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Cover Illustration: Section A-B through "Colegio de Señoritas en Santurce" (Girls School in Santurce), PR (1896), signed by Engineer Pedro F. Fernández. (AGPR)

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A MANUAL ON CONSERVATION METHODOLOGY FOR HISTORIC BUILDINGS & STRUCTURES
Puerto Rico and the Virgin Islands

Beatriz del Cueto, AIA
with the collaboration of Agamemnon Gus Pantel, Ph.D. and Roberto Garcia, M. Arch.

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SUGGESTED READINGS

ABBREVIATIONS UTILIZED IN THE TEXT:

AACUPR - Archivo de Arquitectura y Construcción de la Universidad de Puerto Rico (Architecture and Construction Archives of the University of Puerto Rico) Río Piedras, PR

ACL - Architectural Conservation Laboratory

AGI - Archivo General de las Indias (General Archives of the Indies) Sevilla, España

AGPR - Archivo General de Puerto Rico (General Archives of P.R.) Puerta de Tierra, San Juan, Puerto Rico

AHN - Archivo Histórico Nacional (National Historic Arhives) Madrid, España

AIA - American Institute of Architects

AMP - Archivo Municipal de Ponce (Municipal Archives of Ponce) Ponce, Puerto Rico

CAPR - Colegio de Arquitectos de Puerto Rico (Architect's Association of P.R.) Santurce, Puerto Rico

DI - Department of the Interior, Washington, D. C.

HABS - Historic American Building Survey, Washington, D. C.

HAER - Historic American Engineering Record, Washington, D. C.

ICP - Instituto de Cultura Puertorriqueña (Institute of Puerto Rican Culture) San Juan, Puerto Rico

NCPTT - National Center for Preservation Technology and Training, Natchitoches, Louisiana

NPS - National Park Service, Washington, D.C.

OP - Obras Públicas (Public Works)

PR - Puerto Rico

SCLS - St. Croix Landmark Society Research Library at Whim Plantation Museum, Frederiksted, St. Croix, USVI

SHPO - State Historic Preservation Office

USVI - United States Virgin Islands

VSC - Von Scholten Collection at Enid M. Baa Public Library and Archives, Charlotte Amalie, St. Thomas, USVI

A MANUAL ON CONSERVATION METHODOLOGY
FOR HISTORIC BUILDINGS & STRUCTURES
Puerto Rico and the Virgin Islands

FOREWORD and text parameters

Beatriz del Cueto, ALA - Project Director and Principal Investigator

"Imbued with a message from the past, the historic monuments of generations of people remain to the present day as living witnesses of their age-old traditions. People are becoming more and more conscious of the unity of human values and regard ancient monuments as a common heritage. The common responsibility to safeguard them for future generations is recognized. It is our duty to hand them on in the full richness of their authenticity." (Charter of Venice, 1964)

Fifteen years of research, hands-on experimentation and actual restoration/conservation projects in our geographic region of the Caribbean, brought about the need to put in writing what the results of these activities had been and continue to be for us. As a consequence, a proposal was put together to the National Center for Preservation Technology and Training of the United States Department of the Interior, National Park Service to obtain the matching funds to be able to put together a Field Manual that would assist professionals in the construction field who lack formal preservation training but deal with the built patrimony in our region. Herein, basic Conservation and Preservation concepts would be pragmatically explained and illustrated, utilizing, for acclaratory purposes, case studies of preservation projects in Puerto Rico and the Caribbean.

The work bases itself in part, on the premise that the historic architecture and structures of these islands has fundamentally similar construction materials and technology due to similar natural resources prevalent in the region's islands. Understanding that there are obviously island distinctions due to historical realities, generated from 15th through 19th century European influence, nevertheless, the similarities in preservation topics far outweigh the differences, especially when considering conservation and preservation issues for tropical and sub-tropical environments. The basic concepts, definitions and applications are directly related to our larger volume of work which has been and still is in Puerto Rico. Most of these themes however, are transferable to other areas of the Caribbean due to historic and

geographic similarities. Where exceptions and variations to these concepts occur, acclaratory statements will be made throughout the text.

General map of the Caribbean.

The basic islands or island-countries to be covered in this first study shall be: Puerto Rico and the United States Virgin Islands (St. Croix, St. Thomas and St. John). When appropriate, information on other areas will be included such as the Dominican Republic and some of the Lesser Antilles. The material, as included, will be identified as to provenience in these special cases.

BACKGROUND:

The Conservation and Preservation Movements in Puerto Rico, the U.S. Virgin Islands, and the Caribbean in general, gained momentum and grew in interest since the 1950's, as detailed in Section A.2 of this Manual. In Puerto Rico in particular, the escalating effect of un-controlled decay and demolitions which created considerable voids and losses within historic areas such as Old San Juan during this period, inspired the organization of citizen groups such as the Society for the Development and Preservation of Old San Juan and promoted, in first instance, the creation of the Old San Juan Historic Zone in 1951 and the establishment of the Puerto Rican Institute of Culture in 1955. These actions were quickly followed by the Property and Income Tax Exemption Law for the Historic Zones of 1955 which provided tax exemption

from five to ten years if properties were "restoredt"[1]. In the USVI, the safeguarding of individual historic monuments inspired the founding of citizen groups such as the Whim Museum Inc. and the Landmark League of St. Croix in 1948, followed by the creation of the Christiansted (St. Croix) Historic District in 1951 which included the Virgin Islands National Historic Site.

In spite of these early organized efforts and continued legislation and regulations, much destruction followed in the next twenty years. The positive effects of the United States federal government's National Historic Preservation Act of 1966 and its repercussions on historic districts and buildings served as a renewed catalyst, making regional government agencies and interested groups aware that Puerto Rico and the USVI were once again losing the collective cultural patrimony which made each community unique. Sometimes in disregard to all previous precautions, programs and projects continued to be often hastily developed and carried out. The 1992 and 1993 (locally) Columbus Quincentennial celebrations also generated interest in the rescue or renovation of individual buildings as well as urban centers throughout the islands, but even then there was still . a lack of understanding of basic conservation/preservation principles. Projects were often carried out by groups and individuals not knowledgeable in the traditional construction technologies of historic

[2] The definition for the word "restore" varies depending on the author of a particular document. Due to its importance throughout the text of this Manual, and for acclaratory purposes it is defined under Section A.1.

structures and their interventions were more often than not, contributing to the deterioration of the historic fabric rather than preserving it.

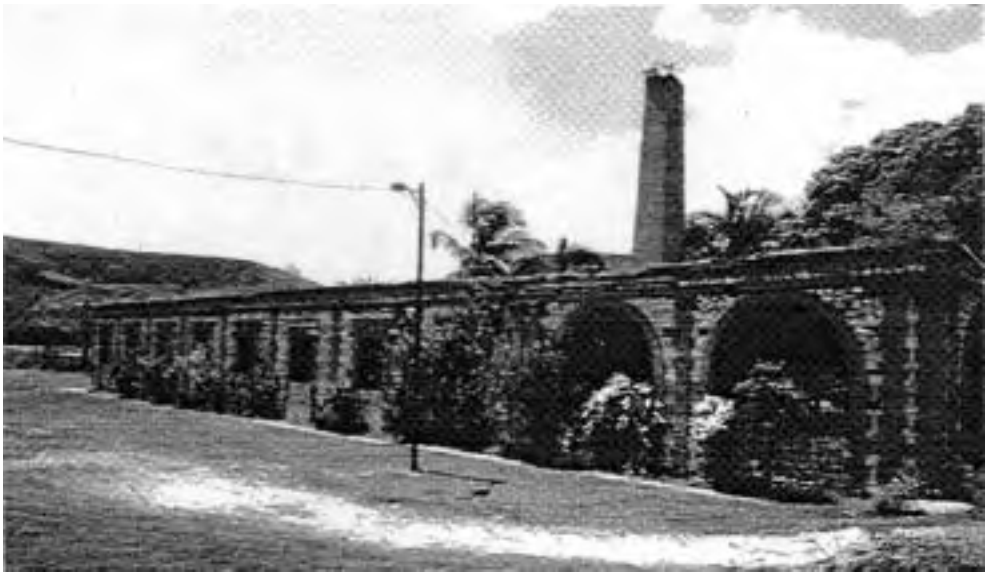
Deterioration caused by the use of incompatible construction materials such as modern concrete block inserted into rubble-masonry fabric.

The information provided in this Manual will clarify some of these shortcomings and will begin to provide guidelines as to how one can respectfully approach the intervention to a historic building, structure or area, with the best information available. It should be made clear however, that this book is not designed nor intended to provide recipes or generic formulas for conservation projects. What it will provide the user is a fuller understanding of the processes and systematics of the conservation, and preservation field.

ACKNOWLEDGEMENTS AND DEDICATION:

We are indebted to the National Center for Preservation Technology and Training (NCPTT) of the United States Department of the Interior, National Park Service (NPS) for having believed in the viability and importance of this project, and providing us with the matching funds to carry it out. Our appreciation is expressed to John Robbins, NCPTT Executive Director, Frances Gale, NCPTT Training Coordinator and Stephen I). Newman, Grants Administrator of NPS,

Our gratefulness also goes to the three official reviewers of this Manual: specialized outside consultant, Jeanne Marie Teutonico, Architectural Conservator, English Heritage, London; for Puerto Rico, Architect Jorge Rigau, ALA, historian, author and Director of the School of Architecture at the Polytechnic University; and for the USVI, Architect Frederick Gjessing, AIA of St. Thomas, former National Park Service Architect and noted historic preservation specialist. All contributed extensively to the text through their knowledge of the history and construction technology of the Caribbean region that specifically concerns this study. Their professional collaboration, through review comments, and the facilitation of technical as well as written information, provided us with essential resources and constructive criticism which have served to strengthen the text as a working technical and reference Manual.



Ruins of sugar factory in Guayanilla, Puerto Rico.

Of special importance also was the collaboration of Prof. Frank Matero, Chairman of the Graduate Program in Historic Preservation and Director of the Architectural Conservation Laboratory at the University of Pennsylvania, whom provided initial organization advice on the text in general, in addition to basic observations on the Sections dealing with Materials Analysis of Historic Buildings and Case Studies of Conservation projects in Puerto Rico. From Puerto Rico, Architect Otto Reyes Casanova, AIA, historic preservation specialist, provided background data on projects carried out by his office, while Architect and Professor, Juan Penabad, submitted his comments on traditional construction technologies and technical terminology for the glossary. Architect Thomas Marvel, FAIA granted us the use of copies of his intervention project to historic Casa Roig, in Humacao. Puerto Rican Attorney Wilfredo Geigel, historian by advocacy, provided extensive reviews and recommendations on information relating to Puerto Rico and the United States Virgin Islands. The collaboration and support of the Conservation Trust of Puerto Rico allowed many of these early preservation efforts to be accomplished locally. Special acknowledgment must be given to Architect Francisco Javier Blanco, Executive Director, as well as to Master Builders of the Trust, Panchito Fernández and Arsenio López for their long-time commitment to our ideals and endeavors.

Our appreciation to other professionals in Puerto Rico includes historians and archivists Ramonita Vega, José Flores and Milagros Pepín who, based on their experience and work in the General Archives of Puerto Rico, provided important basic information specifically for Section A.3 on Research. Architects in Training Kirsten Gonzalez and Wanda Bogdell in addition to Conservator Hector Santiago, from the Office of Built Historic Patrimony of the Institute of Puerto Rican Culture, provided us with necessary local preservation texts that supplemented our general information base. Magda Bardina, M. Arch., Director of the Historic Center of Ponce provided the background data for the Quincentennial projects carried out in that town, in addition to copies of some early 20th century historic plans and specs. Beatriz Nadal, architectural student, and Alexander Fernández, Architect in Training, provided graphic advice and assistance in preparing illustrations and scannings for the Manual. Architecture Students from the Design 203 Course (Architectural Conservation) of the Polytechnic University School of Architecture in San Juan, collaborated through the use of some of their project graphics which were incorporated into the text.

In the United States Virgin Islands, Claudette Lewis, Assistant Director of the Department of Planning and Natural Resources, Division for Archaeology and Historic Preservation furnished us with basic historic and architectural sources. Beverly Smith, Librarian and custodian of the Von Scholten Collection at the Enid M.

Baa Library and Archives in St. Thomas and Carol Wakefield, Librarian at the St. Croix Landmarks Society Research Library at Whim Plantation in Frederiksted, provided indispensable primary and secondary source materials for Virgin islands topics. Architects Maria M. Chalgub, AIA, Hortensia Lanio, AIA and William Taylor, AIA provided us with copies of their intervention projects of historic properties in the USVI

Ruins of Butler Bay Lime Kiln, St. Croix, U.S.V.I.

Lastly, I am greatly indebted to the two formal collaborators of this project, my husband and professional partner, Dr. Agamemnon Gus Pantel, Ph.D., Archaeologist, Anthropologist and Historic Preservation Consultant, together with my friend and colleague, Roberto (Pío) Garcia, M. Arch., who has extensive experience on local conservation projects. These two professionals contributed in the general text organization, general editing, identification and photographic documentation of notable examples detailing materials and methods of extant historic buildings and structures during field trips throughout Puerto Rico and the USVI, and on the final preparation and selection of graphics and illustrations for the text.

We are indebted to the professionals in the construction field of our region whom encouraged the research and final work aimed towards the publication of our pioneering work in conservation. This Manual is dedicated to them and to all those that come after us and equally share the same concerns. This Manual should provide

answers to some of the basic questions and doubts in the important field of Conservation and Preservation of historic buildings and centers, and particularly be useful in Puerto Rico and the United States Virgin Islands.

