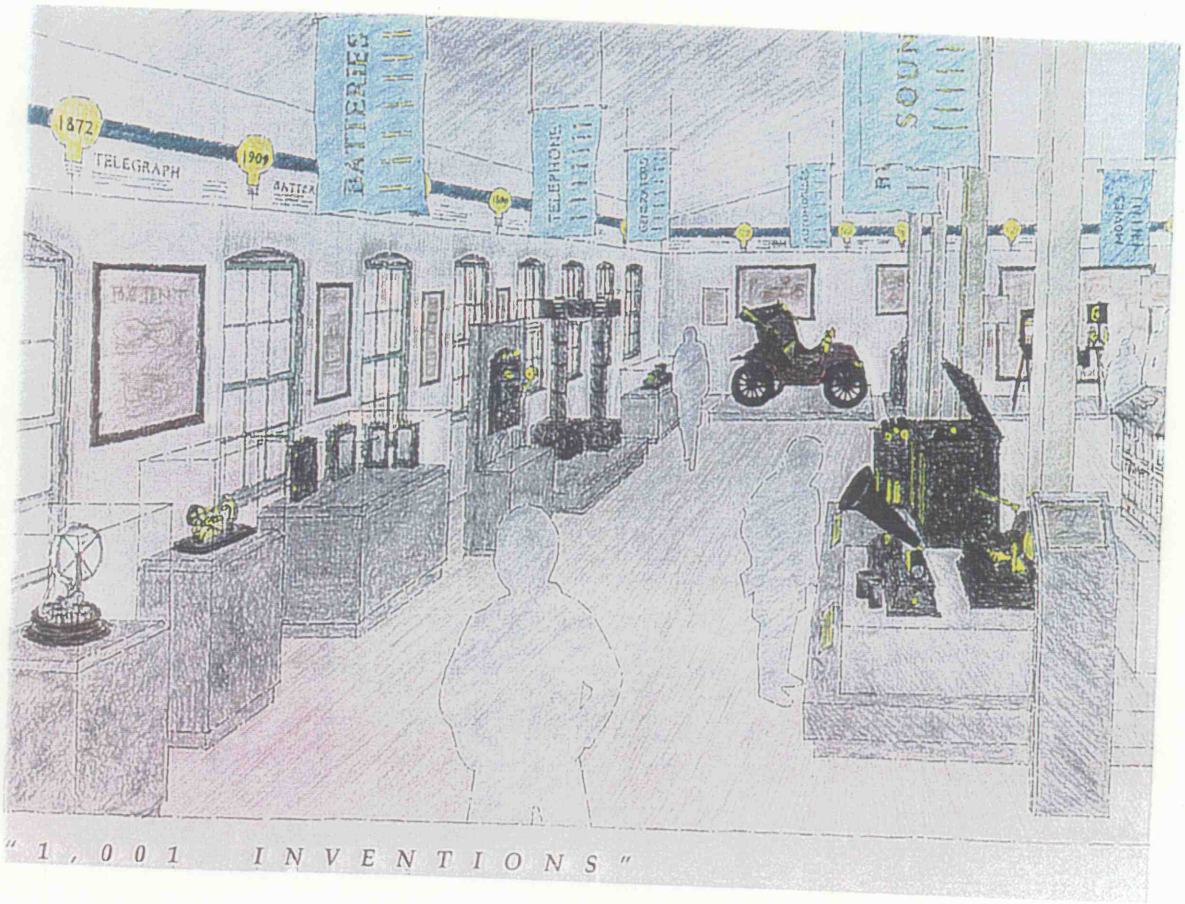


Figure 14
Rendering of the proposed exhibit to be located on the third floor of building #5, "The Edison Legacy or 1,001 Inventions".

samples that are adjacent to it currently, and mistakenly thought to be part of the Black Maria by some visitors.

Building #32
This storage vault will be left in place as an object, but will not be open to the public.

New Construction- The Thomas Alva Edison Resource Center

Based on the programming analysis done as part of this study, the new building will require approximately 60,000 gross square feet of space to accommodate the needs of the staff and visitors. The building will have to be sensitive to the historic context, but must clearly be new construction, not a copy of the historic buildings at the site.

The design strategy is to place the majority of the space in a four story wing located along Alden Street. The location is close to that of the old Phonograph Works building, and will actually overlap the footprint of the former building. This four story element will visually enclose the site as the manufacturing buildings did at the beginning of this century. It will create a foil to the Storage Battery building located across Lakeside Avenue and will create a visual environment closer to what existed in Edison's time. The four-story element will have a "flat" roof and will be constructed of masonry, in keeping with the materials that have historically been used at the site. A one story element will extend to the northeast corner of the site to visually enclose this corner. (Figure 15)

Extending out towards the courtyard near the west end of the new building will be a lower, one and one half story element. Constructed of industrial materials, steel frame and metal panel siding, this element will invoke the memory of buildings which once existed on this area of the site, nickel and gold plating buildings. (Figure 16) Introducing non-masonry elements will also remind visitors about the wide range of building types and materials which existed at the site during its history.

The first floor of the building will incorporate visitor services, administrative office space, and the maintenance shop. (Figure 17) Visitor services will be grouped in the one and one half story section, with a theater/lecture hall, information center, gift shop and restrooms grouped around a gathering space. Adjacent to this will be space which can be devoted to either permanent or changing exhibits. This space will surround Building #33, the Blue Amberol Vault, which can be incorporated into the exhibit. At the east end of the building is the maintenance shop, including an outdoor yard that is isolated from the site by a masonry wall. The remainder of the floor will serve as office space for the administrative and security staffs.

The second floor includes classrooms and multi-purpose space as well as office space for the museum services and interpretive staff. The third and fourth floors are devoted primarily to archival storage and curatorial staff. Visitors will be offered the opportunity to visit these floors to view the collection through interior windows and to view the historic site from this raised vantage point. (Figures 18 and 19) In addition to the National Park

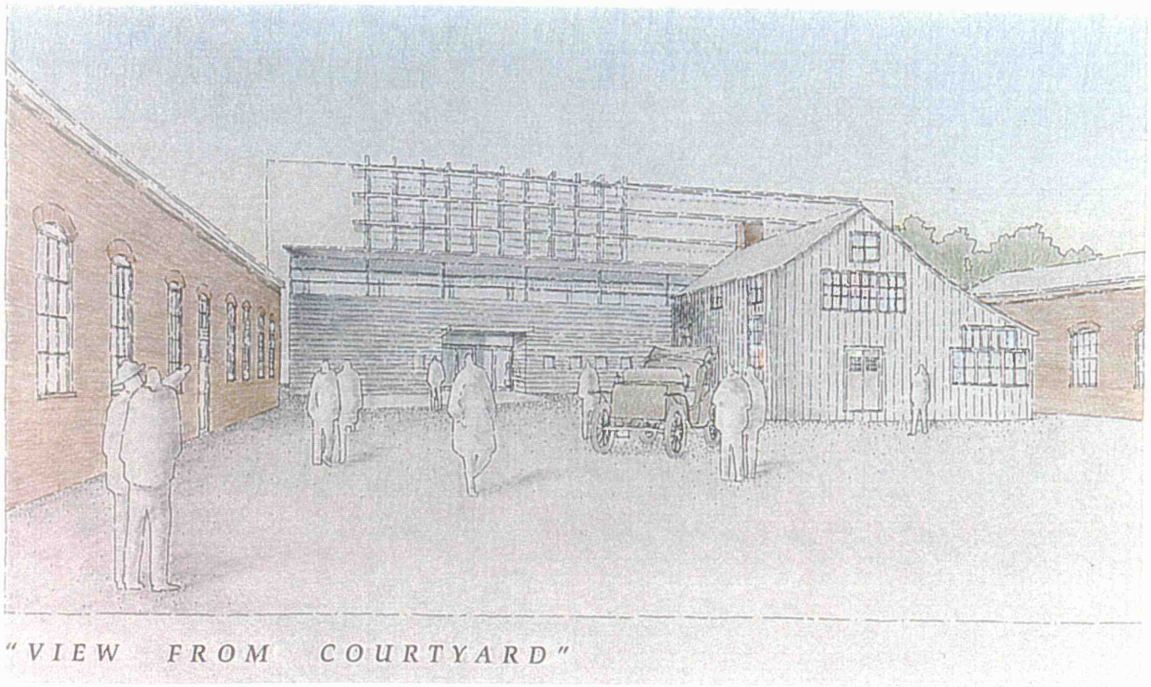


Figure 15
Rendering of the proposed Thomas Edison Resource Center viewed from the courtyard.

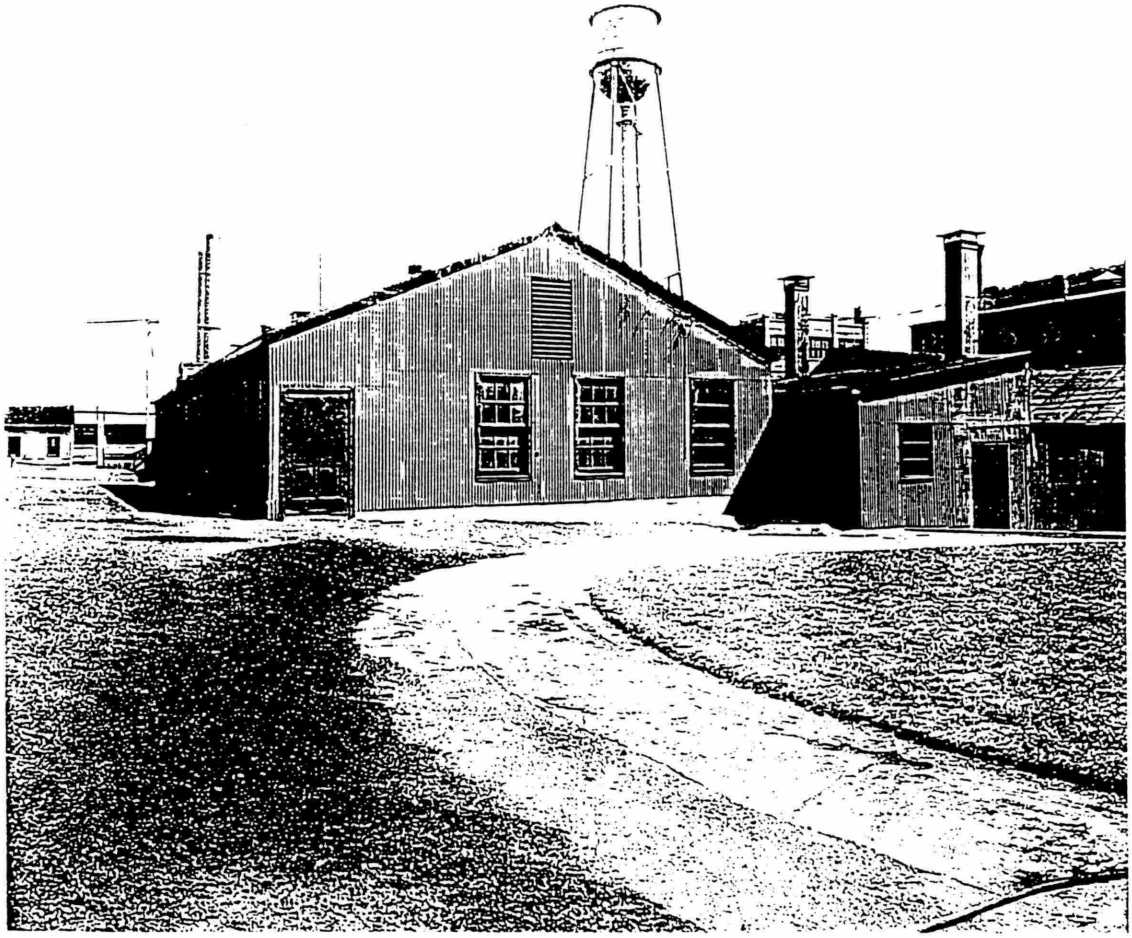


Figure 16
A photograph taken in 1936 of building #22b, which was located in the area just north of the main courtyard. The pavement test circle can be seen in the foreground (EDIS archives, photo 12.440/368)

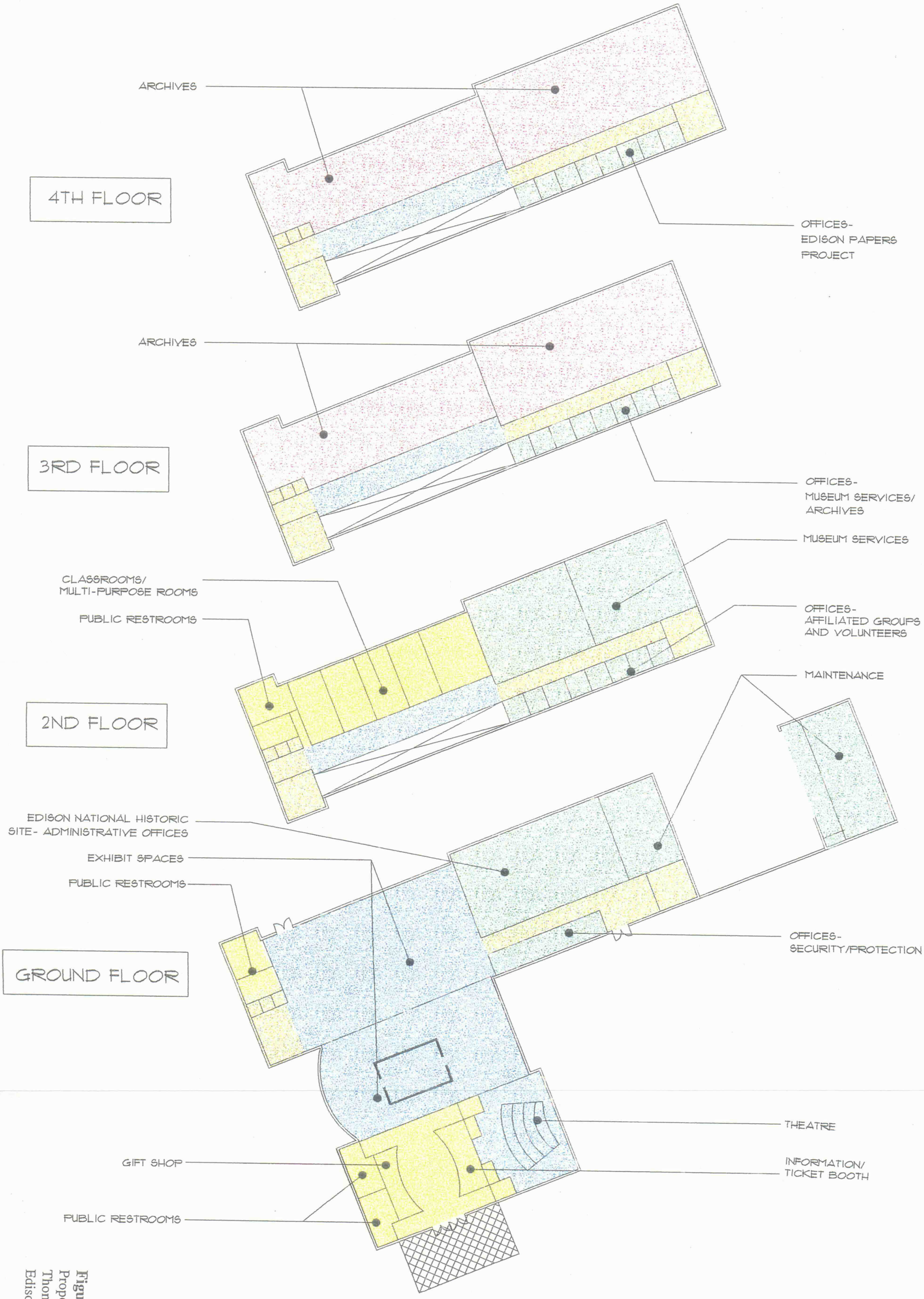
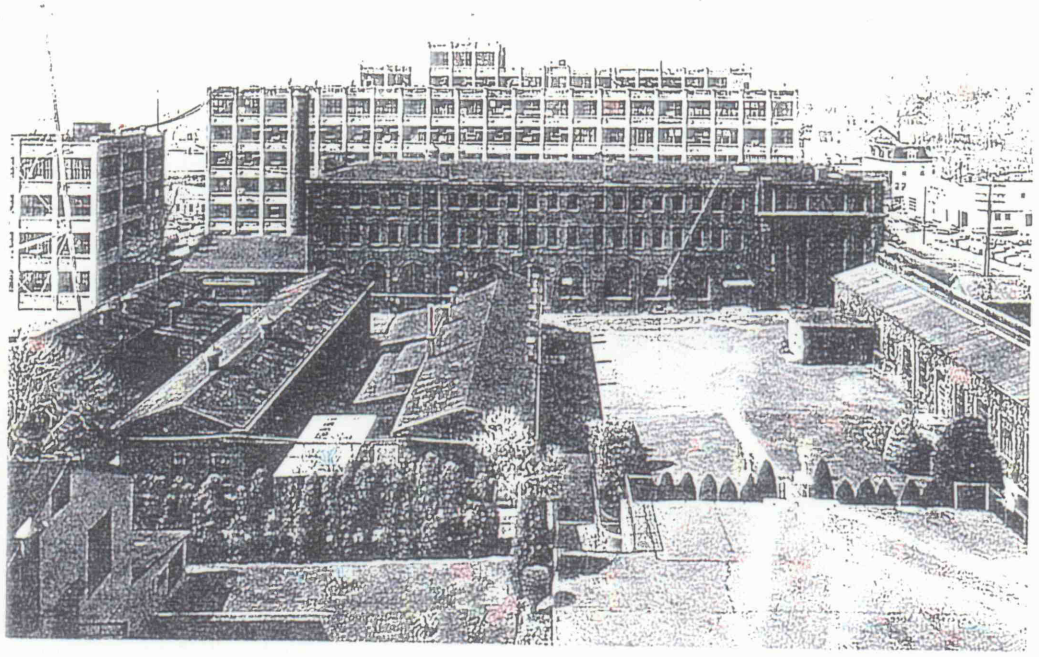
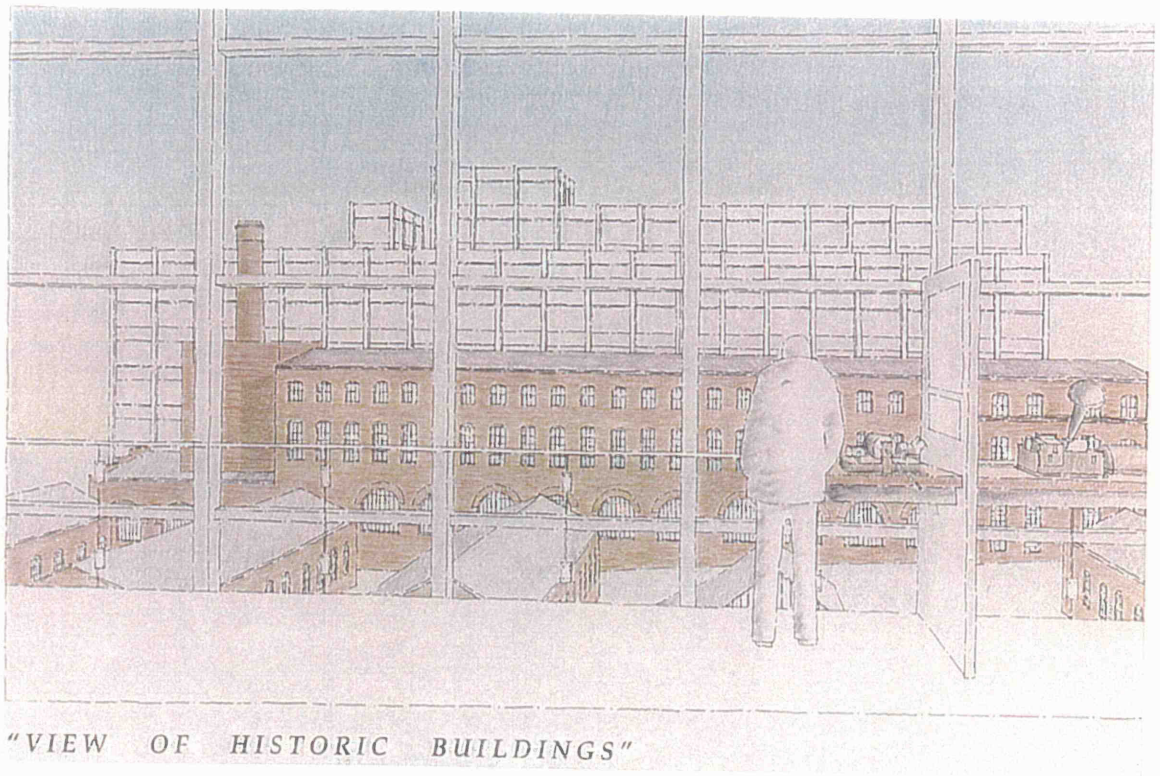


Figure 17
Proposed Space Use
Thomas Edison Resource Center
Edison NHS- Lab Unit





Figures 18 (top) and 19 (bottom)
The top view is a historic photo of buildings #1, #2, #3, #4 and #5 as seen from the upper floors of the phonograph works building. (EDIS archives)
The bottom image is a rendering of the view from the proposed Thomas Edison Resource Center.