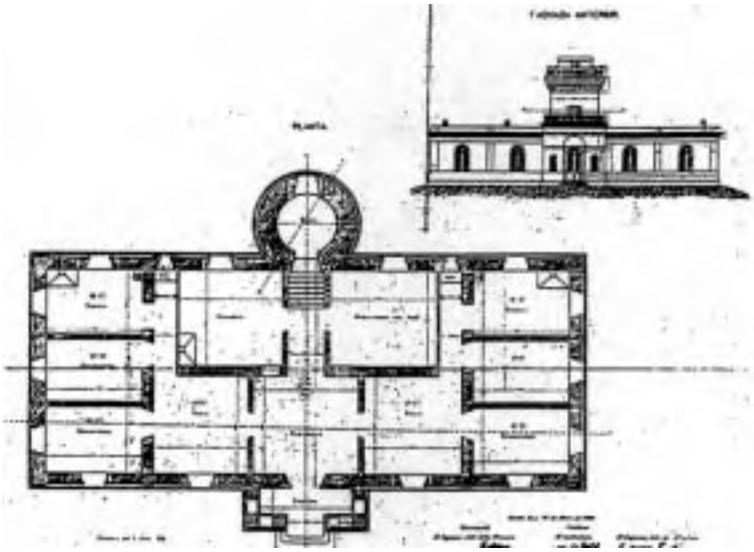
Beatriz del Cueto, AIA
January, 1997
Guaynabo, Puerto Rico

SECTION A: CONSERVATION METHODOLOGY

A.1 Historical, Archaeological and Architectural Research – The existing written or graphic document

INTRODUCTION:

Having been conceived, designed and constructed by someone before us, a historic building, structure, or the urban layout of a town or city undoubtedly contains specific existing information that can grant the contemporary professional valuable clues about the period in which they were constructed and the people that actually carried Out the work. Information such as: name of original owner and designer, date of construction, first construction materials used and their provenience, original construction specifications and drawings, problems encountered during initial construction, first color scheme and the original uses for the building, structure or space can be procured in first instance. This data should be obtained in order that present decisions to be taken have a respectful and cogent point of departure.



Floor plan and front facade of Las Cabezas de San Juan Lighthouse (1881) at Fajardo, PR (AHN)

Historical research provides us a way of honoring the work we inherit, while, with the correct background information gathered, we can guarantee a new use that is compatible with the original and also assure the historical element's continued survival through time. Design compatibility is just as important as the co-existence of modern

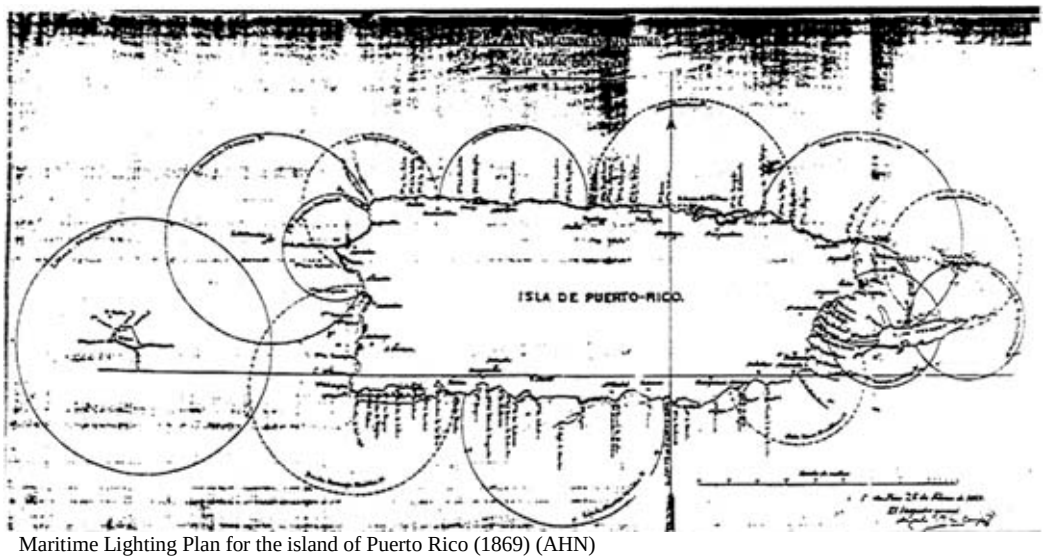
construction materials to those traditional as will be explained in Section B-4. “Architectural investigation is the critical first step in planning an appropriate treatment ...“ (McDonald, 1992)

Besides the research on the building or area itself;, it is also important to gather data on the general history of the sector where the structure (object of study) is located. That way, the historical context can be established and answers to doubts found on specific issues will be explained by events that took place during the specific construction period being researched. It is therefore very important that whenever possible, a multi-disciplinary approach be taken to research, where the material found can be interpreted by professionals in the preservation field which may include: architects, archaeologists, historians (art, ethno and architectural), architectural conservators and planners. These individuals can contribute to the investigation in general by studying the documents from their own profession’s points of view. Nevertheless, beware, because not all professionals enumerated above are inherently good researchers. To be effective in doing the investigations detailed, the person doing the research must have a good knowledge of the history of the place, and a basic understanding of the historic construction technologies and typologies of the area where the building is located to be able to decipher what he or she has found. Good intentions are no longer sufficient or acceptable. The wrong hypothesis at the beginning will definitely yield an incorrect solution in the end.

Historic information may be found in written form such as deeds, testaments, construction documents, letters, travel diaries or chronicler’s accounts. Graphic interpretations, drawings, sketches, paintings, and photographs are also important. Historic material found about the project to be developed sets the data-base upon which any intervention to a specific building or area can be planned.

The first step then, and one that is basic in the methodology of any historic preservation project, is historical research or the recovery of historical memory. Even though some of the most important historical information is often still in archives outside the places where we carry out our work (these being the colonizing nations of Europe) most countries or islands of the Caribbean have been able to put together local archives where basic information is available. It is not intended that research must be carried out in Europe should local sources fail to provide us with the basic

information, but it is strongly suggested that a minimal initial local search be carried out regardless of the scale of the project. Research should be carried out as well in advance as possible to the actual field work so as to guarantee acquisition of enough data which can be corroborated or refuted during the Documentation (Section B.2) and Inspection (Section B.3) phases of the project. Should the documentary information not be available, then the building itself will be the document to be researched and Archaeology will be one of the first tools utilized to obtain the basic construction information (ie. design, layout and technology).



Maritime Lighting Plan for the island of Puerto Rico (1869) (AHN)

Once archival research is completed, we proceed to carry out physical research. Valuable information can be obtained through actual physical examination of the building or structure surfaces and excavation work, commonly carried out by archaeologists. These tests traditionally take place underground, but may also occur on the surfaces of walls, depending on the type of information needed. This search for clues on the building's development through time is known as "Architectural Archaeology". Section B.3 of this Manual will detail Inspection and Archaeological work.

Map of St. Thomas (1730) (Westermann, 1953).

SOURCES OF HISTORICAL INFORMATION IN PUERTO RICO:

Puerto Rico was colonized by Spain in the 16th century, and Spanish became the Island's official language. Due to this, most of the primary historic documents that exist regarding its history, are in Spanish. A great number of these records are housed

Graphic and historic study of ceramics found at Caparra, PR (deHostos personal files).

in the *Archivo General de Puerto Rico [AGPR]*(General Archives Building) in San Juan. These collections, mostly comprised of 19th century documents, are divided into different "Record Groups" of which the most important for architectural, urban and archaeological research are:

Colecciones Particulares (Private Collections) - These documents are classified under the last name of the family that donated the data to the *Archivo General*, and may include: plans or drawings, property deeds, photography and even work carried out during the donor's lifetime, such as public projects carried out during a Mayor's term, among others.

Fondo: Gobernadores Españoles (Spanish Governors' Documents - Record Group 186) These documents contain matters related to the government such as: newsletters, ordinances and codes relating to construction work. The correspondence was carried out between the *Capitanía General* (General Captainship or chief authority)

and the Municipalities. The major subdivisions of this source and a brief explanation of each are:

Records relating to Political and Civil Affairs (1754-1897). Referred to as belonging to the activities of the *Gobierno Politico* (Political Government), are grouped into 72 series bearing such titles as: Royal Orders, census records, elections, political prisoners, and publications. The series is arranged alphabetically by title and chronologically.

Records Relating to Fiscal Affairs (1782-1896). Consists of 56 series bearing such titles as contraband, tariff duties, taxes, usury, financial reports, budgets, counterfeiting, debts, lottery tickets, Royal, income, fines, and public expenditures. Arranged alphabetically by name of series and chronologically.

Records Relating to Military Affairs (1761-1890). 36 series that include artillery, cavalry military conduct, defense, deserters, fortifications, military decorations, prisoners, and volunteers. Arranged alphabetically and chronologically.

Records Relating to Naval Affairs (1782-1891). Consists of 27 small series bearing such titles as: appointments, correspondence, lighthouses, naval matters, shipwrecks, brigantines, corvettes, frigates, schooners, and sloops. Arranged alphabetically by name of letter-writer.

Records Relating to Ecclesiastic Affairs (1782-1 897). Fragmentary records brought together in 21 small series that bear titles as: the Convent of San Francisco, parish priests, church tribunal, appointment of priests, church statistics, and pastoral visits. Information about the construction and repair of churches is often included with the records of a particular municipality or the Office of Public Works.

Records from Government Agencies (1796-1897). Consists of 20 series containing the records from various well-known government agencies. Among these are: Public Health, Public Works, Post Office, and several others such as: *Administración local* (local Administration), *Audiencia* (High Court of Justice), *Casa de Beneficencia* (House of Beneficence), *Comisión de .Estadística* (Statistics Commission), *Diputación Provincial* (Provincial Deputation), *Guardia Civil* (Civil Guard), *Justicia y Ultramar* (Justice and Overseas). They are arranged alphabetically by name of agency and chronologically.

Records from Municipalities (1765-1898). These records were received by the Office of the Governor from mayors and other officials from about 75 towns in Puerto Rico. Arranged alphabetically by name of town and chronologically.

Of particular interest to construction projects is the series: *Comandancia de Ingenieros* (Engineer Command).

Fondo: Hacienda (Treasury, Estate or Wealth) - Dating from 1905 to the 1950's it includes documents from all the municipalities of Puerto Rico. Among the information found in this source are: topographic maps, aerial photography, banks and appraisement forms. Property registries are also included or *Registros de la Tasación y Contribución sobre la Propiedad* (Registry for the Appraisement and Property Taxation). This collection also contains real property maps corresponding to the 20th century.

Fondo: Judicial (Judicial) - Includes documents from the 19th through the early decades of the 20th century (1920's) on topics such as: territorial audience (supreme court), civil and criminal judicature, prisoners, expropriation, notarial registries and attorney general matters.

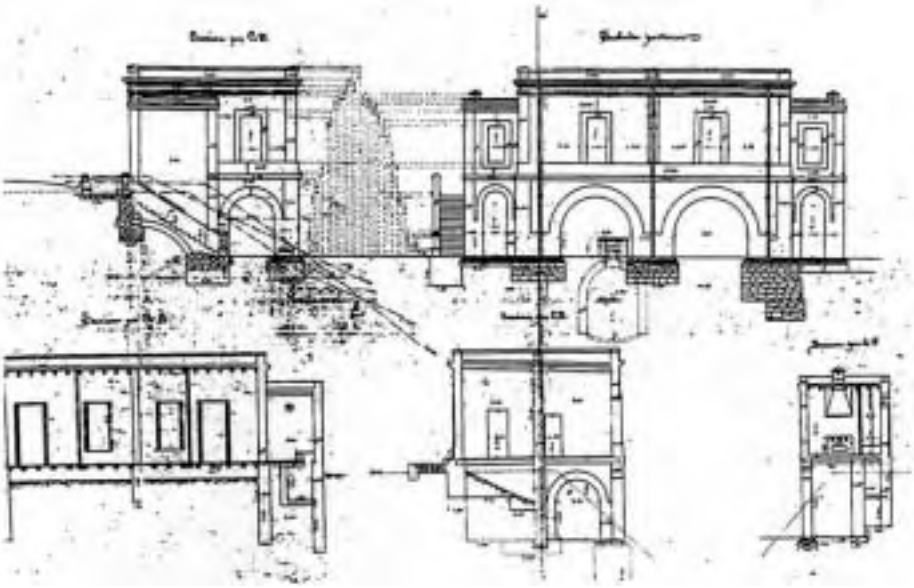
Fondo: Municipios (Municipal Documents) - This source contains municipal projects and authorizations for their go-ahead. Among the many Municipal documents available are those on roads, elections, public instruction, Justice, slaves, public order and day laborers. Also, census on agricultural, urban, industrial and commercial wealth. Puerto Rico is divided into 76 municipalities and four of these have their own document depositories or archives. The archival information which is not in the AGPR building in Puerta de Tierra is that pertaining to the municipalities of: Caguas, Mayagüez, Ponce and San German. There are documents in the "Municipios" collections from the 18th through the early 20th centuries. Each of the municipalities is divided into the following Series:

Actas del Ayuntamiento (Municipal Government Records)
Actas de la junta Municipal (Municipal Board Records)
Caminos-Prestaciones (Roads)
Cédulas de Vecindad (official documents declaring specific citizen information for identification purposes)
Circulares y Oficios (newsletters and occupations)
Contabilidad (accounting)
Copiadores de Correspondencia (correspondence scribes)
Elecciones (elections)
Huracanes (hurricanes)
Iglesia (church)

Instrucción Pública (Public Education)
Jornaleros (Day-laborers)
Juntas - *Varias* (de obras de utilidad o de evaluación y amillaramiento ...) (Various Boards)
Libertos - Contratación (Emancipated slaves)
Moneda (coin)
ObrasPúblicas [planos, memorias descriptivas, caminos y puentes, alineamiento de población] (Public Works)
Orden Público [batallones, guardia civil, milicias urbanas ...] (Public Order)
Padrones - Censos (Tax lists, registers)
Requisitorias - Copiadores de ... (Requisitories, warrant from one judge to another)
Riqueza<a Agrícola [planillas, padrones de tierra] (Agricultural Wealth)
Riqueza de Industria y Comercio [listas de comerciantes y profesionales ...] (Industry and Commerce Wealth)
Riqueza Pecuniaria [Ganadería] (Pecuniary Wealth)
Riqueza Urbana [planillas, tasación] (Urban Wealth)
Salud y Beneficencia (Health and Beneficence)
Solares (Lots)
Subsidio y Gastos Públicos [repartos, protestas] (Public Subsidy and Spending)
Vagos y Amancebados [actas de la junta de vagos] (Vagrants and Concubinage)
Varios (Various)

Fondo: Obras Públicas (Public Works Documents) - These documents include Series on the development of Puerto Rico's infrastructure during the 19th and first decades of the 20th centuries and may include information on: roads, bridges, public buildings, schools, water use permits, religious buildings, ports and docks, lighthouses, empty lots, and railroads, among others. The Series included in this source are titled as follows:

Aguas (water)
Caminos Vecinales (country roads)
Carreteras y Puentes (roads and bridges)
Catastro (tax list of real property)
Edificios Escolares (school buildings)
Edificios Públicos (public buildings)
Edificios Religiosos (religious buildings)
Obras Municipales (municipal projects or works)
Propiedad Pública (public property)
Puertos y Muelles (ports and docks) - may include information on lighthouses



Partial drawings for "Casilla para Peón Caninero" (road maintenance workmen house) at state road #4 (1894) in Jajome, PR. (AGPR)

The *Fondo de Obras Públicas* is usually one of the sources most used by professionals in the construction industry because its descriptions may include:

- descriptive texts of the towns with drawings and urban renewal projects,
- drawings of houses and residences (plans, facades, site plans and others)
- written descriptions and drawings related to repairs and alterations done to existing structures or spaces
- correspondence relative to the obtaining of construction permits, demolition of structures, land and property ownership, and others.