Service staff, space could also be made available for affiliated groups such as The Friends of Edison, The Charles Edison Fund , and The Edison Papers Project. The goal is to create a center of activity, The Thomas Alva Edison Resource Center, which will be utilized by visitors to the site, researchers, and others that are interested in the Edison story.

8 ENVIRONMENTAL ASSESSMENT

Introduction

This document and its appendices present the findings and recommendations of a preliminary Environmental Assessment prepared for the proposed development of the Edison National Historic Site (NHS) in West Orange, New Jersey.

This report was prepared by Louis Berger & Associates, Inc. as a preliminary and partial fulfillment of NPS's requirements under the National Environmental Policy Act (NEPA) of 1969. This document was prepared in accordance with NPS-12, NPS's guidelines for compliance with NEPA.

Proposed Action

The National Park Service proposes certain actions at the Edison National Historic Site in West Orange, New Jersey. The nature and magnitude of this work are such that NPA has prepared this environmental document to ascertain whether or not the proposed action will generate potentially significant impacts. The work will include renovations to the heating, ventilation and air conditioning (HVAC) and other systems of laboratory and other existing buildings; relocation of one building to a new position within the facility; and the transport and location of a building from Dearborn, Michigan to be located on the site. Other work will include construction of a 61,270 square foot visitor center, which will house new facilities for administrative, staff and archival space that is currently located in historic structures. The new building will also include space for the maintenance staff and shops. The existing maintenance facility will be demolished Parking facilities will be expanded to provide a total of 160 spaces for cars and vans, and 10 spaces for busses. A crosswalk and traffic light will be installed, linking the parking areas across Main Street with the historic site.

Statement of Need and Purpose

The Edison National Historic Site, located in West Orange, New Jersey (as shown in Figure 20), comprises the locale of Thomas Alva Edison's home and workplace. The site consists of two units; the Main Street Laboratory Complex and Glenmont, Edison's home for the last 40 years of his life. The Laboratory Complex, which is the focus of this study, covers approximately 5.78 acres of land and includes 14 historic structures where Edison operated the forerunner of the modern research and development organization. Out of this laboratory, came the motion picture camera, silent and sound motion pictures, commercially successful phonographs and the electric storage battery. The laboratory collection includes over 300,000 objects and over five million pages of paper; a collection of national and international significance.

Threats to the safety and preservation of the collections, structures and sites that comprise

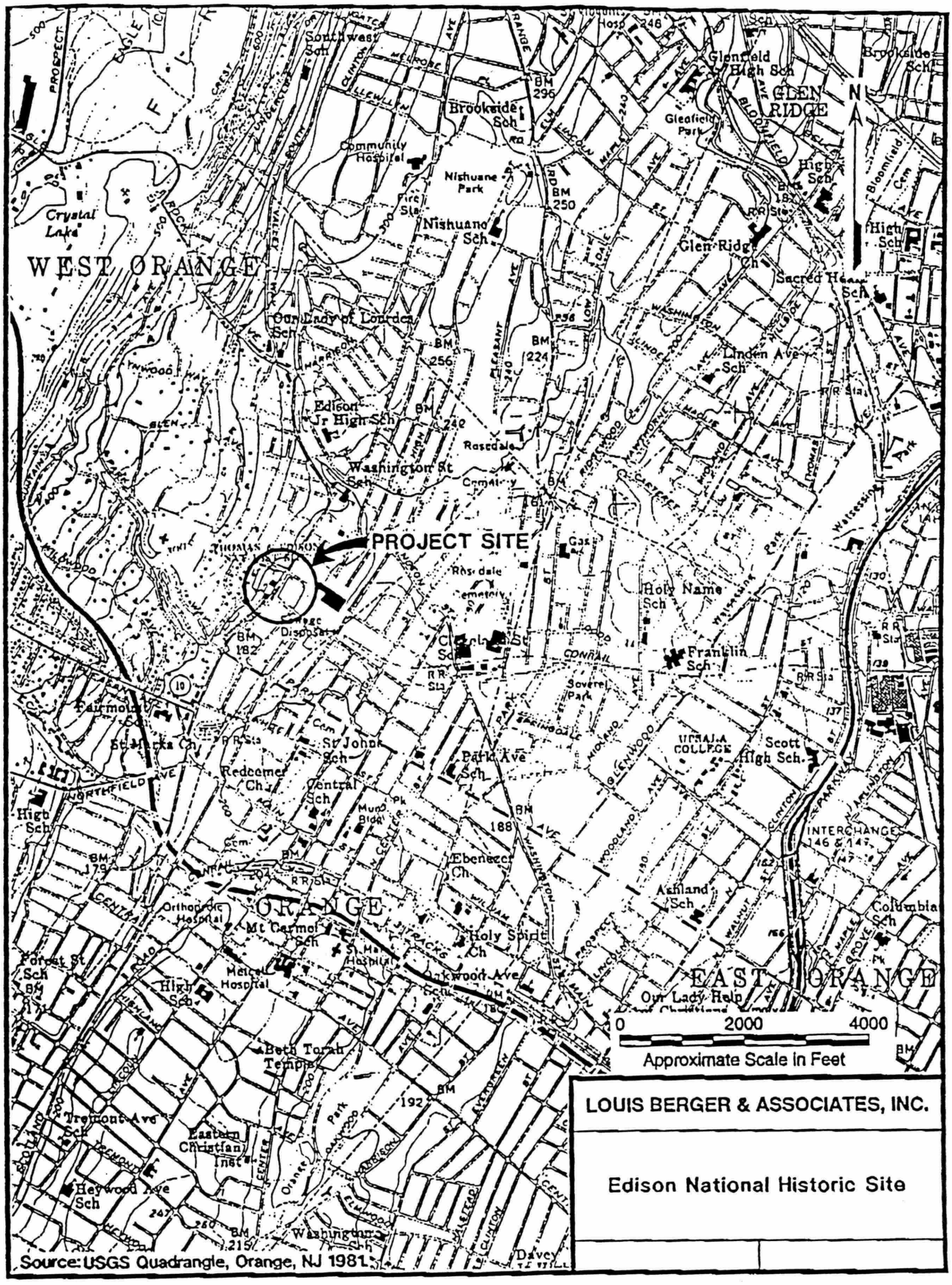

PROJECT SITE
WEST ORANGE
ORANGE
EAST ORANGE
GLEN RIDGE
Crystal Lake
Nishuane Park
Nishuane Sch
Community Hospital
Brookside Sch
Glenfield High Sch
Glenfield Park
Glen Ridge Ch
Sacred Heart Sch
Our Lady of Lourdes Sch
Edison Jr High Sch
Rosedale Cemetery
Washington St Sch
Linden Ave Sch
Holy Name Sch
Franklin Sch
Soverel Park
Scott High Sch.
Park Ave Sch
Central Sch
Redeemer Ch
St John Sch
Fairmount Sch
St Barnabas Ch
High Sch
Ebenezer Ch
Holy Spirit Ch
Mt Carmel Sch
Orthopedic Hospital
Meisel Hospital
Forest St Sch
Beth Torah Temple
Tremont Ave Sch
Eastern Christian Inst
Heywood Ave Sch
Washington Sch
Ashland Sch
Columbia Sch
Our Lady Help
INTERCHANGE 146 & 147
0 2000 4000
Approximate Scale in Feet
LOUIS BERGER & ASSOCIATES, INC.
Edison National Historic Site
Source: USGS Quadrangle, Orange, NJ 1981

Figure 20

the Edison National Historic Site are well documented. They include inadequate archival storage, limited visitor access, lack of climate control, inadequate security systems and limited fire detection and suppression systems and antiquated electrical, plumbing and mechanical systems. Due to space limitations, storage and administrative offices occupy some significant areas of the laboratory unit.

Glenmont, located in nearby Llewellyn Park, includes Edison's mansion and associated buildings as well as the graves of Edison and his second wife, Mina. It is likely that work proposed for Glenmont will be categorically excluded from further NEPA analysis, a determination that will be made at a later phase of the development.

The purpose of this study, insofar as possible within the bounds of available time and resources, is to:

- Assess the likelihood that environmental impacts may occur as a result of the proposed action, and if so, state as to whether they are likely to be minor or significant.

- Present conclusions and recommendations to assist NPS in determining whether further investigation and consideration of one or more sites is warranted;

- Identify potential environmental issues that require consideration under NEPA, Council on Environmental Quality guidelines, and NPS's own guidelines for NEPA; and

- Identify topics and issues requiring additional study.

Environmental areas found to warrant further consideration may be subjected to more detailed levels of analysis as the decision-making process proceeds.

Alternatives Considered

A total of four concept alternatives were considered:

- No Action Alternative- assumes continued operation of the site using existing facilities
- Adaptive Reuse Alternative- assumes use of existing buildings not owned by the NPS for visitor services, offices and archival space
- Off Site Construction Alternative- assumes new construction across Main Street from the historic laboratory complex
- On Site Construction Alternative- assumes new construction on the historic laboratory site

The Adaptive Reuse Alternative, which would require the use of buildings outside the legislated park boundaries, was dismissed as infeasible and was not studied further as an option.

Three alternatives were carried forward for detailed analysis in this study. These include the

No Action Alternative; a preferred alternative which includes the work described in the Proposed Action Section above, and hereinafter described as the On Site Construction Alternative (as shown in Figure 21); and a third alternative, hereinafter called the Off Site Construction Alternative (as shown in Figure 22), which differs from the On Site Construction Alternative in that the proposed Visitor Center would be constructed across Main Street, and would therefore reduce the number of parking spaces available at that location. The On Site Construction Alternative is the preferred alternative because it restores certain historic physical relationships of the laboratory site while providing the necessary functions of enhancing visitor utilization and providing office and administrative space on the historic site. Additionally, construction of the Visitor Center opposite the site, across Main Street, would probably increase pedestrian crossings of Main Street and would conflict, with respect to architectural design and scale, with surrounding privately owned structures.

1. On Site Construction Alternative- Impact on Existing Buildings

Building #1
Existing interior finishes and partitions constructed after the period of significance will be removed. The electrical and HVAC systems will be upgraded and new interior partitions installed to accommodate the Visitor Orientation area and some staff offices. The outside shell of the building will not be modified.

Building #2
The primary interior space of this building, the chemistry lab, will not be modified. The interior of the storage shed will be modified to accommodate visitor access and exhibits. This work will include upgrade to the structure, HVAC and electrical systems and installation of new finishes. The exterior of building #2 will not be modified.

Building #3
The back half of this building, the pattern making shop, will not be modified. Visitor access will be limited to an area just inside the door. Existing interior finishes and partitions constructed after the period of significance in the front half of the building will be removed. The electrical and HVAC systems will be upgraded to accommodate an interactive exhibit area. This will also require the construction of workbenches and cabinets. The exterior of the building will not be modified.

Building #4
Existing interior finishes and partitions constructed after the period of significance will be removed. The electrical and HVAC systems will be upgraded to accommodate exhibits spaces which will fill the entire footprint of the building. These spaces will require some new partitions and finishes. The exterior of the building will not be modified.

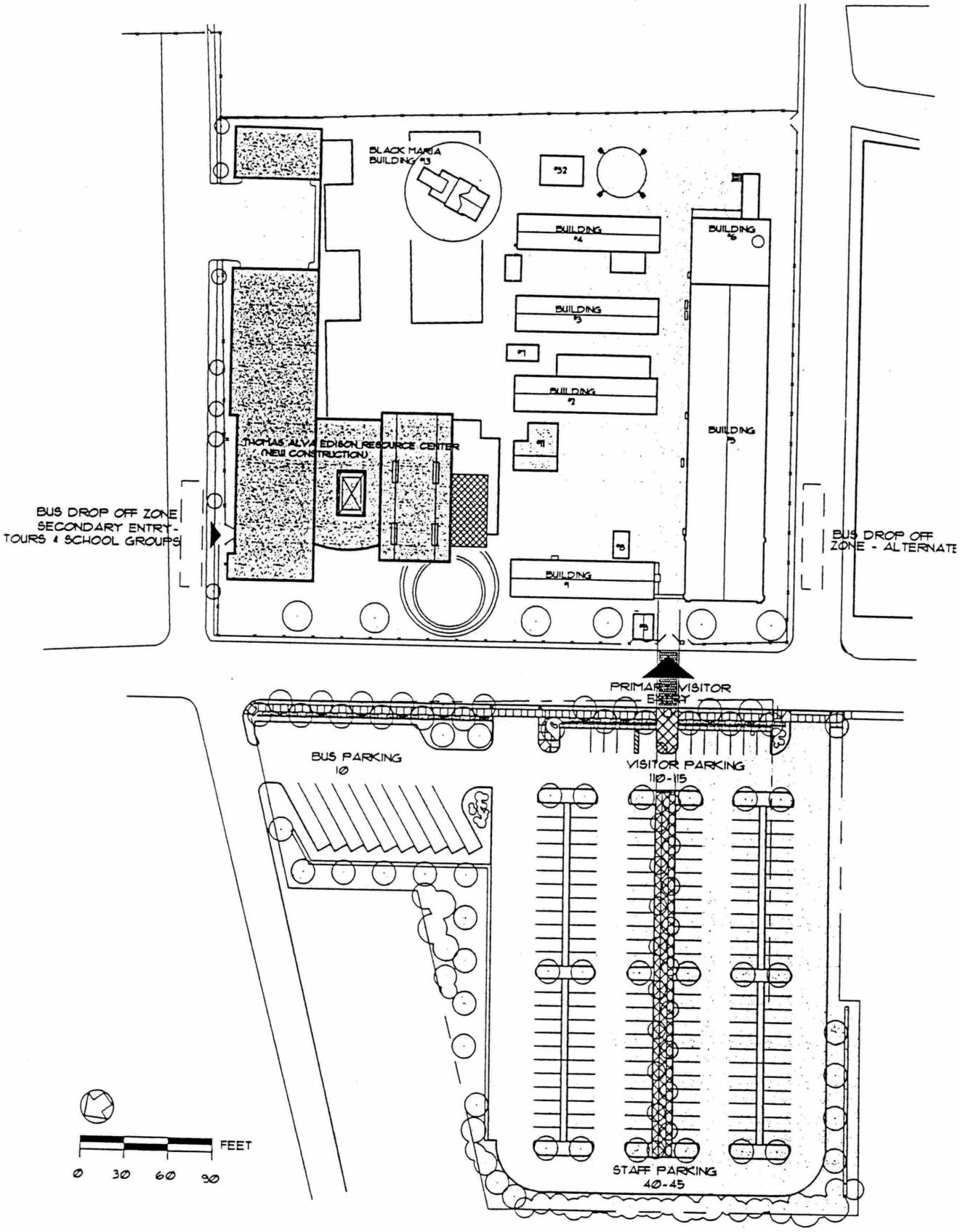

BLACK MARIA
BUILDING #3
#32
BUILDING #4
BUILDING #5
BUILDING #6
BUILDING #7
BUILDING #2
#1
THOMAS ALVA EDISON RESOURCE CENTER
(NEW CONSTRUCTION)
BUILDING #1
BUILDING #5
BUS DROP OFF ZONE
SECONDARY ENTRY -
TOURS & SCHOOL GROUPS
BUS DROP OFF
ZONE - ALTERNATE
PRIMARY VISITOR
ENTRY
BUS PARKING
10
VISITOR PARKING
110-115
STAFF PARKING
40-45
FEET
0
30
60
90

Figure 21

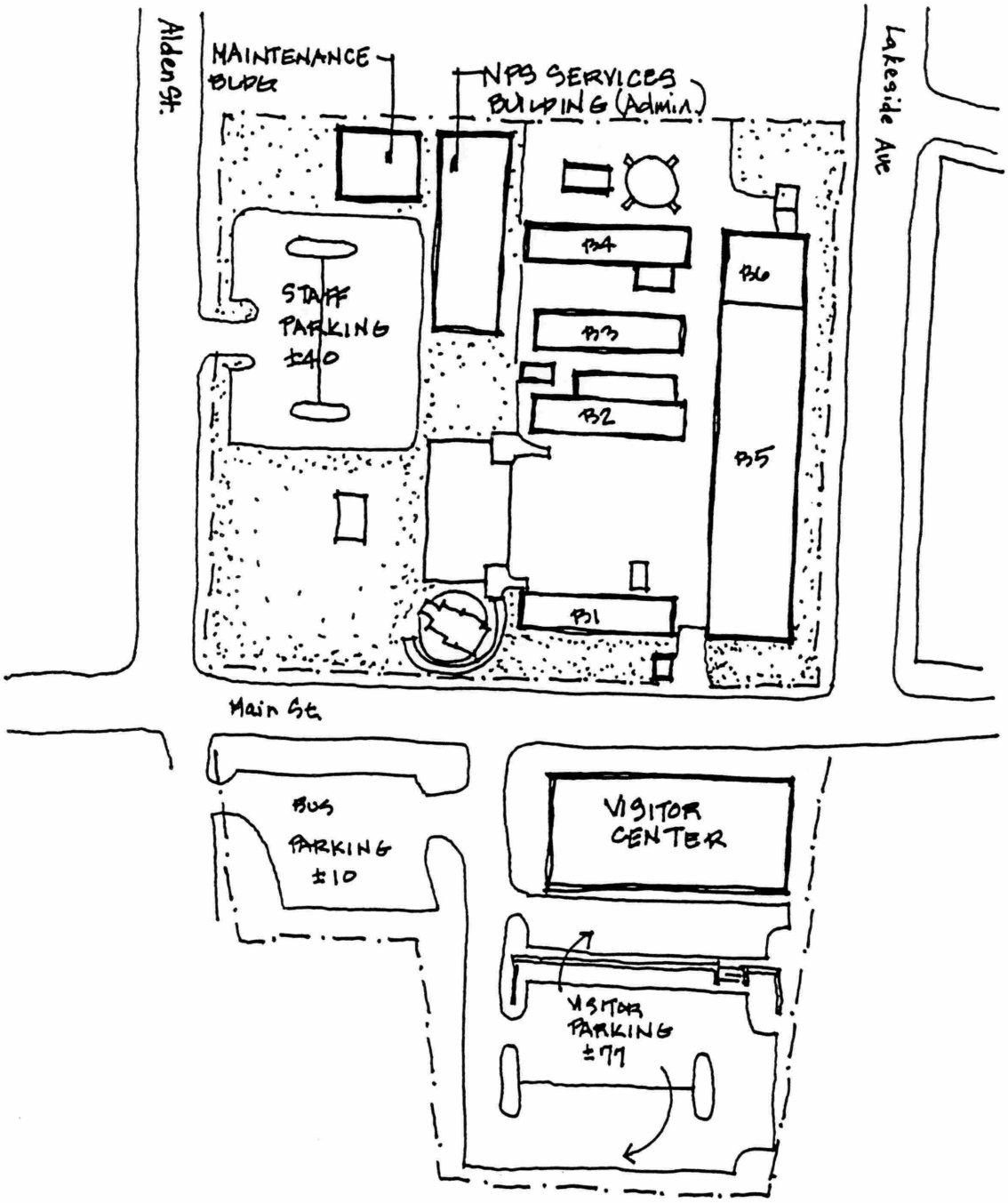

Alden St.
MAINTENANCE BLDG
NPS SERVICES BUILDING (Admin.)
Lakeside Ave
STAFF PARKING ±40
B4
B6
B3
B2
B5
B1
Main St.
BUS PARKING ±10
VISITOR CENTER
VISITOR PARKING ±77

Figure 22

Building #5
The electrical and HVAC systems will be upgraded to accommodate new exhibit spaces and to create appropriate environmental conditions for the exhibits. The existing "period rooms" (the library, stock room, and heavy machine shop) will be retained. The music room on the third floor will be furnished as a period room. The remaining spaces of the second and third floors will be utilized for exhibit space. This will include the insertion of some new partitions but will not require the removal of existing historic fabric. The existing wood stair will be structurally upgraded to accommodate visitor traffic. A new elevator will be inserted within the footprint of the building from the first to the third floors adjacent to the existing stair. An addition at the east end of the building will include a second elevator and a fire stair. This will be the only modification to the exterior of building #5.

Building #6
The addition to building #5 (see above) will be within the footprint of building #6 and will require modification to the roof. The existing interior finishes and partitions constructed after the period of significance will be removed. New construction will be inserted to accommodate visitor rest rooms and storage space. The electrical and HVAC systems will be modified for the new use.

Building #7
No modifications will occur to this building.

Building #8
No modifications will occur to this building.

Building #9
No modifications will occur to this building.

Building #11
This building was dismantled and moved to Dearborn, Michigan, in 1941. It will be repatriated to its original location on the laboratory site. The electrical and HVAC systems will be upgraded to accommodate exhibits.

Building #12
This building, which post dates the period of significance, will be removed.

Building #13
The recreation of the "Black Maria" will be relocated to the eastern edge of the site. The interior will be modified for use as an exhibit space.

Building #32
No modifications will occur to this building.