Fondo: Salud (Health) - Contains documents such as plans and specifications dealing with authorizations or approvals required for projects for health reasons (such as height and elevation requirements to avoid rat passage and guarantee better building ventilation, therefore, better health). Includes basically 20th century data. Includes vigilance and hygienic rules for public safety reasons.

Protocolos Notariales (Notarial Registry) - These are the volumes of documents from the notary publics where you can find varied data on economic activity: property transfers, last will and testaments, purchase and selling of properties and

slaves, mortgages, power of attorneys, debt payments and securities. The collection runs from 1750 through to 1934.

Oficina de Protocolos y Notaría (Notarial Archive) - This source contains documents from the previous collection and starts where the other one ends, in 1934. Located at the San Juan Judicial Center in Hato Rey, it includes information from inactive notaries.

IMPORTANT HISTORICAL SOURCES ELSEWHERE IN PUERTO RICO:

Archivo Eclesiástico o del Arzobispado de San Juan (Ecclesiastical Archive or San Juan Archbishopric Archive) - Special Chaplaincy lists (a capital, the interest of which is required by the Spanish Laws for the support of an ecclesiastic) that detail the obligation, debt or hardship to some real property as a percentage for the payment of masses, funerals, etc.

Archivos Municipales (Municipal Archives) - which have pertinent information to their geographic area. Only four municipalities in Puerto Rico have their own archives, these are: Caguas, Mayagüez, Ponce and San Germán.

Archivos Parroquiales (Parochial Archives) - Contain documents of individual parishes of the 19th and 20th centuries and may include in addition to birth, marriage, baptism and death certificates originals plans and specifications for the construction or repair of churches.

National Park Service Archives [for Puerto Rico at Fort San Cristóbal - May include U.S. government records from the late 19th through the 20th century specifically related to military installations or events in Puerto Rico. Has valuable collection of glass covered slides related to these subjects.

Registro General Demográfico de Puerto Rico (General Demographic Registry of Puerto Rico) - Housed in the Health Department of Puerto Rico, it registers, collects, curates and preserves vital records and related activities. The Registry includes documents from 1875 to the present relating to births, deaths, marriages, etc. The records contained in this collection were originally known as the *Registro Civil* or Civil Registry.

Registros de la Propiedad en Departamento de Justicia (Recorder of Deeds at the Justice Department) -These documents were started in 1880 and formally under Royal Decree and Ruling for Cuba, Puerto Rico and the Philippines in 1893; before

then, only contributors lists existed. They were begun as an inventory of immovable estate or property (urban and rustic). These documents are subdivided by groups of two or three municipalities with the exception of San Juan, which itself is divided into sections.

Time Period Publications - These may include: magazines, newspapers, yearbooks of patron saint festivities and photographic collections, among others. Publications regarding natural disasters, social and political activities can be used to find information regarding the character and condition of buildings or structures in their original context.

University of Puerto Rico, Río Piedras (main campus):

> *La Colección Puertorriqueña* (Puerto Rican collection) - comprehensive collection of rare books, periodicals and publications related to Puerto Rico's history
>
> *Centro de Investigaciones Históricas* (Center for Historical Research)
>
> *Archivo de Arquitectura y Construcción de la Universidad de P.R.* (Architecture and Construction Archives of the University of Puerto Rico)

U.S. Coast Guard, San Juan - These documents include specific information on lighthouses in Puerto Rico built by the Spanish Government during the 19th century. The documents include originals of some drawings, specifications and photography of the Lighthouse service during the early 20th century.

Conventional signs for different lighthouses in Puerto Rico (1889) (AHN).

IMPORTANT HISTORICAL INFORMATION ABOUT PUERTO RICO OUTSIDE THE ISLAND:

Archivo General de las Indias en Sevilla (General Archives of the Indies at Seville) in Spain - documental information from the 16th-19th centuries.

Archivo Histórico Nacional (National Historic Archives) in Madrid, Spain -18th and 19th centuries.

Library of Congress of the United States - Washington, D.C.

Historic American Building Survey and Historic American Engineering Record collections of historic buildings, structures and historic districts documented during summer projects in Puerto Rico by architectural students. Old San Juan, Ponce, Mayagüez and San German documentation projects are featured.

National Archives of the United States - New York City, New York

Puerto Rico collection.

SOURCES OF HISTORICAL INFORMATION IN THE UNITED STATES VIRGIN ISLANDS:

Even though the largest Danish West Indian historical records collections are outside their physical territory, each of the three United States Virgin Islands has its own library and archive collection. Although most of the important documents are in Danish, a surprisingly large number of these are in English. This is due to the fact that Charlotte Amalie, St. Thomas became an important port during the 18th century, and the language most commonly used for commerce was English, and as such, it was adopted for important sources such as newspapers. Periodicals and newspapers of

ROYAL DANISH
AMERICAN GAZETTE.

the l700's such as the Royal Danish American Gazette and The St. Thomas Gazette are in English and found at the Von Scholten Collection of the Enid M. Baa Public Library and at the St. Croix Landmarks Society Research Library in microfilm form.

As follows, are the individual island collection depositories:

St. Thomas:

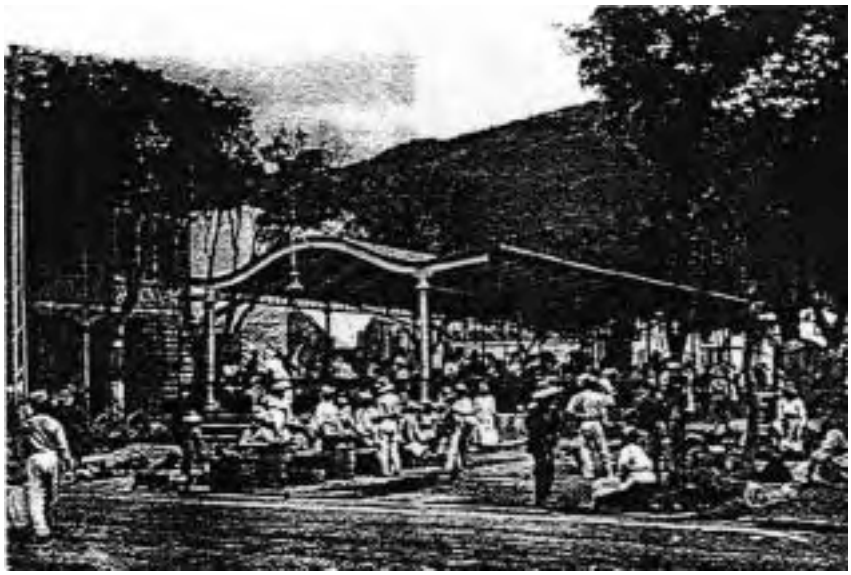
Enid M. Baa Public Library and Archives - Von Scholten Collection, Charlotte Amalie

Lieutenant Governor's Office - Land Records

Department of Public Works Archives

Department of Planning and Natural Resources USVI

U.S. Virgin Islands' Territorial Archives, Charlotte Amalie



Cast-iron marketplace in Charlotte Amalic, USVI (late 19th century)

St. Croix:

St. Croix Landmarks Society Research Library at Whim Plantation Museum, Frederiksted

The Florence Williams Public Library Caribbean Collection, Christiansted

Department of Public Works Archives

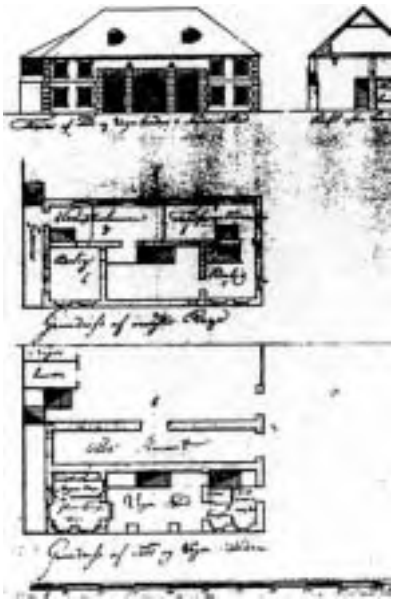
St. John:

Sprauve Library, Cruz Bay

United States National Park Service Library

IMPORTANT HISTORICAL INFORMATION ABOUT THE UNITED STATES VIRGIN ISLANDS OUTSIDE THE REGION:

The major depositories for information related to the former Danish West Indies is located at the **RIGSARKIVET (Danish National Archives)** in Copenhagen, Denmark which are subdivided into 35 record sections and include customs duties. Most of the documents found in Denmark under the Danish West Indian Collection of the Rigsarkivet are in Danish although some records may be found in English.



Plans for Customs Toll-House in Frederiksted (ca. 1780) St. Croix, USVI (Rigsarkivet, Copenhagen)

Other important historical sources in Denmark include:

The Royal Library, Copenhagen

The Municipal Archives of Copenhagen

The Danish Maritime Museum, Elsinore Castle, Elsinore

The Danish National Museum, Copenhagen

The Royal Danish Naval Museum, Copenhagen

The Royal Danish Arsenal Museum, Copenhagen

After the islands were purchased by the United States Government in 1917, a large portion of these records, in addition to some of those produced from the date of government transfer, were taken and deposited in the **United States National Archives** in Washington, D.C. These specific records are titled: RECORD GROUP 55.RECORDS OF THE DANISH GOVERNMENT OF THE VIRGIN ISLANDS (1672-1917). Shelf List of Records. 1961 and are classified by topic in alphabetical order. In addition, there are separate sections under the titles of: Office of the Building Inspector, Records of the Upper Guardians, Records of the Post Office Department-St Thomas, Records of the Fire Department-St. Thomas, Records of the Department of Streets & Public Roads, Office of the Building Inspector and Surveyor, Records of the Department of Health, and Records of the Radio Room on St. Thomas. As previously indicated, Government Records relating to the "cession or the rights and property of the inhabitants of the islands" were specifically transferred to the United States by the Treaty of Cession. This Record Group comprises the records that came into the possession of the United States according to this provision of the treaty, with a few series extending briefly into the period of United States possession.

Due to their lack of space, the United States' National Archives has had to transfer some of its collections to different facilities. The Records of the Danish Government of the Virgin Islands or Record Group 55 are believed to be in a depository in Maryland.

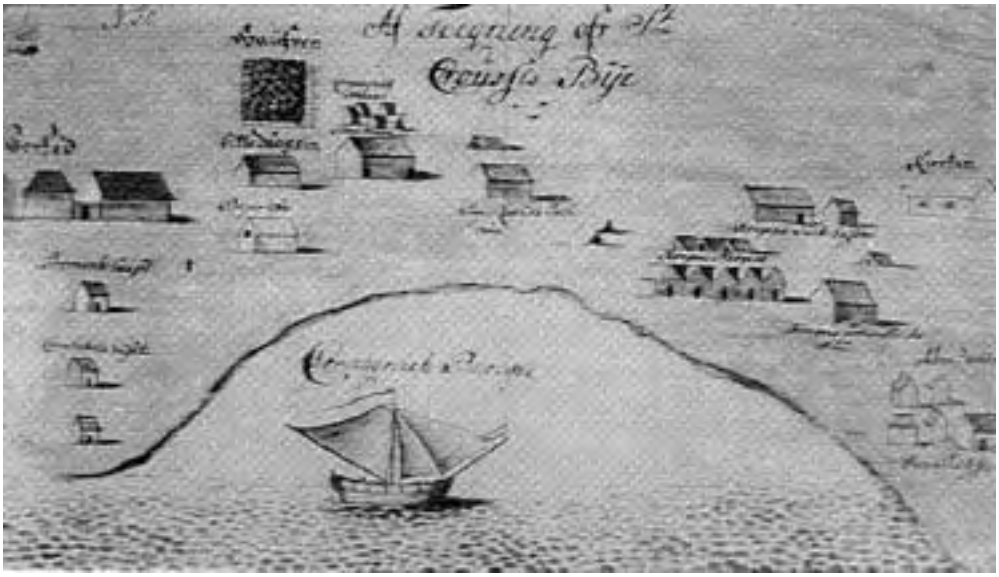
Other deposits containing USVI information in the United States mainland are:

The Congressional Library, Washington, D.C.

The Bancroft Library, at UC Berkley, California

The New York Public Library - Caribbean Collection, New York City

Moravian Church Archives, Bethlehem, Pennsylvania



Historic map of Christiansted Harbor. St. Croix,USVI. (Westermann, 1953)

SECTION A: CONSERVATION METHODOLOGY: The Anatomy of an Historic Building

A.2 Photographic and Graphic Documentation

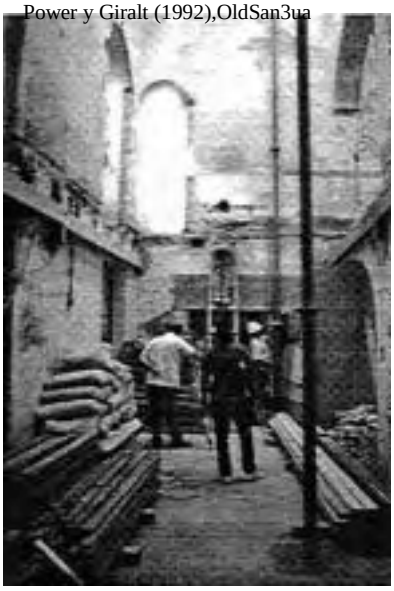
Production of As-Built Drawings

INTRODUCTION:

Recording the actual state of a building, urban space, or element of our technological and industrial heritage is of utmost importance, because, in order to intervene upon their fabric we must first investigate, document and understand it. Documentation, by means of photography and measurement, is a way of preserving this information for the future. Present-day cities, communities and our rural landscape are filled with these remnants from the past which create links to the different historic period's constructed environments. Before these elements or areas are lost, or before any present work is specified for them, it is our duty to accurately and properly record these for posterity. "Preservation through documentation is the minimum preservation which all of our historic buildings and structures should receive." (Kapsch, 1990)

Photographic documentation of historic wall stencils at Casa Ramón Power y Giralt(1992),Old San Juan, PR

Surveying of elevations during documentation process at Case Rernón Power y Giralt (1992),OldSan3ua



PHOTOGRAPHIC DOCUMENTATION METHODOLOGY:

The photographic documentation of buildings or areas is imperative since it frequently becomes the only document of the building's state or condition at a specific period in time. Specifically, when a building or an area is in imminent danger of being demolished or transformed from its original historic form or shape (photography, either still or video) is the best means at our disposal to rapidly record the present state of its historic fabric. In many recent historical periods, photographs are the only documentation found about some cultural resources.