Building #33
The proposed Visitor Center will surround this existing building. Building #33 will be incorporated into the exhibit space of the new building, but will not be modified itself.

2. No Action Alternative

Under the No Action Alternative, existing buildings would continue to be serviced through a maintenance program. Systems within the buildings have deteriorated over time despite such a maintenance program, and would likely continue to do so in the absence of a major upgrade as is proposed. Building #11 would not be restored to the site and Building #13, the Black Maria would remain in its present position. The Visitor Center would not be constructed and offices and administrative space would remain housed within the historic structures.

3. Off Site Construction Alternative

The effects on existing buildings would be identical to the effects produced by the On Site Construction Alternative, except that Building 33 would not be surrounded by and incorporated into the Visitor Center, which would be located across Main Street, opposite the main gate to the site. The new maintenance building and curatorial center would occupy current parking spaces.

Affected Environment

1. Topography

The topography is essentially flat, sloping downward from the northeast to the southeast at an elevation of approximately 180 feet above Mean Sea Level.

2. Geology

The geology in the vicinity of the site is within the Passaic Formation with bedrock at an approximate depth of 20 feet. The bedrock in this area is overlain by till.

3. Floodplains

A review of the Federal Emergency Management Agency Flood Insurance Rate Map for West Orange, Panel #340197, indicates that a small portion of the project area is located within the 100-Year Floodplain (Zone A5). Additional topographic mapping which is obtained for the project will be utilized to assess the boundaries of the floodplain.

4. Vegetation and Wildlife

A wetland and endangered species survey was conducted at the Edison National Historic Site in West Orange, New Jersey on December 5, 1997. The site is located in an urban area and is comprised mainly of buildings and paved walkways. A small section of mowed turf is situated in the northeast corner of the property. Wetlands were not observed on the site or in the adjacent properties.

During the survey, no plants or animals that are endangered, threatened or of special concern were observed. The site is inhabited with species common to densely developed urban areas. Transient wildlife species are not likely to move through the area. Written correspondences have been sent to the New Jersey Natural Heritage Program and the United State Fish and Wildlife Service to request information regarding any potential species of concern in the vicinity of the site.

5. Land Use

The Edison Historical Site is situated in the Township of West Orange, near the border between West Orange and Orange. The site is on the east side of Main Street and is bounded by Alden Street to the North and Lakeside Avenue to the South. A parking lot for the site is on the opposite side of the street. The area is typical of an older, inner-ring suburb, and is characterized by a dense mixture of land uses and a pedestrian-oriented neighborhood retail area. Also noteworthy about the area is the conversion and re-use of old industrial facilities and houses as commercial and retail uses along Main Street. Industrial and commercial/retail uses are predominant along Main Street, while the blocks surrounding Main Street include a mixture of housing types and an industrial area to the east of the Edison site.

Immediately to the north of the Edison site, on the east side of the street is a neighborhood strip shopping center, and a bank is located on the opposite side of the street. North of the site, retail and service buildings are the predominate land use, interspersed with some small industrial facilities such as auto repair shops. This pedestrian-oriented retail strip continues to the north to Washington Street. A community facility called "Community House" occupies the west side of Main Street between Shepard Terrace and Erwin Place.

On Main Street immediately south of the site are mostly industrial and commercial properties, while more residential properties front Main Street further south. On the east side of Main Street between Lakeside and Charles are two large, old industrial facilities that appear to be used as commercial and retail space.

Most streets intersecting with Main Street to the east and west of the site are dead-end streets containing single-family and duplex housing exclusively. To the west of these residential streets is open space and a large-lot residential area not accessible from

Main Street in the area immediately surrounding the site. Directly east of the site is an industrial area accessible from Lakeside Avenue. Government buildings housing the Township's Department of Public Works are also found in this industrial area.

6. Zoning

The zoning map for the Township of West Orange reflects the variety of land uses found in the area surrounding the site. An Industrial-Business (I-B) classification is given to the site and the industrial area east of the site. This classification includes nearly all property on the east side of Main Street surrounding the site, except for the properties fronting Main Street, and now includes both industrial and commercial uses. The area north of the site, on the east side of Main Street, is zoned B-1, a business zone with no minimum lot size. Property fronting Main Street on the west side is zoned Office Building (OB-1) between Park Avenue and Erwin Place, and then B-1 north of Erwin Place. The properties on the residential streets off of Main Street are zoned R-T (two-family residential) and R-M (apartments).

In addition, all properties in the area are part of a special overlay zoning district which applies to the Main Street and Valley Road corridor. An architectural review process is required for approval of construction, renovation or demolition of all properties within this zone, pursuant to Section 25-6.3 of the Township's Zoning Ordinance. As a federal agency acting on federal property, NPS may be exempted from this requirement

7. Socioeconomics

Like much of New Jersey, West Orange and surrounding areas of Essex County are ethnically, racially and economically diverse. Over the past few decades, the proportion of white residents has declined somewhat, while the proportion of black, hispanic and other groups has increased. The population in West Orange has declined from 43,715 in the 1970 census to 39,103 in the 1990 census. The black population increased as a percentage of total population from 0.7 percent in 1970 to 5.7 percent in 1990. "Other" ethnic groups, however, increased their proportion of the whole even more dramatically, from 0.7 percent in 1970 to 6.6 percent in 1990.

In West Orange, according to the 1990 census, the largest age cohort was the 25-44-year old group (31.8 percent). There were slightly more females (53.3 percent) than males. The largest category of educational attainment was college degree (30.4 percent). Median household income was higher in West Orange ($49,777) than for Essex County ($34,518), although the difference was slightly less than the difference between the two in 1980.

In the 1990 census, West Orange had 19,867 housing units, of which 74.6 percent were owner occupied and 2.2 percent were vacant. This compared to 298,710 housing units

in the county, with 42.3 percent owner occupied and 6.7 percent vacant.

8. Aesthetics

The Edison NHS is located in West Orange, New Jersey, a typical dense inner-ring suburb in the Newark, New Jersey-New York City corridor. The site contains historic industrial buildings and open space fronting Main Street, a major, tree-lined two-lane road. Local land use surrounding the site consists of a mix of industrial, commercial and residential functions. The most dominant structures in the vicinity of the project area are part of the former Edison Battery Factory located directly south of the Edison NHS.

9. Cultural Resources

The Edison NHS is a registered National Historic Landmark and included in the National Register of Historic Places. The historical significance of the property has been well documented (Uschold and Curry 1996). Besides the significant historic buildings and landscapes, the site has the potential to contain undocumented archaeological deposits. Former Edison buildings, such as the phonograph works, have probably destroyed archaeological remains of earlier land uses. Evaluating archaeological sensitivity would require cartographic research to identify former land uses in areas of potential development.

The Edison Laboratories, which represent one part of the Edison Company's West Orange Plant, were constructed between 1877 and 1899. From 1899 to 1914, the West Orange Plant expanded from 7.5 acres to 26.26 acres with the acquisition of lots on Alden Street from Main Street south almost to Watchung Avenue, and along the west side of Lakeside Avenue. Facilities that were constructed on these properties included the Edison Phonograph Works, the National Phonograph Company, and the Storage Battery Factory. The Edison National Historic Site includes the Laboratories and the location of the former Phonograph Works.

10. Utilities

According to information obtained from the Township of West Orange, the following utilities are available at the site: water, gas, electric, cable, telephone, and sanitary sewer.

Water serviced by New Jersey American Water Company
Gas and Electric serviced by PSE&G
Cable serviced by Comcast Cable
Telephone serviced by Bell Atlantic
Sewer by the Township of West Orange Public Works Department

11. Transportation

The Edison NHS is located in West Orange New Jersey, in an area well served by the local highway network, with ties to the interstate system as well as the Garden State Parkway and New Jersey Turnpike via I-280. The town is served by New Jersey Transit, and has good access to Newark International Airport.

Local public transportation to the site is provided by a bus route traversing Main Street.

12. Traffic and Parking

No formal traffic studies have been conducted in the immediate area of the site within the last three years. However, observation during peak rush hours and the hours just before the afternoon rush hour, showed nearby intersections to be at Level of Service E or worse. Off-peak hours are significantly less congested in the street network serving the area.

Public parking is either on-street or on private lots or driveways, with the exception of the NPS lot located across Main Street which can accommodate 12 cars and 2 busses. A larger, fenced parking area adjacent to the existing maintenance building provides staff parking and is used for public parking on some weekends and special occasions.

13. Air Quality

Strategies of air quality evaluation and checklist for the proposed project should be considered in the context of compatibility with the Federal Clean Air Act and its Amendments (CAAA), the National Ambient Air Quality Standards (NAAQS), and the relevant thresholds and requirements set by the U.S. EPA's General Conformity Rules (40 CFR Parts 6,51, and 93). The primary study area is located at West Orange, Essex County, New Jersey. This area is currently designated as severe - nonattainment for ozone (O_3) and as moderate nonattainment for carbon monoxide (CO), while as attainment for all other criteria pollutants (PM_{10}, NO_x, SO_2, and lead). The New Jersey State has completed the SIP as the ongoing efforts to identify, mitigate and eliminate the exceedance locations. Stringent pollution control measures are applied to the nonattainment area, and only limited increases in air emissions are allowed. To conform to the SIP, the De Minimis emission thresholds applied to the proposed project (as a federally sponsored or approved project) are: 25 tons/year for VOC and NO_x, and 100 tons/year for CO.

14. Noise

Existing noise levels were spot-checked with a hand-held noise meter at the

intersections of Main Street and Alden Street and Main Street and Lakeside Avenue, adjacent to the NHS, and at the intersection of Main Street and Washington Street. Meter readings were taken at 30 feet from the edge of the pavement at Main and Lakeside, and at 60 feet from the edge of pavement at the remaining two sites. Readings were taken from 3:20 to 3:26 PM at Main and Lakeside, from 3:30 to 3:36 PM at Alden and Main, and from 3:40 to 3:46 PM at Washington and Main. L_{eq} of 67.9 dBa were recorded Main and Lakeside, 63.7 dBa at Main and Alden, and 63.3 dBa at Washington and Main. The readings do not reflect excessive existing noise levels, although the levels recorded at Main and Alden Streets exceeds the level triggering noise abatement for federal highway projects. The measurements taken were done in a manner designed to give merely an indication of present noise levels. They are not adequate for impact analysis.

15. Hazardous Waste

The subject site has a known history as a research and development facility, and the use of hazardous materials on the site is virtually certain. In addition, the site is located in an area that has been associated with industrial uses. Federal and state databases indicate that the subject site is a CERCLIS-NFRAP(Nor Further Remedial Action Planned) site, which means that the U.S. Environmental Protection Agency did not find contamination, found that the contamination was removed quickly without the need to place the site on the National Priorities List, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. The site was also identified as having reported a spill or underground storage tank leak.

In addition to potential On Site contamination, the subject site is within a mile of three National Priorities List regions: The U.S. Radium (Alden and High Street) region; the Glen Ridge Radium Site and the Montclair/West Orange Radium Site. The Site is also less than a half mile from 13 leaking underground storage tanks. It is less than a quarter mile from 7 of the 13. The site is less than a mile from four sites listed in Known Contaminated Sites in New Jersey, the closest being the U.S. Radium site at Alden and High Streets. The site is located within a half mile of two CERCLIS sites, the nearest being less than ⅛ of a mile away. A copy of the database reports is included as Appendix A.

16. Groundwater Quality

The subject site lies within the Piedmont physiographic province of New Jersey. It is underlain with less than 50 feet of unconsolidated glacial sediment (continuous till) which overlies bedrock consisting of the sandstone and minor siltstone units of the Late Triassic and Early Jurassic Passaic Formation.

Ground water in the Passaic Formation and overlying unconsolidated deposits is Class II-A with the primary designated water use of providing potable water supply

with conventional treatment at its current water quality (New Jersey Ground Water Standards, N.J.A.C 7:9-6; revised February 1993). Secondary designated uses are agricultural and industrial water.

Data regarding the depth to ground water, the direction of ground water flow at the property, and existing ground water quality were not available. The project area does not lie within a Sole Source Aquifer designated by the USEPA.

Impacts

1. Topography

1.1 No Action Alternative

No effects on topography would occur under this alternative

1.2 On Site Construction Alternative

The construction of the On Site alternative will require some grading in areas where new construction will occur and areas where buildings will be relocated.

1.3 Off Site Construction Alternative

The construction of the off site alternative will require grading in areas where new construction will occur outside the existing parking spaces. The proposed off site alternative will also require grading of the hillside behind the existing parking area for construction of the proposed parking.

2. Geology

2.1 No Action Alternative

It is assumed that in the absence of any construction activity, there would be no impacts to geological structure.

2.2 On Site Construction Alternative

The proposed construction of the On Site Alternative would require regrading of some areas, but would not alter the overall geology of the Site area.

2.3 Off Site Construction Alternative

The proposed construction of the Off site Alternative would require regrading of some areas, but would not alter the overall geology of the Site area.

3. Floodplains

3.1 No Action Alternative

No effect on floodplains would be generated by this alternative

3.2 On Site Construction Alternative

Since a portion of the project is located in the 100-year floodplain, the portion of the work area within the floodplain may require a Stream Encroachment Permit. The necessary permits will be obtained for any exterior construction which will occur within the floodplain. An increase in impervious surface would generate additional surface runoff, but runoff would be managed by the local stormwater sewer system. Best Management Practices (BMP) will be employed to avoid any increase in peak runoff levels. The extent of increases in runoff and the most appropriate BMP will be determined during the Title I phase of the work.

3.3 Off Site Construction Alternative

The effects of this alternative would be essentially the same as those for the On Site Construction Alternative.

4. Vegetation and Wildlife

4.1 No Action Alternative

Since the site would remain in its present state under this alternative, no effects would be anticipated.

4.2 On Site Construction Alternative

No species of special concern were observed on the site, no critical habitat was observed and transient wildlife species are not likely to move through the area. No impacts are anticipated to result from the proposed project. This assessment is based on observation of the site, and findings cannot be finalized pending receipt of site-specific confirmation from New Jersey Natural Heritage and the U.S. Fish and Wildlife Service with respect to species of special concern and habitat critical to them.

4.3 Off Site Construction Alternative

The effects of this alternative would be essentially the same as those for the On Site Construction Alternative.

5. Land Use

5.1 No Action Alternative

Under this alternative, land use patterns in the area of the National Historic Site would likely persist. An exception would be if the West Orange's proposed Main Street Redevelopment Program progresses, in which case, the residential and commercial uses of Main Street properties would be enhanced, and the architectural integrity of the Main Street corridor would be restored in some cases and preserved in others.

5.2 On Site Construction Alternative

Under this alternative, an enhanced Edison National Historic Site would not directly affect land use in the area, but could complement the Main Street Redevelopment Program by attracting additional visitors to the area. An incidental benefit to the National Historic Site might be the provision of additional parking areas developed by the town in connection with the Main Street Redevelopment Program.

5.3 Off Site Construction Alternative

Under this alternative, an enhanced Edison National Historic Site would not directly affect land use in the area, but could complement the Main Street Redevelopment Program by attracting additional visitors to the area. An incidental benefit to the National Historic Site might be the provision of additional parking areas developed by the town in connection with the Main Street Redevelopment Program. Since this alternative may result in fewer on-site parking spaces, the synergy of the Historic Site improvements and the Main Street Redevelopment Program is of particular interest. While not inconsistent with existing land uses in the area, the location of the visitor center on the opposite side of Main Street may conflict with some surrounding land uses with respect to scale and design.

6. Zoning

6.1 No Action Alternative

No effect is anticipated under this alternative.

6.2 On Site Construction Alternative

The special overlay zoning district in which architectural review is required for both demolition and construction, applies to the project area. This requirement may not apply to NPS as a federal agency proposing an action on federal property. Otherwise, the proposed use is consistent with existing zoning.

6.3 Off Site Construction Alternative

The special overlay zoning district in which architectural review is required for both demolition and construction, applies to the project area. This requirement may not apply to NPS as a federal agency proposing an action on federal property. Otherwise, the proposed use is consistent with existing zoning.

7. Socioeconomics

7.1 No Action Alternative

Current trends would be expected to continue under this alternative.

7.2 On Site Construction Alternative

Present trends would be expected to continue. Some additional benefit would accrue to the West Orange Downtown as a result of expenditures during the construction phase. To the extent that the improvements to the National Historic Site support and enhance the town's Main Street Redevelopment Program, and to the extent that program achieves its objective of revitalizing West Orange's downtown, the proposed action may indirectly serve as a stimulus to economic growth in West Orange. No adverse effect is likely. The amount of the construction- and operations-related contribution to local economy can be estimated when construction costs and anticipated visitorship estimates become available.

7.3 Off Site Construction Alternative

The effects of this alternative are identical to the On Site Alternative.

8. Aesthetics

8.1 No Action Alternative

The No Build Alternative will not impact the aesthetics of the existing buildings, landscapes, and streetscapes.

8.2 On Site Construction Alternative

The new Visitor Center proposed to be constructed at the corner of the property at Valley Road (Main Street) and Alden Street, would have aesthetic impacts, some of which would be considered positive. Part of the new building would occupy the site of the former five-story National Phonograph Company building that was located about 160 feet from the corner of Main and Alden streets. The Phonograph Works, rebuilt after a 1914 fire, was demolished as part of the West Orange Urban Renewal plan.

Therefore, creating a large visitor center at this location would improve the present aesthetics, from a historic landscape perspective, by reintroducing a building mass that served as a "back drop" to the laboratories for half a century.

The design of a new Visitor Center at this location should be sensitive the surrounding buildings, and the 1914 Phonograph Works that stood on this site, in terms of both massing and facade material.

As discussed under *Historic and Archaeological Resources*, relocating the 7/8-scale replica of the Black Maria to the rear of the site would be more consistent with the historic location of this structure. However, removal of the Black Maria from its prominent location along Main Street could be considered an impact to the aesthetics of the streetscape because the building has become a distinctive local landmark.

8.3 Off Site Construction Alternative

The construction of a new Visitor Center on the west side of Main Street, across from the historic entry to the complex, would impact the aesthetics of this streetscape. A building of this size would replace a parking lot and maintenance building with a low profile. A large building on this site would introduce a dominant facade that could have the tendency of overshadowing the historic Laboratory Unit buildings on the opposite side of Main Street. Design of a new Visitor Center at this location should be sensitive the surrounding buildings and streetscape in terms of both massing and facade material.

9. Cultural Resources

9.1 No Action Alternative

The No Build Alternative will not impact the existing historic buildings and landscapes related to the Edison Plant.

9.2 On Site Construction Alternative

Potential impacts to the historic site will occur from both removal and relocation of buildings and features, and construction of the new four-story building that will house exhibits, a theater, archives, and administrative, maintenance and office functions. In addition, foundation excavation and landscaping for the new building, as well as grading for the expanded parking facility, will have the potential to impact archaeological resources.

Structures and features that would incur significant impact in the course of this site development include the Underground Storage Vault, the Japanese Lanterns, the Blue Amberol Vault and, possibly, the Pavement Test Circle. Of these, only the Blue

Amberol Vault and the Pavement Test Circle are considered contributing to the historic significance of the Edison site; both date before 1931, the end of the period of historic significance, and represent evidence of Edison's experimentation with concrete.

The design plan calls for the Black Maria, a 1954 replica at 7/8-scale of the 1893 original, to be relocated from its present location about 15 feet from the Main Street fence to the rear of the NPS site. This seems to be an appropriate action given that the original Black Maria was situated at the rear of the site and away from public view. In addition, a former lab building that is now displayed at the Henry Ford Museum in Dearborn, Michigan, will be relocated to its original location as part of the Edison Laboratories. This action would be considered an enhancement of the historic landscape. The World War II memorial will be moved from the corner of Main and Alden Streets to another location, but because the memorial is a non-contributing element to the historic site, this action should be considered to have no affect to the historic landscape.

9.3 Off Site Construction Alternative

This alternative would not impact any historic structures of the Laboratory Unit. The replica Black Maria would remain in its location on the east side of Main Street. A new NPS Services Building and Maintenance Building would be constructed southeast of the Laboratory Unit near Alden Street. This location does not appear to have archaeological sensitivity. A new Visitors Center would be constructed on the west side of Main Street, across from the historic entry to the complex. This location presently contains parking and the existing NPS Maintenance Building; the site does not contain historic resources and does not appear to have archaeological sensitivity.

10. Utilities

10.1 No Action Alternative

No effect would occur under this alternative.

10.2 On Site Construction Alternative

No adverse impact to utilities would be expected as a result of this alternative. A conversation was held with Alan Palmeri of the Township of West Orange Engineering Department, there is no moratorium on the addition of sewer connections. Mr. Palmeri indicated that a connection would be recommended to the Lakeside Ave. connection as it has better capacity than the Main Street system. Apparently, the Main Street system has difficulties handling wet flows.

10.3 Off Site Construction Alternative

No adverse impact to utilities would be expected as a result of this alternative. A conversation was held with Alan Palmeri of the Township of West Orange Engineering Department, there is no moratorium on the addition of sewer connections. Mr. Palmeri indicated that a connection would be recommended to the Lakeside Ave. connection as it has better capacity than the Main Street system. Apparently, the Main Street system has difficulties handling wet flows.