Photographic documentation should include the interior as well as the exterior of the building or structure, specific or unique details, and general areas or elements such as flooring material and ceiling type. Apart from the camera itself, the other indispensable tools during this process, are graphic scales. Graphic scales are measuring tapes, bars or stadia rods which are utilized to give precise size data to the space or element being documented. A graphic scale facilitates interpretation by adding proportion to the photograph and helping clarify actual dimensions. The scale also helps to corroborate doubts on specific size and relative location of different elements at the time the "As-Built" drawings are being developed.

PHOTOGRAPHIC EQUIPMENT AND GRAPHIC SCALES:

Cameras:

There are different camera types that can be used for this purpose, and large-negative[1] format are preferable for the detailed possibilities of the printed image provided by these. Nevertheless, 35mm cameras are often used since these are more commonly accessible to the typical user. Developing and printing processes for the 35mm format are also more commonly available. A 50mm lens provides good photographic detailing work, while a 28mm lens provides for satisfactory spatial documentation with minimal distortion. Close-up lenses can be added as needed. Architectural corrective lenses (such as the parallax lenses) are available, but not necessary to obtain a basic working set of data.

Video and digital photography is becoming ever more accessible and an economically effective means of documenting. The advantage of this format is that the information can be electronically recorded and stored with immediate visual results. It can be

[1] 4X5 inch, 5X7 inch, or 8X10 inch negative size photography, archivally processed

Photographic
documentation at
Hacienda Buena Vista
(1986) Ponce. PR.

printed directly onto the drafting film if using Autocad or onto a stampad by a laser printer which can be adhered to the surface of a working drawing. There exist various computer programs which allow field documentation to be converted directly into line drawings through the manipulation of images recorded at a specific time.

Graphic Scales:

Graphic scales come in a variety of forms and sizes. A regular measuring tape or wooden tape measure stick is acceptable for close-up detailing work, For the overall documentation of spaces, a stadia rod such as those used for site measurements (land surveying) is preferable. These give readouts at a distance because of their distinctive graphic explicitness of measurements through the use of separate bold colors (black and white, or red and white). Of these, the most convenient are the collapsible or foldable type because these provide easier carrying and handling possibilities. A viable alternative for measurement in feet are the 6 1/2 feet long rollable measuring tapes called “Pocket-Rods” by Keson. These scales are also available in meters. The easiness of use of these stems from the fact that they can be removed from, or rolled back into, a 3” X 3” casing which can be easily carried with other equipment. The only draw-back is that by being flexible and thin in section, it is hard to make it stand by itself when taking a photograph. The other resource, which provides an easy solution and can be home-made, is to purchase a 1” X 2” slat of treated wood, from 8 to 10 feet in length on which a graphic scale can be drawn. This is done by dividing the first foot of measurement into one inch increments and the subsequent length in feet. (See examples of documentation photography in this Section for a visual clarification of these alternatives).

Processing/Reproduction:

Processing and reproduction of the commonly used formats, such as 35mm, is available at commercial photographic laboratories located, almost always, in close proximity to the project sites. One hour developing for color prints is usually viable and can provide for rapid examination and corroboration of still photography with field notes.

Cataloguing and Storage:

It is of utmost importance to carefully identify each negative taken whether these be for prints or slides. These should be labelled with regards to cardinal points (ex. North facade or South view of kitchen, etc.) and in relation to particular spaces or rooms. All views pertaining to one exterior elevation whether they be general or of a detail, should go together. Likewise, interior spaces' shots should be grouped.

As with all archival materials, photographs should be stored in a cool, dry place that is located away from direct light. This will guarantee a longer life for this important record.

Photogrammetry:

Photogrammetry is the technique of taking accurate measurements of an object, building or area through rectified photography. It can be extremely complicated to achieve the process correctly, even though it is very simple in principle. "Pairs or series of stereoscopic photographs are used, as in air photography, and from these it is possible to delineate on a plotting machine, a plan, section or elevation of the subject and so compute its volume." (Feilden, 1994) The more accuracy required, the more complicated the equipment, but it is an efficient and fast system for large bodies of work. Various advantages distinguish this technique. Among them are the speed with which it can be done and the possibility of measuring fragile or extremely deteriorated objects and buildings which cannot withstand the conventional manipulation needed by manual measurement. Precision of the measurements guarantees high accuracy and makes it possible to reveal distortions and irregularities not detectable by mere eyesight. The system also permits storage of photography for use and analysis at a later date and also permits photography at different intervals to check on the stability of an object under study. There is a high initial cost regarding the necessary equipment and the need of skilled operators, but it becomes economical if used for large or multiple projects.

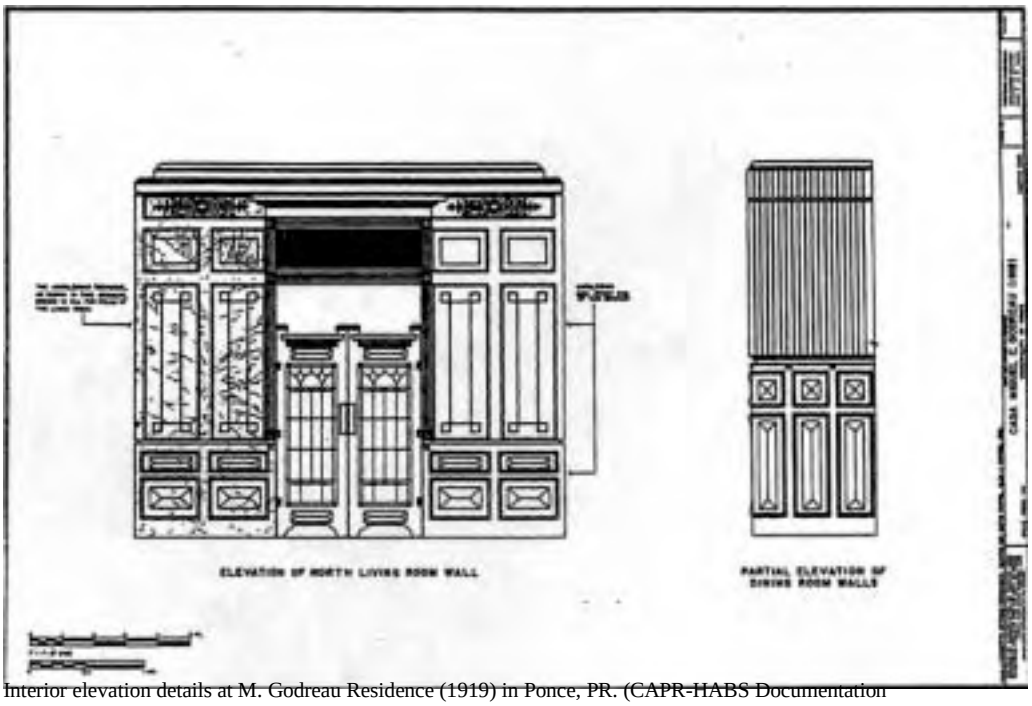
Remote Sensing:

Other methods of documenting less obvious elements of a structure can be achieved through the use of remote sensing techniques. The most common and readily available of these is an earth penetrating radar which can assist in detecting sub surface features such as foundations, buried walls, and other elements not readily visible. Other equipment such as metal detectors might also assist by helping locate embedded or concealed elements within a partition or structural clement.

Use of remote sensing equipment to detect the location of buried wells and floors. (Orinoco Project 1994)

GRAPHIC DOCUMENTATION METHODOLOGY:

Graphic documentation or the actual recording/measuring of historic buildings and spaces shall precede any intervention. It is of utmost need to the Architect or Construction Professional to have a set of Plans and Details of the existing condition of the building or space before the proposed work is planned. Graphic documentation also affords the professionals or students carrying out the work a unique opportunity to analyze and study in depth the object of their documentation. For this purpose it is very important to utilize and follow established procedures instituted by the United States Department of the Interior through the National Park Service (NPS). A special Division under NPS, commonly known as HABS or HAER, "administers a series of programs designed to develop documentation on historic buildings, structures, and sites throughout the United States." (Kapsch, 1990) The guidelines provided by HABS and HAER have proved to be very successful throughout the years and are used as effectively today as they were in the past.



Interior elevation details at M. Godreau Residence (1919) in Ponce, PR. (CAPR-HABS Documentation Project 1985)

Historic American Building Survey (HABS) and Historic American Engineering Record Standards (HAER)

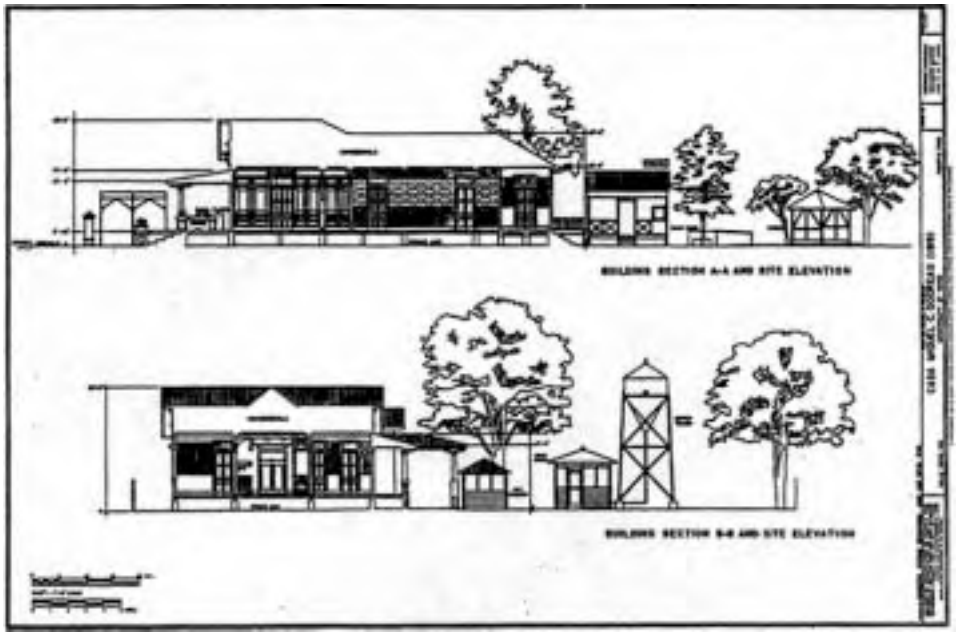
HABS stands for Historic American Building Survey, which was initiated in 1933 as a program established to record America's historic buildings. HAER stands for Historic American Engineering Record. It was established in 1969 as a counterpart to HABS to document structures of technological and engineering significance.

"Under a 1934 agreement among the National Park Service, the Library of Congress and the American Institute of Architects, the NPS administers HABS with congressionally appropriated funds supplemented by donations ... The NPS is responsible for setting qualitative standards, and organizing, staffing and selecting recording projects. HABS staff directs the preparation and editing of records, and transmits them to the Prints and Photographs Division of the Library of Congress. The Library preserves the records, makes them available for study and publication, and supplies reproductions to the public upon request. The American Institute of Architects (ATA) provides professional counsel through its national membership." (HABS Guidelines)

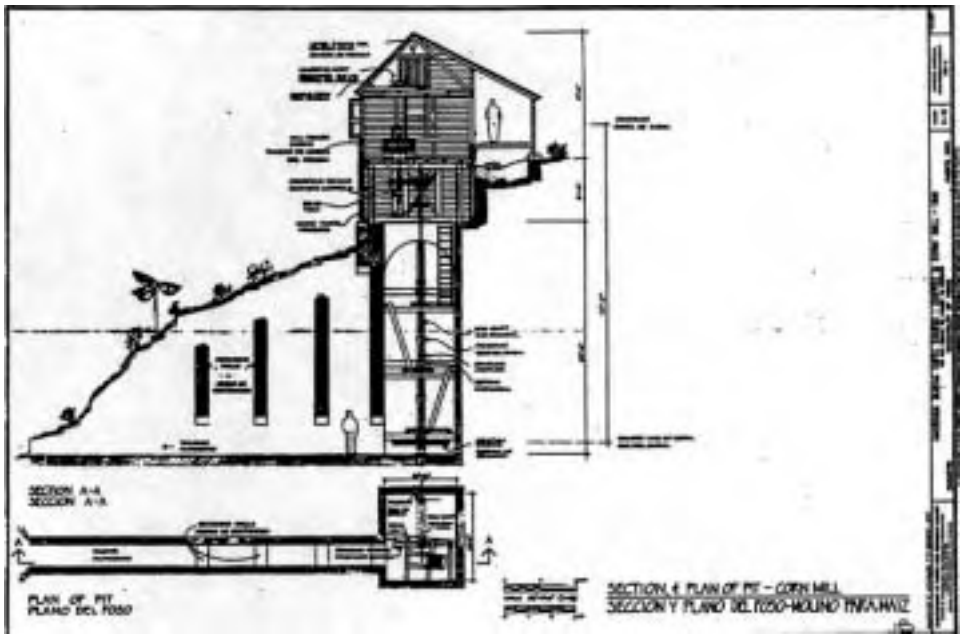
"The HAER program was founded in 1969 by the American Society of Civil Engineers, the Library of Congress, and the National Park Service after it became apparent to many in the preservation community that industrial and engineering resources demanded a different sort of interdisciplinary documentary approach from that applied to historic architecture." Like HABS records, the staff edits the records once submitted and transmits them for keeping to the Prints and Photographs Division of the Library of Congress.

Through documentary records (drawings, photographs and historical reports) HABS and HAER preserve over 30,000 sites. Microfilm and hard copies of some of these records are located in various libraries in the United States and other state-side academic entities such as the *Archivo de Arquitectura y Construcción de la Universidad de Puerto Rico* [AACUPR] (Architecture and Construction Archives of the University of Puerto Rico) and the State Historic Preservation Office of Puerto Rico.

It is important to clarify that these documentation processes are recommended because they have proved to be very effective, for more than 60 years. They are simple methods which produce excellent end products in the form of very reliable and accurate "As-Built" drawings. Yet this is possible, only if the processes are followed carefully.



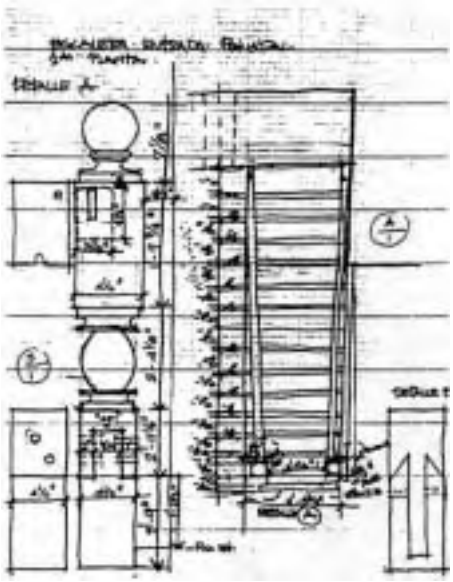
Site sections of the M. Godreau Residence (1919) in Ponce, PR. (CAPR-HABS Documentation Project, 1985)



Corn Mill drawings of Hacienda Buena Vista (1851) in Ponce, PR. (HAER, 1977)

PROCEDURE FOR GRAPHIC DOCUMENTATION:

The HABS and HAER Manuals, (bibliography reference is included in this Section of the Manual), both enumerate a system of simple steps to carry out documentation work. Within their context, documentation means: measured drawings, large-format, formal photographs and historical data, all prepared to their specific standards. These guidelines should be consulted and followed in order for the documentation project to be as accurate as possible.



Field notes of entrance staircase. Hacienda 3uena Vista (1851) in Ponce, PR. (HAER 1986)

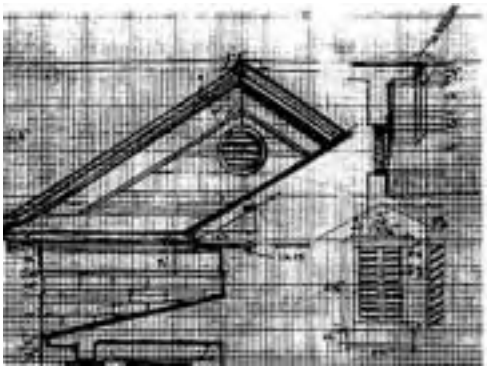
Nevertheless, in very general terms, a summary of the basic chores will be detailed as follows:

1. Acquaint yourself with the building, walk through it and observe with care such things as layout, details and specific features that will be documented.

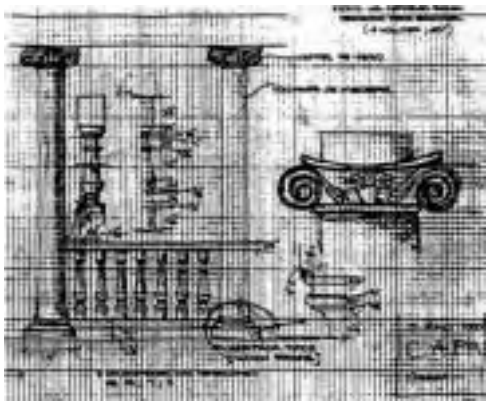
2. Proceed by making Field Notes:
   a) Field notes are annotated, pencil-drawn, free-hand sketches on graph paper that will thoroughly explain the building, structure or site in the exact condition found, and not in idealized form. (These sketches should be large enough for notes and dimensions).

b) Measurements should start at zero and progressively run to avoid cumulative errors of partial measurement. These are called "running dimensions". Triangulate[2] corners to provide plan squareness. Dimensions should be marked in red pencil or ink so that these stand out from the sketch lines.

c) Constantly use scaled field photography which are helpful in production and refinement of measured drawings. These will also assist considerably by providing information while away from the project site. (See initial part of this Section for detailed information on this topic).



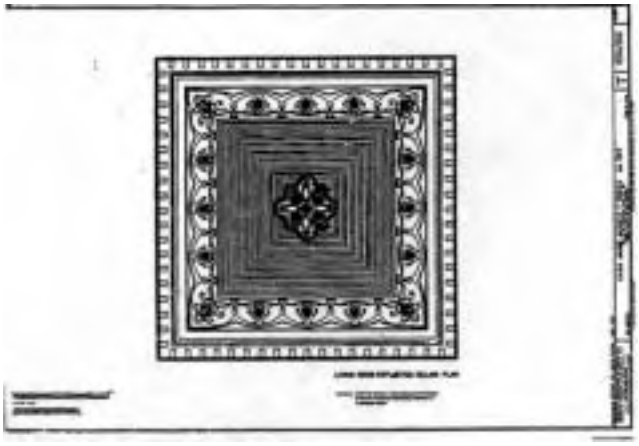
Field notes of Colegio de Arquitectos proposed headquarters in Santurce, PR. (HABS 1990)



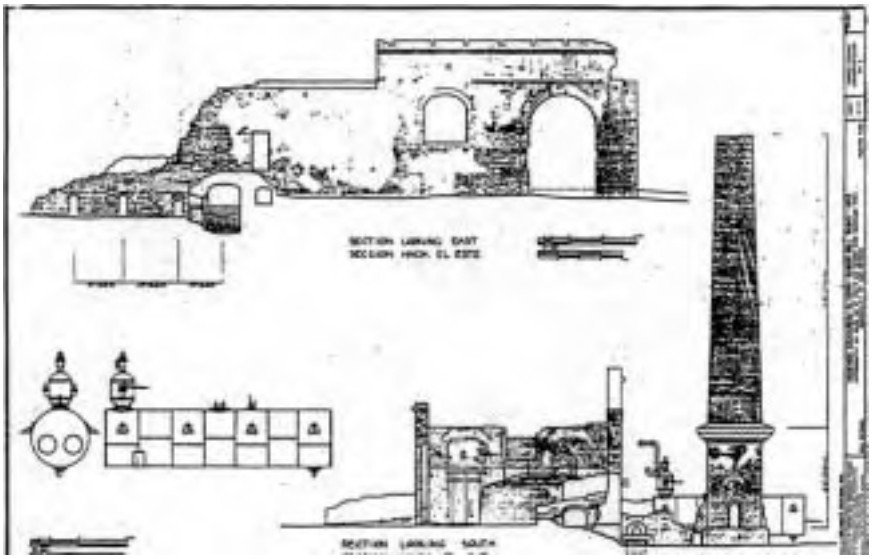
[2]Triangulation is taking diagonal dimensions within a space to corroborate squareness or from corner to corner of buildings within a building site to fixed objects like trees, or among buildings themselves in order to locate these. Refer to HABS or HAER Manuals for a more detailed explanation regarding this topic.

3. Production of a Preliminary Set of Drawings
   a) Preliminary drawings are the first hard-line draft of field information. The drawings are done to chosen scales depending on breadth of information needed. Recording errors or missing data will be detected initially at this point. Usually a second site visit to the field or project is needed to corroborate information or obtain that not obtained initially. Preliminary drawings are usually the first draft of the final drawings which are done manually in pencil on vellum paper.
   b) The amount and selection of the final drawings needed to explain the project thoroughly is determined at this time. Building or structure complexity will determine these issues.
   c) Individual final sheet layouts are also decided at this time.

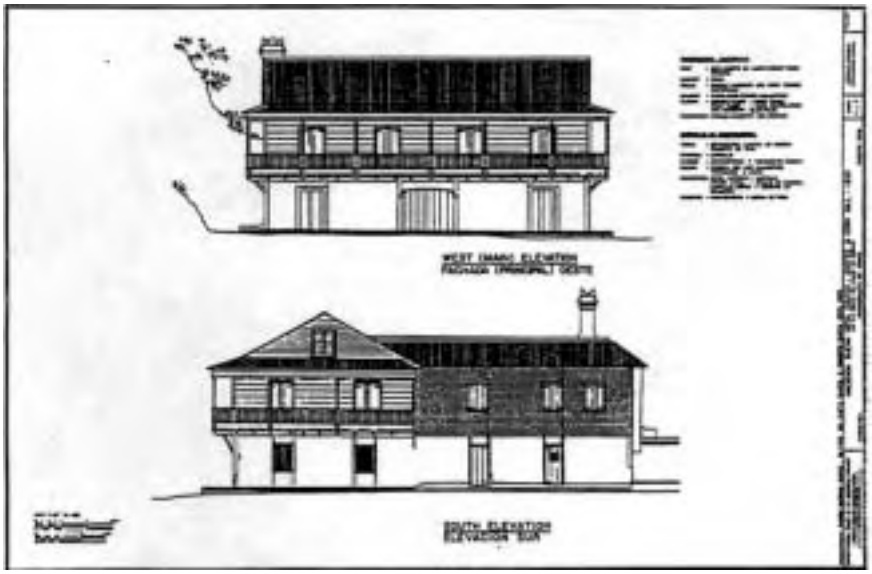
4 . As-Built or Final Drawings in ink are those which will become the permanent record of the documentation project. The final layout determined during the preliminary stage will be drawn or traced in ink on mylar sheets or drafting film. In the final scale drawings, minimal dimensions are given due to the fact that it is not a new building to be built, but rather one existing. The drawings should be accurate enough so that a future researcher might be able to obtain the information needed by taking direct measurements from the drawings themselves.



Reflected ceiling plan J. Acosta Forés Residence (1917) in San German, PR. (CAPR-HABS Documentation Project 1983)



Sugar mill ruins at Hacienda Coto (1852) in San German, PR. (HAER 1976)



Elevations of Main House at Hacienda Buena Vista (1833) in Ponce, PR, (HAER 1986)

Equipment Needed for Measuring and Surveying.

The following materials and equipment are commonly used at HABS and HAER documentation projects:

* transit and/or Electronic Distance Measuring Device (EDM) for site survey and horizontal datum lines
* chalk line, string level for marking horizontal datum lines
* drafting tape on which to mark datum points on structures and objects where use of chalk line is prohibited
* tape measures from 6 to 300 feet
* carpenter's square and level
* plumb bob to check columns and walls
* profile comb to describe full-size profiles of moldings and other difficult to measure ornamentation
* calipers for measuring diameters of objects circular in plan/section, such as balusters
* string
* stakes, nails, hammer and flashlight
* rods marked at 12" intervals for use in supplemental photography
* wall calipers to measure wall thicknesses

To ensure accuracy and consistency throughout the measuring process, steel rather than cloth tape measures should be used, preferably of the same name brand.

Equipment and materials for field notes and preliminary drawings:

* graph paper for field notes
* clip boards or other convenient boards for sketching in the field
* vellum or drafting film (mylar) for preliminary drawings; trace is not acceptable
* parallel rule, with brake if possible
* triangles, French curves, templates
* 2H or harder leads, lead pointer, colored pens
* vinyl eraser ("white soap eraser"), brush
* architect and engineer scales, preferably of one brand otherwise check for consistency
* flexible curve or ship's curve

Plastic lead is not recommended. Frequent pointing of leads while drawing enhances accuracy.

Equipment for ink drawings:

* drafting film, size as needed
* technical inking pens .13 mm-.8 mm (6x0-3)
* black ink for matt drafting film, non-etching
* reproducible (Diazo), “Pelikan PT” or similar
* mechanical lettering set with 240,200, 175, 140, 120,80 template sizes
* triangles and templates with inking edges or raising bumps
* chamois or tissue
* trace for masking completed areas
* vinyl eraser (use electric erasers with great care!)
* erasing shield
* cleaning fluids or alcohol for technical pens and drafting film

Final Drawing Format:

Two formats are commonly used for HABS/HAER documentation drawings, either 24” x 36” or 19” x 24”. These sizes are easy and manageable to work with and fits their storage and cataloguing facilities at Washington, D.C. The HABS/HAER Division at NPS provides the mylars with pre-printed title block information at user’s request and a small cost.

Cataloguing and Storage:

Once the documentation projects are completed, these are sent to the HABS/HAER offices in Washington, D.C. where they are checked by staff to insure compliance with the standards. Once included into the HABS/HAER database, a computerized inventory system, copies of the documentation are produced and submitted to the Library of Congress. Its personnel revises projects again to guarantee conformity with these standards. If any pieces are found to not meet the standards, these are sent back to HABS/HAER offices where they must be corrected. “The completed documentation is then accepted by the Library of Congress and physically transported to the James Madison Building, its permanent repository for the next several centuries.” (Kapsch, 1990) These documentation projects of our cultural resources become part of the Prints and Photographs Division of the Library of Congress where

they are one of the most popular sought collections. Requests are mainly for reproduction of part of these collections.

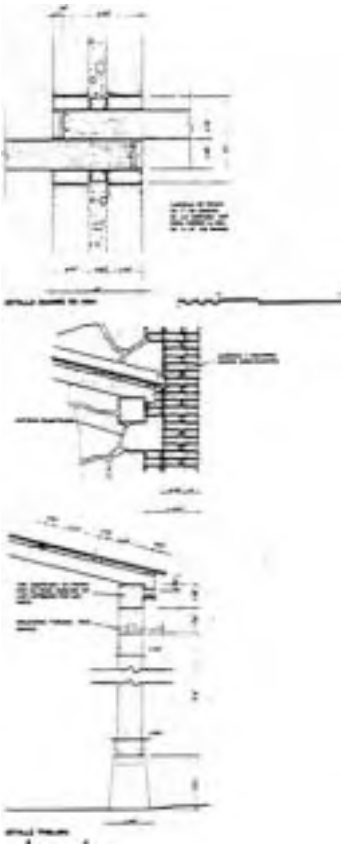
In Puerto Rico, partial collections of local buildings documented to these standards can be found at the National Park Service Offices located at Ft. San Cristóbal in Old San Juan, the Puerto Rico State Historic Preservation Office, also located in Old San Juan, as well as at the *Archivo de Arquitectura y Construcción de la Universidad de Puerto Rico* [AACUPR] (Architecture and Construction Archives of the University of Puerto Rico) in Río Piedras.