11. Transportation

11.1 No Action Alternative

No effect would occur under this alternative.

11.2 On Site Construction Alternative

Minimal effects may occur as a result of slightly increased ridership, assuming an increase in visitorship. Pending an estimate of visitorship increases anticipated as a result of the proposed action, estimates of increased transportation systems load is not possible. Current visitorship to the site averages 60,000 individuals per year. A significant percetage of this visitation is comprised of school groups arriving by bus. A very limited number of visitors arrive by public transportation.

11.3 Off Site Construction Alternative

The effects under this alternative would be identical to the impacts of the On Site Construction Alternative, if any.

12. Traffic and Parking

12.1 No Action Alternative

Under this alternative traffic conditions will remain approximately the same including a regionwide growth in traffic. Parking conditions in the area may improve due to the Main Street Redevelopment Program and the Town of West Orange's recognition that parking spaces, particularly on-street spaces are in short supply.

12.2 On Site Construction Alternative

Impacts are likely to be caused by increased traffic to the site. The intersection of Main and Washington Streets is currently estimated to be at Level of Service E, or nearing capacity. Traffic estimates and estimates of project-generated traffic will be necessary in order to systematically evaluate traffic impacts. These will occur during the Title 1

phase of the work.

The proposed mid-block crossing between the parking area and the Edison NHS main gate may represent a problem, because it will likely be opposed by local planning and engineering officials. The mid-bloc crossing would almost certainly have to be traffic light controlled. This could created a disturbance of normal traffic flows.

Parking would not suffer any adverse impact from this alternative.

12.3 Off Site Construction Alternative

The traffic effects would be the same as for the On Site Construction Alternative, except that the mid-block crossing is likely to create more of an adverse traffic effect due to larger numbers of persons crossing from the Visitor Center, on the west side of Main Street, to the exhibits and grounds on the east side of the street.

Parking would be adversely affected, because construction of the Visitor Center across Main Street would take up some parking spaces and cause the new maintenance building to be built on other, current, parking spaces.

13. Air Quality

Since the proposed project would generate relatively few additional vehicles during any day, and particularly any peak hour, the induced vehicular emissions would be insignificant, and air quality impacts on those areas near proposed project or other roadway facilities that experience minor traffic changes would be negligible.

14 Noise

14.1 No Action Alternative

No change in ambient noise levels would be anticipated under this alternative. If the Main Street Redevelopment Program is effective in revitalizing the West Orange downtown, increases in traffic might raise noise levels some. The increase would probably be gradual and over an extended period.

14.2 On Site Construction Alternative

Absent projection of increased visitorship and associated vehicle trips, it is not possible to quantify changes in noise levels related to the proposed action. If, as suggested in section 6.12.2, increases in vehicular traffic in the area of the site would be relatively small, the impact on ambient noise levels would be minor.

14.3 Off Site Construction Alternative

The effects of this alternative would be effectively the same as those for the On Site Construction Alternative.

15. Hazardous Waste

15.1 No Action Alternative

Under this alternative no adverse impacts would be likely to occur, assuming soil on site remains undisturbed.

15.2 On Site Construction Alternative

This alternative is unlikely to produce any hazardous waste contamination of the site if normal precautions are observed during construction. Perhaps the most effective precaution is to store drums of fuel, oil, hydraulic fluid and the like in areas where they are not likely to be struck by construction equipment, and, if possible, where any spillage will be contained and prevented from entering the soil.

The history of the site, its status as a CERCLIS-NFRAP site and its proximity to three NPL regions suggest a need for precautions prior to excavating or otherewise disturbing soils. The most prudent course of action would be to conduct a Phase 2 hazardous waste investigation in areas that are scheduled to be disturbed.

15.3 Off Site Construction Alternative

The effects of this alternative and the precautions suggested are the same as those for the On Site Construction Alternative.

16. Water Quality

Potential project related impacts to ground water consist of the loss of recharge area by the addition of impervious surface area; construction period contamination and modification of ground water hydrology; and post-construction contamination. During construction, potential sources of contamination consist of accidental spills and discharges of dewatering activities. Ground water hydrology can be affected by the diversion of ground water during dewatering. When construction has been completed, potential post-construction sources of contamination are storm water runoff, deicing salts, and accidental spills.

16.1 No Action Alternative

Under the No Action Alternative the proposed action will not occur. There will be no

loss of recharge area and no construction period impacts. The possibility of potentially adverse impacts to ground water quality from the infiltration of storm water runoff, deicing salts, and accidental spills will continue.

16.2 On-Site Construction Alternative

Precipitation over a wide area recharges the ground water system. Within this context, the pervious surface area to be replaced by impervious surfaces by this project constitutes a very small portion of the overall potential recharge area. Thus, the on-site alternative will have minimal overall impact to ground water recharge. Less pervious surface area will be replaced under this alternative than with the off-site alternative. Thus, what little impact occurs will be less than with the off-site alternative.

Temporary staging areas for construction equipment and supplies are also potential sources of contaminants during the construction period. The potential impacts to ground water can be minimized by implementing the following measures to reduce the likelihood of infiltration. Accidental spills or leaks will be cleaned up immediately by the removal of contaminated soils. Equipment and parking areas will be paved or thoroughly compacted to be effectively impermeable. Mechanical repairs and the storage of fuel, oil, and cleansing agents will be in contained, paved areas. Post-construction, the potential impacts to ground water by accidental spills or leaks will be minimized by the immediate removal of contaminated soils to reduce the likelihood of infiltration.

The withdrawal and discharge of shallow ground water during construction period dewatering activities could lead to ground water hydrology and water quality impacts. If dewatering is needed, a permit may be necessary. The requirements of this permit will ensure that ground water quality and hydrology are not adversely affected.

If five acres or more land is disturbed, a NJPDES permit for stormwater discharges during construction will be needed. The requirements of this permit will ensure that ground water quality is not adversely affected.

Since storm water runoff will be conveyed to discharge points in a closed system of pipes, it will not have the opportunity to infiltrate the surface and reach the ground water system. Thus, ground water quality in the project area will not be impacted by the storm water runoff from impervious surfaces.

Deicing salts in snow that is plowed to form snowbanks and in spray from cars have the potential of escaping the closed storm sewer system and may enter the ground water system through infiltration where impervious surfaces are not present. The quantity of deicing salts that might escape the storm sewer system and infiltrate the surface will be small and sporadic. This process is not likely to lead to elevated chloride contents. Less pervious surface area will be replaced under this alternative than with the off-site

alternative. Thus, there will be less deicing salt applied to the new impervious surfaces and what little impact occurs will be less than with the off-site alternative.

16.3 Off-Site Construction Alternative

Precipitation over a wide area recharges the ground water system. Within this context, the pervious surface area to be replaced by impervious surfaces by this project constitutes a negligible portion of the overall potential recharge area. Thus, the proposed action will have no impact to ground water recharge area. More pervious surface area will be replaced under this alternative than with the on-site alternative. Thus, what little impact occurs will be more than with the on-site alternative.

Temporary staging areas for construction equipment and supplies are also potential sources of contaminants during the construction period. The potential impacts to ground water can be minimized by implementing the following measures to reduce the likelihood of infiltration. Accidental spills or leaks will be cleaned up immediately by the removal of contaminated soils. Equipment and parking areas will be paved or thoroughly compacted to be effectively impermeable. Mechanical repairs and the storage of fuel, oil, and cleansing agents will be in contained, paved areas. Post-construction, the potential impacts to ground water by accidental spills or leaks will be minimized by the immediate removal of contaminated soils to reduce the likelihood of infiltration.

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and what little impact occurs will be more than with the on-site alternative.

Public Involvement, Consultation and Coordination

At the inception of the programming study for this project a scoping meeting was held at the site. In attendance at that meeting were the architects, the site superintendent, and each of the division managers at the site. The previous programming studies were reviewed, analyzed and updated.

As part of the design process for the project an informational meeting was held at the site. Attending the meting, in addition to the design team and the Edison NHS staff, were representatives of the NPS Northeast Regional Development Office, other NPS sites in the northeast region, the Thomas Alva Edison Foundation and the Friends of Edison NHS. While previous design efforts were discussed the focus of the meeting was on the vision of how the site might best be utilized in the future and how to accomplish this with regard to architectural design, site planning, interpretive planning, exhibit design and marketing.

As the design was developed an informal meeting was held with the New Jersey State Historic Preservation Office (SHPO). The design process and the preferred design option were presented. As the project moves into later phases of design additional meetings and submissions will be made to the SHPO.

When the Development Concept Plan was essentially completed a public meeting was held at the site to present the findings and receive comments.

Consultation was initiated with the U.S. Fish and Wildlife Service and New Jersey Natural Heritage with respect to species of special concern and critical habitat. The Town Engineer and Director of Planning were consulted with respect to planning and development issues in the Town of West Orange.

Methodology

The methodology by which this preliminary assessment was made included site visits, interviews with knowledgeable local officials and NPS officials and review of state and federal databases.

The federal databases include:

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either

proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 08/01/97

ERNS: Emergency Response Notification System
ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/01/97

NPL: National Priority List
The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC).

Date of Government Version: 09/25/97

RCRIS: Resource Conservation and Recovery Information System
RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Version: 07/01/97

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/01/96

The State of New Jersey Databases include:

NJ LUST:

LUST: Leaking Underground Storage Tanks
LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 03/25/96

KNOWN LUST: Known Contaminated Sites in New Jersey Associated with Bureau

of Underground Storage Sites (BUST)

The Bureau of Underground Storage Tanks (BUST) oversees environmental cleanups at sites subject to the Underground Storage of Hazardous Substances Act (UST) where remediation may involve soil and/or groundwater. This program remediates subject sites under New Jersey's Spill Compensation and Control Act and/or the Water Pollution Control Act.

Date of Government Version: 01/31/97

SHWS: Known Contaminated Sites in New Jersey Except Those Associated with Bureau of Underground Storage Sites (BUST)

The Known Contaminated Sites in New Jersey includes sites under the purview of the Site Remediation Program which have contamination present at levels greater than the applicable cleanup criteria for soil and/or groundwater standards. The sites appearing in Known Contaminated Sites in New Jersey are classified as either active, where the site assigned to a specific remedial program area, or pending, where the site is awaiting assignment to a specific remedial program area. Sites where no further action (NFA) designation has been given are not included in this report unless there are other areas of identified contamination which have not been remediated. This report includes sites being remediated under all of the various regulatory programs administered by the Site Remediation Program such as: Federal Superfund Program, Federal Resource Conservation & Recovery Act (RCRA), New Jersey's Industrial Site Recovery Act (ISRA), New Jersey's Underground Storage of Hazardous Substances Act, New Jersey's Spill Compensation & Control Act, New Jersey's Solid Waste Management Act, New Jersey's Water Pollution Control Act.