<u>HABS/HAER Division Offices:</u>

These are physically located in Suite 6101, 1100 L Street, N.W., Washington, D.C. and their telephone number is: (202) 343-9606. To obtain copies of the Manuals or additional information on these sources write to:

HABS/HAER Division
National Park Service
P.O. Box 37127
Washington, D.C. 20013-7127

Main House roof documentation at Hacienda Buena Vista in Ponce, PR (1986).



Documentation of traditional construction details (rubble masonry with specially cut stone components, bricks and wood). Documentation Project of Casa de Camiero, Aibonito, PR (1997)

SUMMARY

PERFORMANCE STANDARDS OF THE HISTORIC AMERICAN BUILDINGS SURVEY/HISTORIC AMERICAN ENGINEERING RECORD (HABS/HAER)

(SECRETARY OF THE INTERIOR'S STANDARDS FOR ARCHITECTURAL AND ENGINEERING DOCUMENTATION, *FEDERAL REGISTER*, SEPTEMBER 29, 1983, PP. 44730-44734)

STANDARDS	I. CONTENT				II. QUALITY				III. MATERIALS				IV. PRESENTATION			
REQUIREMENTS	"DOCUMENTATION SHALL ADEQUATELY EXPLICATE AND ILLUSTRATE WHAT IS SIGNIFICANT OR VALUABLE ABOUT THE HISTORIC BUILDING, SITE STRUCTURE OR OBJECT BEING DOCUMENTED."				"HABS AND HAER DOCUMENTATION SHALL BE PREPARED ACCURATELY, FROM RELIABLE SOURCES WITH LIMITATIONS CLEARLY STATED TO PERMIT INDEPENDENT VERIFICATION OF INFORMATION."				"HABS AND HAER DOCUMENTATION SHALL BE PREPARED ON MATERIALS THAT ARE READILY REPRODUCIBLE FOR EASE OF ACCESS; DURABLE FOR LONG STORAGE; AND IN STANDARD SIZES FOR EASE OF HANDLING."				"HABS AND HAER DOCUMENTATION SHALL BE CLEARLY AND CONCISELY PRODUCED."			
CRITERIA / LEVEL	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A. MEASURED DRAWING	FULL SET OF MEAS DWGS	SEE PHOTOS BELOW	SKETCH PLAN	INVEN-TORY CARD	MEASURED DRAWINGS ARE TO BE PRODUCED FROM RECORDED, ACCURATE MEASUREMENTS. THOSE PORTIONS DRAWN FROM EXISTING DRAWINGS OR OTHER SOURCES SHOULD BE SO IDENTIFIED AND SOURCES LISTED.				INK ON TRANS-LUCENT MATERIAL	8x10" PHOTO-COPY	INK ON BOND PAPER	INK ON INVENTORY CARD	ADEQUATE DIMENSIONS ON ALL SHEETS			
									INK ON ARCHIVALLY STABLE MATERIAL				MECH. LETTER-ING OR EQUIVA-LENT		SKETCH PLANS SHALL BE NEAT AND ORDERLY	
									18x24" OR 24x36"	8x10" PHOTO-COPY	8½x11"	INVEN-TORY CARD				
B. PHOTOGRAPHS	LARGE FORMAT PHOTOGRAPHS EXTERIOR & INTERIOR			35mm B&W	PHOTOGRAPHS SHALL CLEARLY DEPICT THE APPEARANCE OF THE PROPERTY AND AREAS OF SIGNIFICANCE. ALL VIEWS ARE TO BE PERSPECTIVE-CORRECTED AND FULLY CAPTIONED				PRINTS SHALL ACCOMPANY ALL NEGATIVES				DUPLI-CATE PHOTOS WITH A SCALE STICK	MIN. OF ONE PHOTO WITH A SCALE (PRINCIPAL FACADE)		
	LARGE FORMAT PHOTOCOPIES – SELECT EXISTING DWGS – SELECT HISTORIC VIEWS								MUST BE ARCHIVALLY PROCESSED, NO R/C PAPER							
									4x5" OR 5x7" OR 8x10"			35mm FILM				
C. WRITTEN DATA	HISTORY AND DESCRIPTION IN NARRATIVE OR OUTLINE FORMAT		ONE PAGE SUM-MARY	INVEN-TORY CARD	BASED ON PRIMARY SOURCES		SECONDARY SOURCES MAY PROVIDE ADEQUATE INFORMATION		CLEAN COPY FOR XEROXING				TYPEWRITTEN ON BOND			TYPED ON INVEN-TORY CARD
					INCLUDE: – METHODOLOGY – NAME OF RESEARCH & DATE OF RESEARCH – SOURCES – FRANK ASSESSMENT OF SOURCES AND THEIR LIMITATIONS				ARCHIVAL BOND REQUIRED							
									8½x11"							
D. OTHER	OTHER MEDIA CAN AND HAVE BEEN USED. CONTACT HABS/HAER OFFICE BEFORE EMPLOYING A MEDIA OTHER THAN THOSE SPECIFIED ABOVE.															
TESTS	INSPECTION BY HABS/HAER OFFICE STAFF. DOCUMENTATION NOT MEETING HABS/HAER STANDARDS WILL BE REFUSED															
COMMENTARIES	KIND AND AMOUNT OF DOCUMENTATION SHOULD BE APPROPRIATE TO THE NATURE, AND SIGNIFICANCE OF THE BUILDING, SITE, STRUCTURE OR OBJECT BEING DOCUMENTED.				THE PRINCIPLE OF INDEPENDENT VERIFICA-TION IS CRITICAL IN ASSURING HIGH QUALITY OF HABS/HAER MATERIALS.				BASIC DURABILITY PERFORMANCE STANDARD IS 500 YEARS.				HABS/HAER ARE MOST WIDELY USED OF SPECIAL COLLECTIONS AT THE LIBRARY OF CONGRESS.			

SECTION A CONSERVATION METHODOLOGY: The Anatomy of an Historic Building

A.3 Inspecting a Historic Building - the Building as a Document
Systematic Identification of problems and special features before new intervention

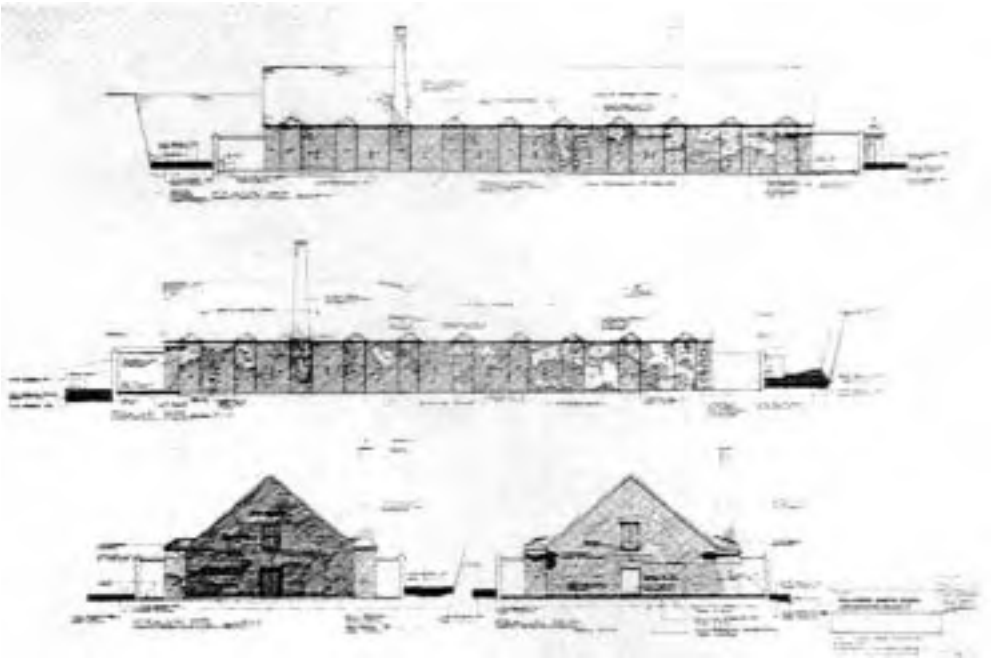
INTRODUCTION:

The detailed inspection of built historic resources is considered imperative in that it is the way in which a complete understanding of the physical realities and conditions of the historic fabric can be explained in a systematic manner. As a minimum, the information gathered during this process will provide initial data necessary for preventive maintenance guidelines if an intervention is not possible at the time. Also, through the knowledge obtained by this investigation, intervention processes can be determined with enough lead time so as to not jeopardize a building or structure's important features during any conservation work. Inspection work serves as an inventory of the actual condition of a building or structure at a given moment in time, wherein recommendations will be clearly laid out.

Colegio de Arquitectos Headquarters Inspection work (1993)

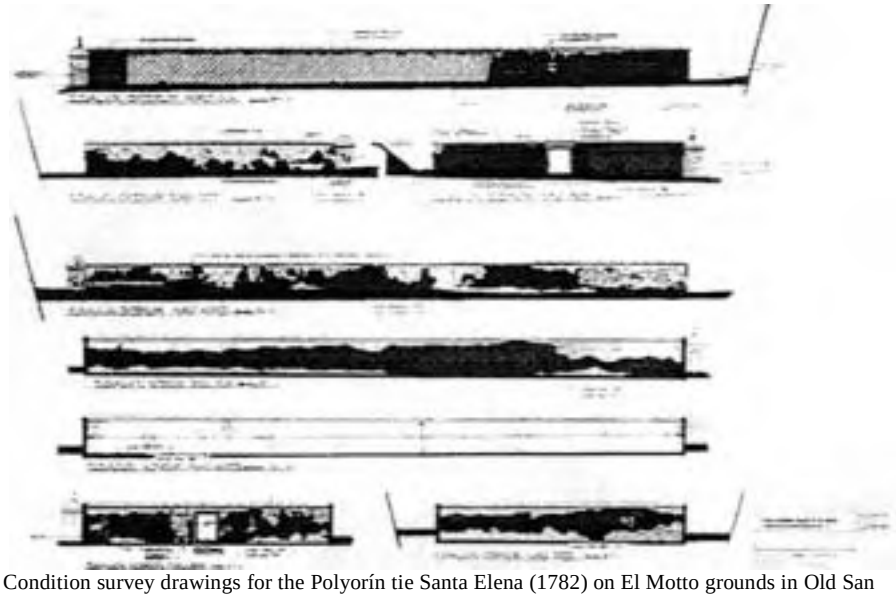
The inspection or condition survey of a built cultural resource consists of physically visiting and carefully checking all spaces, areas and surfaces that are part of it. For this, the conservation architect or professional carrying out the work, like a good

detective in search of clues, must fully understand what they see, touch, smell and listen to, in order to be able to put together an accurate evaluation of the historic element's status. In order for this to be possible, the "inspector" must have a basic understanding of the traditional construction materials and technology of the subject of a proposed intervention (Section B.1), since this is the only way that distinct features and anomalies can be accurately detected with precision. A building must be understood in its totality. This is done through field notes, sketches and scaled photography. If causes can be determined, effects can be diagnosed and predicted. This basic inspection/condition survey can be augmented by analysis of humidity, structural monitoring, and non-destructive diagnostic techniques.



Condition survey drawings for the Polvorín de Santa Elena (1782) on El Motto grounds in Old San Juan, PR. (Otto 0. Reyes Cassanova, AIA, Architects, i991)

The written, graphic and physical information gathered throughout the historical research and Documentation phases of a conservation project (Sections A,3 and B.2) serve as the basis for Inspection work in a historic building. Inspection methodology s systematic and meticulous, where no section or area of the structure is omitted. As result, an inventory is developed listing the physical realities of a given historical element without assuming its conditions before-hand.



Condition survey drawings for the Polyorín tie Santa Elena (1782) on El Motto grounds in Old San Juan. PR. (Otto 0. Reyes Cassanova. AIA. Architects. 1991)

Inspection of historic buildings and structures can be very arduous work which requires climbing, squatting, crawling and in general, messy work in buildings that have been sometimes closed-off or abandoned. In many cases, the present conditions might be dangerous due to collapsed sections of the roofs or floors and extreme deterioration of the construction materials, so utmost care is recommended during the field work. Testing of areas to be entered by tapping floors first is (1992). wise and can often times assure structural stability and therefore safety of entrance into a space. As a result, specialized equipment and materials are needed. These are listed in this section, Also, due to the arduous and detailed task at hand, the conservation architect or professional carrying out the inspection work should have the help of assistants during field work, so that the required information may be safely and thoroughly collected without undue risk to personal safety.

Inspection fieldwork in progress at Casa Ramón Power y Giralt in Old San Juan, PR (1992)

PRINCIPAL CAUSES FOR THE DETERIORATION OF BUILT CULTURAL RESOURCES:

There are many causes for the deterioration of buildings and structures. We must pay careful attention to the factors, which are many. There are basically three categories of deterioration:

1) EXTERNAL CAUSES, which are those related directly to climate (changing temperatures, rain, excessive heat, humidity; biological and botanical (animals, insects, and biological growth such as plants, trees and fungus); and natural disasters in our region (hurricanes, flooding and earthquakes).

2) INTERNAL CAUSES such as humidity (artificial changes in temperature between the interior and exterior caused by air-conditioning, high water table); contaminated or stagnant nit (due to building abandonment and boarding up).

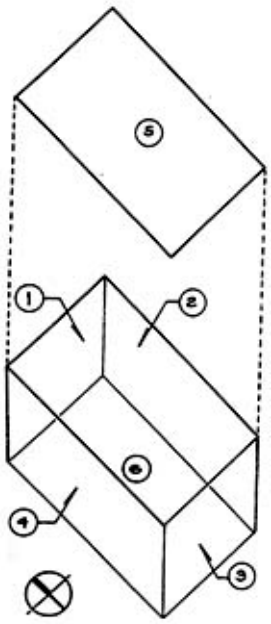
3) HUMAN CAUSES such as neglect, changes to the building fabric without proper technical knowledge, vandalism, fire, and environmental pollution.

BUILDING INSPECTION OR CONDITION SURVEY METHODOLOGY:

In order to expedite and organize the inspection or condition survey process, a simple series of steps was first proposed by English Architect Bernard M. Feilden who devised a methodology that would assure the systematic and thorough inspection and examination of the spaces, areas and surfaces of a historic building or structure. In his book Conservation of Historic Buildings, he states:

> "Procedure on a visual survey will vary according to the problem, but in essence the building must be divided into parts and dealt with methodically. Always work to a standard routine, e.g. vertically, from top to bottom,

horizontally clockwise ... It is usual to start the inspection of a building at the north-west corner, because it is conventional for plans to have the north at the top and because it is customary to read from left to right. ...The interior of a multi-cell building should be inspected room by room in a similar sequence starting at the ceiling and working clockwise and downwards, inspecting walls, floors and then doors, linings, skirtings and windows in each room." (Feilden, 1994)



It is an easy-to-use method which has proved very useful by assisting the "inspector" in the organization of a condition survey sequence which will undoubtedly yield a complete building inspection report.

EQUIPMENT:

Different types of materials and equipment are basic to inspection work, even though specific and specialized elements might be needed to complete a project. Nevertheless, past experience on local conservation projects has dictated the following essentials which must be taken to the field:

* Reduced set of As-Built drawings of the building or structure to be inspected, should these be available;

* Gridded note pads (of various sizes) with corresponding clipboards; pencils and different colored felt tip pens, to be able to sketch and code different specific site conditions;

* Flashlights, penknives and scalpels; magnifying glasses, screwdrivers, hammers and pocket mirrors for close-up observation like probing, lifting and tapping;

* Measuring tapes of varying maximum lengths (see Section B.2);

* Protective eye wear and clothing (goggles, overalls and field gloves);

* "Ziploc" or plastic sealable bags and containers for sample collection arid

* Ladders of different heights or an extension type, which may be needed for access to high spaces, ceilings and the roof.

ARCHAEOLOGY: (ground and wall surface)

The use of an Archaeologist using archaeological field methods in historic buildings is often necessary to establish unrecorded changes that have taken place to the building over time. Changes in floor coverings or levels and other critical information required before new interventions are proposed is often only attainable through archaeological investigation. The removal or alteration of walls, door openings, windows and other elements which are often covered by plastering or in-fills are other types of changes to the structure which can be easily determined by archaeology. These types of data are in addition to the more common conception of archaeological methods being utilized to uncover underground cisterns, drainage and sewage systems. Archaeological applications of this type are available to assist the documentation and inspection processes greatly and allow the understanding of a historic building with all its particular individual traits acquired over time through human usage.

Archaeological excavation of footing at Ballajá Military Barracks (1990).

Archaeological excavations of Precolumbian and Spanish colonial remains in Puerta de Tierra, PR (1976).

An archaeologist can also provide valuable information on the foundations of a structure, differential settling caused by buried historic strata, and even questionable dates of construction through the analysis of artifacts under or around a structure. Archaeological investigations of historic structures should be done in a systematic form by trained technicians, and be designed to answer a clear set of questions about the building or structure which are unexplainable through other analytical means.

FORMATS - FIELD FORMS:

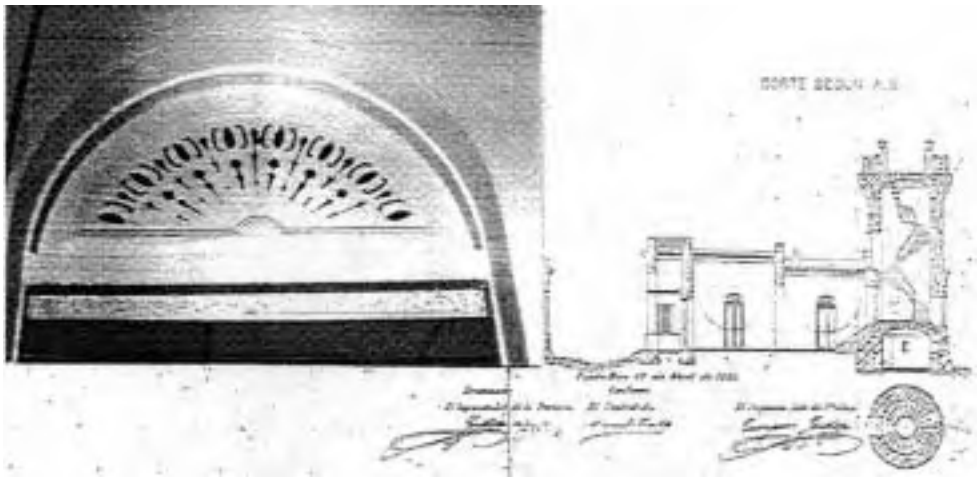
Even though every building or structure is different, we have designed a flexible field form where basic site information may be summarized. The included sample format, organizes and directs the inspection work via descriptions which utilize cardinal points in each space or surface as starting points. The distinct features or problems related to one specific cultural resource are therein enumerated or listed with accompanying sketches and scaled field photography that explain the annotations graphically.

Two different formats, one titled: *HOJA DE INSPECCION POR ESPACIO* (Inspection sheet per space), composed of three sheets, and the other: *HOJA DE INSPECCION DE FACHADAS* (Inspection sheet for facades) are included so that the information categories can be appreciated. Distinct issues such as water infiltration, major and minor cracks, perforations, falling plaster, existence of moldings, ceramics, traces of removed original elements, rusted metal features, and biological growth can be detailed in the individual spaces of the inspection form. Existing conditions of ceilings and pavements or flooring are also detailed per space. The last sheet of interior inspection details, serves to identify existing original historic elements. This final sheet of the enclosed set, also provides space for the inclusion of information on photographic documentation of a particular space or detail within it. This helps the photography cataloguing process of large or complex buildings, by making these cross references easily identifiable with its corresponding space.

PROCESSING OF FIELD INFORMATION INTO TECHNICAL REPORT:

The field forms and graphic data are then taken and analyzed together with the historical research and documentation drawings. The most important and up-dated field information is graphically transferred onto building drawings (such as cracks and moisture patterns on a given wall surface). The text together with the graphics will become part of a technical working report (not final specs) which will summarize distinct features, patterns or problems observed, and the conclusions and recommendations based on this field inspection work. Knowledge of the causes and

effects of decay of the resource in the region where the building is located, are necessary tools, to be able to provide prudent and successful solutions to conservation problems.



Part of inspection report of lighthouse at Las Cabezas tic San Tuan in Fajardo, PR which compares historic drawings to actual constructed details (1988).

CATALOGUING AND STORAGE:

As world-wide electronic access to technical conservation information has become more readily available, inspection and condition survey information together with diagnosis of problems related to historic buildings and structures should also become easily accessible to interested professionals. Storage of the data collected should be put in computer-forms and attainable either electronically or in printed form so that it may serve a larger interested public.

HOJA DE INSPECCION POR ESPACIO

No. de espacio_____

Condición de las Superficies (paredes interiores)

	norte	este	sur	oeste
Buenas condiciones				
Manchas de humedad/hongo				
Infiltración de agua				
Crecimiento biológico				
Caida del empañetado: daño mecánico				
Caida del empanetado: a causa de demolición selectiva				
Grietas mayores				
Grietas menores				
Paredes/tabiques existentes dentro del espacio				
Perforaciones				
Tubos adosados a pared				
Muros originales cortados /removidos				
Cerámica				
Molduras				
Elementos decorativos particulares	.			
Huellas de elementos originales removidos				
Elementos de metal oxidados: cast-iron /sheet metal				

Otros Problemas:

CONDICION DE LOS TECHOS

	buena	mala
Vigas, alfagías y ladrillos		
Madera (plafón machihembrado)		
Hormigón		
Plafón acústico o su huella		
Metal lath & plaster		
Built-up roofing		

Infiltracions:

Cambios estructurales:

Techo no existe:

Notas:

CONDICION DE LOS PISOS O PAVIMENTOS

	buena	mala
Argamasa		
Ladrillo		
Losas de Canaria		
Losas de mármol 11” x 11”		
Cerámica		
Losas de cemento 8” x 8”		
Torta hormigón		
Madera		
Otro		

Piso no existe:

Notas:

ELEMENTOS ORIGINALES/ANTIGUOS EXISTENTES

	Conservar	Eliminar	Huellas
Herrajes:			
goznes regulares (franceses)			
goznes capuchinos			
cerraduras			
aldabas			
Balaustres madera tallados a mano			
Balaustres hierro calado			
Cornisas			
Puertas			
Ventanas			
Montantes de madera calados			

Otros [indicar número ac herrajes o elementos a ser re-utilizados]:

Comentarios y Observaciones Generales del Espacio

DOCUMENTACION FOTOGRAFICA

	Si	No
Espacio en general		
Detalles		

FACHADA_____

	Planta Baja
Buenas Condiciones	
Manchas de	
Infiltración de agua	
Caida del empañetado	
Grietas mayores	
Grietas menores	
Barandas existentes	
Ventanas originales	
Puertas originales	
Decoración/ornamento	
Cornisas deterioradas	-
Cornisas buenas	
Perforaciones	
Tubos adosados a la	

Notas:

SECTION A: CONSERVATION METHODOLOGY: The Anatomy of an Historic Building

A.4 Material Analysis for Historic Buildings

Sampling and Evaluation

INTRODUCTION:

In order to rectify the erroneous assumption that all traditional construction materials and corresponding mixtures that hold them together are the same, it is important that we carefully examine selected samples from every structure we are to work with in a Scientific Laboratory. It is necessary to understand the characteristics of these traditional materials as explained in Section BA of this Manual (physical, chemical, mechanical and visual) so as to choose compatible materials for repair and conservation. Compatibility[1] is critical to ensure both an appropriate appearance and technical success (ie. materials which are similar will co-exist in harmony).

Material inventory and analysis at the Ballajá Barracks Scientific Laboratory, Old San Juan, PR (1986).

It is important to understand that, even within the same building, primary materials did not always originate from the same sources (for example, there may be two or three sand types in the mortars or plasters of one building depending on construction

[1] Capable of existing together without discord or disharmony; capable of blending into a homogeneous mixture that neither separates nor is altered by chemical interaction of ingredients.

material availability and transportation convenience at the time of construction). Therefore, "a greater familiarity with laboratory tests and techniques will better enable the (architect and the) architectural conservator to obtain the information needed for the critical evaluation of historic structures" (Teutonico, 1988) and to specify suitable repair materials.

It is to be emphasized to the reader, that this Manual is not a recipe book on compatible construction materials and methods. This book is a Manual which details a process to be followed and should serve as a guide which identifies necessary consultants in conservation work that a building or construction professional might need for a specific project or particular project phase.

SAMPLING:

Sampling is the collection of a set of representative specimens of the historic building in which we propose to intervene. However, before any samples are collected, a series of steps have to be taken in order to guarantee that the specimens to be selected will give us the information we are seeking:

1) Complete documentary research should be carried out before sampling begins (Section A.3).

2) The objectives and method of the sampling should be clearly defined from the outset (why and how?)

3) The building must have been carefully and exhaustively documented before the sampling procedure begins (Sections B.2 and B.3).

4) The number and size of the samples required should be determined depending on the type(s) of analysis to be carried out. Samples should be kept to the minimum that is needed to provide the desired information. Samples must be representative, but should be taken, where possible,

Ballajá Barracks material sampling from a high area of the building to assure least altered surfaces (1986). Done with the help of a “cherry picker” from the Electric Energy Authority

from areas where they cause the least damage to the structure. In general, undisturbed areas (such as just under the cornice) where materials have suffered as little alteration as possible usually yield the most information.

In the case of surface materials, a sample generally consists of a series of strata[2] representing various finish layers[3], subsequent interventions, and surface deposits[4].

Color stratigraphies or chromochronologies as seen through a microscope. P3 gives the background color for a plaster surface while P12 gives the color op a wood window frame. Lighthouse at Las Cabezs dc San Juan at Fajareo, PR (1988).

[2] Layers

[3] Treatment of surfaces in a building; the texture, color and smoothness of a surface, and other properties affecting appearance.

[4] Elements such as pollutants that adhere, through time, to the building surface

A truly representative sample should include all the existing layers in addition to the substrate[5]. The thickness of the sample will thus differ in each case, depending on the type of material and the building history.

If possible, it is better to have more than one sample of each type of material to be analyzed. Nevertheless, one should be careful to obtain the required samples with as little disruption as possible to the historic fabric.

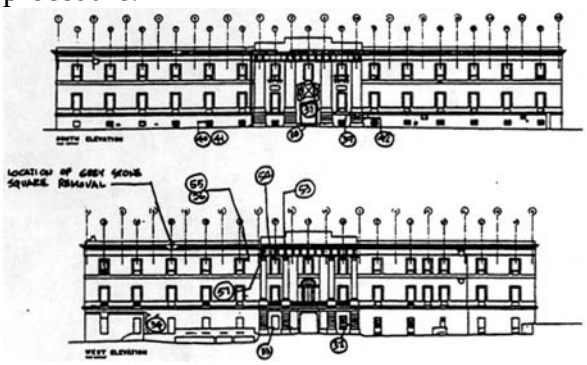
Samples should be taken with the appropriate tools, chosen according to the consistency of the surface materials.

Samples should be collected in small containers of appropriately inert materials which can be labeled and sealed tightly.

Only one sample should be placed in each container.

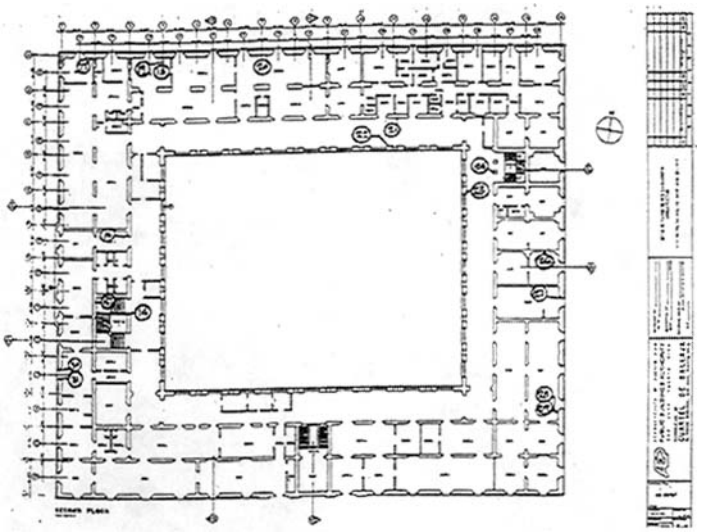
The sample label should include: date, name of sampler, name of building, location of sample and sample number.

Each sample should correspond to a photograph and graphic location on a drawing; this is done for location as well as to be able to retrace chronology of sampling procedure.