Date of Government Version: 01/31/97

SWF/LF: Solid Waste Facility Directory

SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/14/97

UST: Underground Storage Tank Data

UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the program. Available information varies by state program.

Date of Government Version: 07/01/97

Findings

This preliminary environmental assessment of the improvements proposed at the Edison NHS was prepared on behalf of the National Park Service. Some areas of analysis can not be considered complete because of missing information. For example; analysis of noise, air quality, economic benefits, traffic and transportation can not be completed until a definitive estimate of additional visitorship is provided and an estimate of additional vehicles can be provided. Analysis of economic benefits of the construction phase of the project can not be estimated until construction budgets are known. Nonetheless, some preliminary findings can be offered on a qualitative basis; others are more definitive. The findings are as follows:

- Cultural Resources impacts will result from the proposed action. The construction and demolition of buildings and the relocation of buildings on the site all have the potential for Cultural Resources impacts to archaeological resources and architectural resources. These impacts can be mitigated, however, through coordination under Section 106 of the National Historic Preservation Act.

- The history of the site, its status as a CERCLIS-NFRAP site and its location in an area proximate to three NPL sites, all suggest a need for precautions. Before excavation is begun, a Phase 2 hazardous waste investigation should be completed for areas that will be disturbed during construction.

- Traffic generated by visitors may be of sufficient size to affect air quality, noise and traffic flow. It is not possible to conclude with certainty that there will or will not be impacts in these areas until additional trafic data is available. This information, if necessary, will be compiled during the first phase of design. Based on reasonable assumptions, it is unlikely that the proposed action will generate a sufficient number of vehicle trips to create a significant impact.

- Use of a mid-block crossing from the west side of Main Street to the main gate may disrupt traffic flow and would probably be opposed by town officials.

- Additional impervious area will be created as part of the proposed construction at the Edison national Historic Site. This additional impervious area will increase the amount of stormwater runoff at the site. At this time it is not possible to determine whether the existing stormwater system has the capacity to handle the proposed additional flow. On-site mitigation in the form of detention may need to be created. Further examination of the impact of the increased impervious area will be completed during the Title I phase of the project design.

- A small portion of the project site may be located within the 100-year floodplain. The work to be done within this area of the project site is expected to be on the interior of the building. If any construction will be done on the exterior, a Stream Encroachment Permit will be applied for as necessary.

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9. BUDGET COST ESTIMATES AND PROPOSED PHASING

The development plan that has been described is one that will have a great impact on the Edison National Historic Site. The cost of this undertaking and the logistics of the various components dictate that the project will be done in phases. This will allow for the funds to be generated over a longer period of time and will also allow the site to remain open to the public throughout the course of the work. This second point, keeping the site open, is very important. Recent undertakings at other historic sites shows that visitors enjoy seeing the preservation process, whether it is a small object in the hands of a conservator or an entire historic site. The phasing of this project should be developed in such a way to encourage visitors to return at various times to be involved in various aspects of the project.

Budget Cost Estimates

The following budget cost estimates are conceptual in nature and are based on the information that was available to the team at the time of the study. As the plans for the project are further refined the estimates should be re-evaluated and updated. The budget cost estimates are also based on the following assumptions:

- There is no money included for hazardous waste testing or removal, either above ground or in the soil.

- The costs do not include escalation contingencies. The values are based on 1997 dollars.

- The costs do not include overtime or phasing requirements.

- The subsurface soil conditions are assumed to be acceptable. No costs are included for special testing or mitigation of archaeological deposits that will be impacted by construction.

- Where appropriate additional information, square footage costs, are included for reference.

Inflate to FY-02
5 years (1.041)
= 1.217

Construction Cost Summary - Base Project

New Visitor Center and Administrative Building *The Thomas Alva Edison Resource Center* *- 61,210 gross square feet @ $223/sq.ft.*	$13,717,000
Existing Historic Buildings- Lab Unit *- 55,995 gross square feet @ $129/sq.ft.*	$7,227,000
Glenmont (Allowance)	$1,200,000

Parking, Sitework, and Demolition	$1,045,000
Sub-total	$23,189,000
Project Contingency @15%	$3,478,000
Construction Total	$26,667,000

Additional Costs

A facility of this type and use requires specialty items and furnishings to allow it to function. The cost of these items will vary depending on the quality of the units, their complexity, reuse of existing units and other variables. The following costs are included to give an order of magnitude for the potential costs in these categories.

Furniture $392,750

Administrative and staff offices
Classrooms and multi-purpose rooms

Archival Storage Equipment $2,920,000

Open shelf storage, file cabinets, flat files, specialty storage for sensitive items.
146,000 gross square feet of storage @ $20/sq.ft.

Exhibits $4,400,000

This cost will vary greatly on the level of technology incorporated into the site. Current costs at other sites have ranged from $75/sq.ft. to $400/sq. ft. or more. Our exhibit areas include existing period rooms that will require limited work to entirely new spaces. We have assumed a general level of cost for the entire site.
40,000 gross square feet @ $110/sq.ft.

Design and Engineering Costs

$4,380,000

The professional services costs on a project of this type will vary based on a number of issues. Design of new construction may be less costly than work involving existing buildings, which are typically more labor intensive both during design and construction. Professional fees will depend on the required scope of work for environmental, archaeological and civil engineering services as well as the requested scope of services, particularly during construction. The cost of designing the exhibits will depend on the complexity of the displays and their incorporation of current technologies such as computers.

Phasing

As stated previously undertaking this entire project at one time is not in the best interest of the site and would most likely not be feasible with the existing overlap of historic buildings and administrative space. Recent projects have included work on the exteriors of the historic laboratory buildings and upgrades to the mechanical systems. These projects will help stabilize the buildings and make them essentially watertight. This work will still leave many historic objects in substandard archival conditions and areas of the historic buildings occupied by staff and closed to the public.

The following phasing is intended to illustrate how the project might be broken down to improve certain conditions as soon as possible yet allow the site to remain open throughout construction.

Phase 1- New Construction

This first phase of work will focus on the construction of the four-story section of the new building, the Thomas Alva Edison Resource Center. Construction of this building will create critically needed archival storage space and will allow the historic buildings to be emptied of inappropriate uses such as office and storage. The lower, one-and-one-half-story section of the new building, which will primarily house visitor services, will be undertaken in Phase 2. Dividing construction of the new building into two phases will allow the existing active part of the site to remain as it is currently used.

When this phase is completed all staff, administration and archival storage will be consolidated in the new building.

Phase 2- Demolition for Completion of TAE Resource Center

With the collections relocated in the new building it is now possible to remove vault #12. This demolition, combined with the relocation of the Black Maria replica, clears the way for construction of the remaining piece of the TAE Resource Center. Relocation of the Black Maria will also require site improvements to the area of the site that will be utilized as a landscape interpretive zone.

With the demolition of vault #12 it may be economically sensible to also remove the existing maintenance building during this phase. In addition to the cost savings of undertaking major demolition as a single contract, it will also remove a potential security problem, an unoccupied building.

Public access to the site during this phase will remain unchanged. Researchers will be directed to the Alden Street entry of the new building. The staff will be required to travel around the construction zone to get from their offices to the historic buildings.

Phase 3- The Laboratory Courtyard and Visitor Parking

This phase will focus on reorienting public access to the site. Building #1 will be renovated to house the new Visitor Orientation Center and office space for Park Rangers. The parking area across Main Street will be modified to accommodate additional busses and parking for approximately 75 cars. The laboratory courtyard will be renovated and building #11 reassembled on its original site.

This will most likely be the most difficult phase with regard to visitor flow on the site. With the new building operational the visitor services will be focused there, but they will have to cross the site to get to buildings #5 and #2 for tours. Careful coordination of this phase should keep the disturbance to a minimum.

Phase 4- Buildings #2, #3 and #4

The three remaining one-story laboratory buildings can now be isolated to allow work to take place. The level of intervention in each building varies. If desirable the buildings could be done one at a time, reducing the impact to the visitor. In this scenario building #4 could be done first, then #3 and finally #2. This would allow tours to continue to take advantage of the Chemistry Lab and the Pattern Making Shop as long as possible and will also bring building #4 on line as a part of the interpretive program as quickly as possible.

This phase will have a limited impact on the visitor with the exception of when buildings are closed for work. The main gate will now be in use as the primary point of entry and the courtyard will be available to connect the TAE Resource Center with building #5. Construction activity will be isolated towards the rear of the site.

Phase 5- Building #5

With work on all other historic structures completed the main building will become the focus of activity. While most of the work will take place on the upper floors and in the old powerhouse (building #6), there will be activity on the first floor as well. Sequencing of the work may allow the first floor to be expedited and reopened as work continues on the second and third floors.

It will be necessary for building #5 to be closed to the public for at least some period of time. As the first floor spaces are so important to the visitor experience this floor should be reopened as quickly as possible.

Phase 6- Parking Expansion

When necessary the parking lot across Main Street can be expanded to accommodate approximately 75 additional cars. This work could be undertaken earlier if the demand is high, or it may never be required.

Glenmont

Work at Glenmont can be scheduled independently from the work at the Laboratory Unit. The affect on visitation should be taken into account, but this will pertain to the main house only. Work on the outbuildings, such as the garage, can be undertaken at any time without negatively impacting the visitor experience. Work on the main house may require the building to be closed to visitors for short periods of time,

Acknowledgments

A project of this type is only possible through the cooperative efforts of many people.

We gratefully acknowledge the National Park Service for authorizing the project. We would like to thank all of the staff at the Edison National Historic Site for their time, ideas, and creative input. Their incredible knowledge of the site and their devotion to its future were an invaluable resource to our entire team. In particular we would like to thank the Site Superintendent, Maryanne Gerbauckas.

The following personnel of Ford Farewell Mills and Gatsch, Architects and their consultants executed this study:

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Leone Design Group, Inc.- *Museum Services*

Principal	Lucian Leone
Museums Consultant	Dr. Robert Matthai
Interpretive Design	Ann Clausen
	Peter Dajevskis
Exhibit Design	Louis Scrima

Landscapes, Inc.- *Cultural Landscape, Landscape Architecture*

Principal	Patricia O'Donnell, FASLA
Landscape Architect	Heidi Hohmann

Building Conservation Associates, Inc.- *Architectural Conservation*

Principal	Ray Pepi
Conservator	Claudia Cavanaugh

Marketing Insights, Inc.- *Market Research*
Principal Ellen Morgan

Hanscomb Associates, Inc.- *Cost Estimating*
Principal Andrew Kapp