The specimens should be kept in their containers until ready to analyzed.

[5] Underlying or building construction material in itself, (without the finishes) such as rubble-masonry wall, wooden planking, beams, columns or door and window frames, etc.



Sample extraction locations. Ballajá Baracks, Old San Juan, PR (1987).

Some of the basic information in this section of the Manual is taken directly and quoted from: A Laboratory Manual for Architectural Conservators, written by Jeanne Marie Teutonico for ICCROM (International Centre for the Study of the Preservation and the Restoration of Cultural Property) and published in Rome, Italy in 1988. To our knowledge, this is one of the most important architectural conservation laboratory references published to date. It was "aimed at helping the reader to understand the character and behavior of building materials, their identification, and the diagnosis of their state of conservation."

We can determine process by asking a few simple straight-forward questions:

Magnified view of sand sample showing coral, shell, stone and wood from mortar analysis done in Ballajá Barracks Scientific Laboratory (1986)

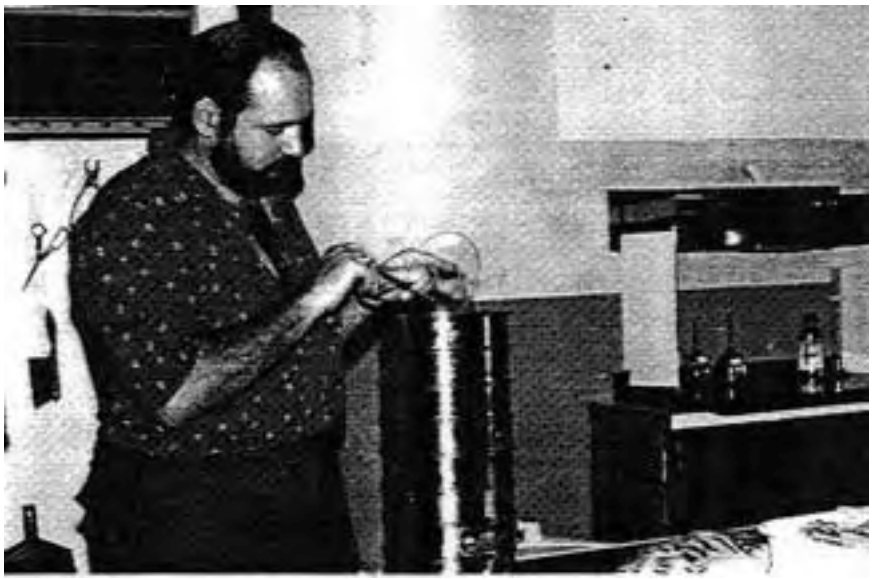
Why sample or analyze historic construction materials? - The fields of restoration, rehabilitation and conservation of historic buildings and structures in our region has increased dramatically in the last ten years. Along with this perceptible increase in the field of historic preservation, there has been a commensurate increase in the need for analysis of historic occur, it is imperative that representative samples of the historic construction

materials of the building to be conserved be collected and sent to an architectural conservation laboratory. This will permit the study and analysis of the specific properties of the construction materials, and as a result, provide indications as to the repair materials which will be physically, chemically, and aesthetically compatible with the original building components.

Who does analysis? - A trained Architectural Conservator or an Architect with training and academic experience in the field of Architectural Conservation do the analysis. A Conservation Scientist working with a Conservator can also carry out this specialized work.. Sampling should be done by these professionals working together. An Architectural Conservator is a trained professional who utilizes scientific processes to analyze and implement measures to increase the useful longevity of an historic architectural element and/or entire structure. "Conservators are concerned with a number of factors in preserving an object, including determining structural stability, counteracting chemical and physical deterioration, and performing conservation treatment based on an evaluation of the aesthetic, historic, and scientific characteristics of the object." (AIC Guidelines) It is no longer acceptable to treat historic buildings using "good intentions" or through "intuition". Too much of our built cultural patrimony is and has been lost by these means to be able to justify anything but the correct scientific approach to the material analysis of historic buildings.

What do you do? - The experimental process begins in the field when the samples are taken. Experimental design or the sampling procedure is critical. The location and number of samples to be selected are also of utmost importance. In order to select the appropriate amount and type of samples, the Architectural Conservator or the Conservation Architect should be clear about the information being sought. Techniques and results must be reproducible. You will need enough information or data to be able to make relevant comparisons both within the building itself as a whole, and with other buildings of the same area and approximate time period.

Where do you do analysis? - As of 1996, there were no established Architectural Conservation Laboratories (ACL) in Puerto Rico or the Caribbean area in general, even though there is a growing interest in the application of scientifically sound conservation practices. There was an ACL set up specifically for the restoration project of Cuartel Ballajá, a 19th century military barracks building in Old San Juan, Puerto Rico. During 1987 and 1988 it was used exclusively to analyze the materials that originated specifically from that building. Once analysis was completed, it was dismantled and no



Sands are sifted for particle size analysis through grading of fines. Ballajá Barracks Scientific Laboratory (1986).

Color stratrigraphy samples arc mounted in resin, then polished for microscopic identification. Ballajá Barracks Scientific Laboratory (1986)

other laboratory to analyze historic building materials has been set up since in Puerto Rico or the areas that concern this study.

Academic Laboratories in several Universities have provided services for the analysis of samples in the past, specifically, those from the Main House at Hacienda Buena Vista (1850's) in Ponce, the Lighthouse (1880's) at Fajardo and the Polvorín de Santa Elena and the Powder Magazine building in Muñoz Rivera Park (both late 19th century buildings). Analyses of the sample materials were done at the Architectural Conservation Laboratories of Columbia University and the University of Pennsylvania. The work in all cases was carried out by trained Architectural Conservators under the direction of Prof. Frank G. Matero. (See References at the end of this Section)

When do you do it? - The work should be carried out during the initial phases of a project along with other activities such as the historic research and documentation work, so that there is ample time for lab analysis and compatible materials to be specified before the project working drawings and special technical specifications are completed.

Under what conditions should the samples be taken? - Not all projects can guarantee enough lead time to allow for optimal sampling conditions. However, it is recommended that, whenever possible, the best weather conditions be chosen, where control of the sampling can be as perfect as possible (no wind or rain).

EQUIPMENT AND MATERIALS:

For documentation of existing materials and their conditions prior to intervention, a camera, film and graphic scale bars will be necessary. The areas to be sampled should be photographed before, during, and after sampling. Please refer to Section B.2 of this Manual, where photographic documentation at all levels is detailed.

For collection of samples plastic sealable bags ('Ziploc' bags or similar) or other inert sample containers, a set of variable width chisels, a scalpel or similar instrument, a light hammer, a permanent marker to label the sample containers, a gridded 8 1/2" X 11" notebook, a corresponding size clipboard, black and red pencils and a set of reduced sketches or drawings of the building will be needed. In these drawings, the location of sample extraction can be marked in plan and elevation. A field bag to keep and carry this equipment is also recommended.

For specific sample collection, ladders of different heights or in some cases, even a cherry picker may be needed (for very high buildings). The best samples are usually found in inaccessible places such as tight, out-of-the-way corners or underneath very high cornices. This is due to the fact that the more inaccessible the spot is, the more difficult or unlikely that this spot has had either too many interventions or too much alteration to its original, historic condition.

SECTION A: CONSERVATION METHODOLOGY: The Anatomy of an Historic Building

A.5 Case Studies

Laboratory Analyses applied to Conservation Projects in Puerto Rico

INTRODUCTION TO
CONSERVATION PROJECT CASE STUDIES IN PUERTO RICO:

To demonstrate how sampling, laboratory and analytical procedures are basic, essential, and useful tools for conservation work, we will examine a few of the pioneering conservation projects in Puerto Rico. Specific studies carried out on the distinct building materials of a particular structure will be detailed by first, outlining information needed, and secondly, by describing the scientific test carried Out to obtain this exact information. This does not mean that these were the only analyses done for each particular project, but rather these are chosen to illustrate to the reader of this Manual what issues can be examined, depending on the results needed.

Hacienda Buena Vista - Main House Restoration Project: (1987)

Location: Ponce, Puerto Rico
Owners: The Conservation Trust of Puerto Rico
Architects: Beatriz del Cueto, AIA - Architects and Historic Preservation Consultants
Conservators: Frank G. Matero and Glenn Boornazian - Center for Preservation Research, Columbia University
Archaeologist: Agamemnon Gus Pantel, Ph.D.

Project Description: Hacienda Buena Vista was a working coffee and minor fruit *hacienda* with a mill, which was constructed and run by the Vives family during the 19th century on the outskirts of Ponce. The building complex was acquired by the Conservation Trust of Puerto Rico in order to reconstruct, restore and conserve the historic buildings, machinery and grounds. This was done so as to convert these into part of a living technological and cultural museum of Puerto Rico's agricultural golden era.

Hacienda Buena Vista Main House before restoration. Ponce, PR (1986).

Answers Sought: Due to the extreme degree of decay to the building surfaces principally as a consequence of their age, most of the plasters, shingles and wooden siding of these historic rubble-masonry and wooden structures had to be replaced. Original color schemes had been covered over the years. It was deemed important to try to identify these in order for the present intervention to be as faithful as possible in the recreation of the complete ambiance of an epoch. Of extreme importance then, were the establishment and reproduction of the original colors and finishes. It is important to understand that it is essential to utilize not only correct colors but correct surface finishes in conservation work (eg. Acrylic emulsion paint is not the same as limewash). The finish used for the conservation work need not be exactly the same as the original but should be similar in nature, properties and behavior.

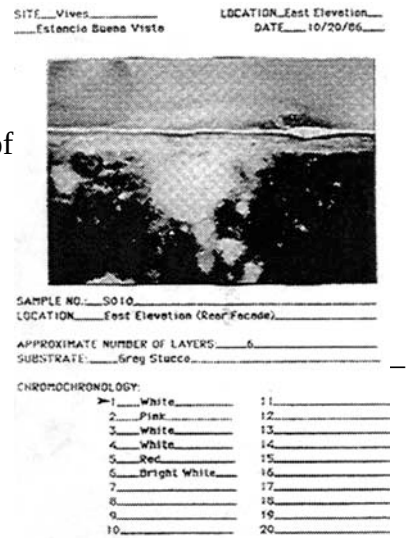
One Example of an Analysis Carried out to obtain an answer:

FINISHES (paints and coatings):

Sampling of Architectural Surface Materials - As explained in Section B,4 of this Manual, the selection of samples (where to take them from and what information is pursued) was fundamental to the success of lab work. In the case of finishes, color chronology or stratigraphy was established, including identifying the original historic schemes.

Imbedding a Sample for Cross Section - In order to be subjected to microscopic analysis, each selected sample of plaster or wood with paint on it was:

1) imbedded in a cold-setting resin; then
2) cut in cross-section;
3) polished; and
4) inserted in a container for analysis utilizing light microscopy


SITE Vives Estancia Buena Vista
LOCATION East Elevation
DATE 10/20/86
SAMPLE NO.: S010
LOCATION East Elevation (Rear Facade)
APPROXIMATE NUMBER OF LAYERS: 6
SUBSTRATE: Grey Stucco
CHROMOCHRONOLOGY:
1 White
2 Pink
3 White
4 White
5 Red
6 Bright White
7
8
9
10
11
12
13
14
15
16
17
18
19
20

Chromochronology of lime stucco, rear facade of Hacienda Buena Vista Main House. Ponce, PR (1986).

Through visual examination of the samples selected under the microscope the different type of paint layers applied to the building surfaces were identified, as well as the order in which they were applied to the buildings This analysis made the reproduction of these colors and finishes possible and the chromatic restoration of the surfaces a reality. The end result of this process was the faithful reproduction of the original color schemes and textures of the main house. Interesting conclusions to the analysis demonstrated that the original rear facade was pink while the rest of the house was white-washed. Even though this was unusual by our present-day standards, it allowed us to better understand the practices of the period and present these realities to the visiting public in a visual form.

Hacienda Buena Vista Main House after restoration. Pence, PR (1990)

Fajardo Lighthouse Restoration and Rehabilitation Project: (1988-1991)

Location: Las Cabezas de San Juan Nature Reserve, Fajardo, Puerto Rico
Owners: The Conservation Trust of Puerto Rico
Architects: Beatriz del Cueto, AIA - Architects and Historic Preservation Consultants
Conservators: Frank G. Matero and Joel C. Snodgrass Center for Preservation Research, Columbia University
Archaeologist: Agamemnon Gus Pantel, Ph.D.

Project Description: A 19th century lighthouse built by the Spanish Government was researched, documented and investigated in order for it to accommodate Nature Exhibits and a Research Center for the Conservation Trust of Puerto Rico. Located on a promontory on the northeast tip of the island of Puerto Rico, the climatic deterioration of the structure in general was substantial. Constant interventions on its historic fabric had also eliminated original materials and finishes.

1890's view or lighthouse at Las Cabezas de San Juan in ba1ardo, PR. (Album de Puerto Rico)

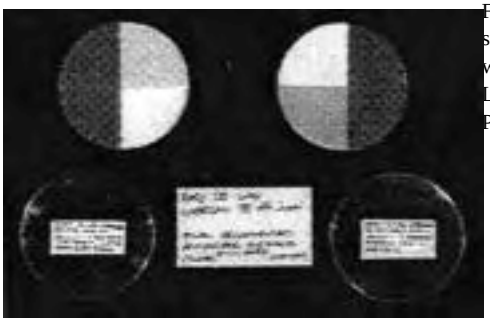
Answers Sought: In general, the plasters of the building were in an advanced state of deterioration, whether they were the original lime plasters or those of Portland Cement added as building repairs through time. The incompatibility of traditional to modern was causing considerable deterioration to the

remaining historic finishes of the building. These surfaces were carefully examined to find sources of the traditional lime plasters so these could be analyzed in a scientific laboratory and repair mixtures could be prepared that were compatible1 with those original. The project sought to reproduce the surface colors and textures the lighthouse would have had at the time of its original construction.

<u>One Example of an Analysis Carried out to obtain an answer:</u>

MORTAR AND PLASTER:
Step 1:

Mortar Analysis: Simple Wet Chemical or Gravimetric Analysis
- This type of analysis was utilized for determining the proportions of the three principal components of the historic mortar: the binder (which is basically calcium carbonate soluble in acid); the fines (which



Final recommended compatible surface finishes (plaster and lime washes). Lighthouse at Las Cabezas de San Juan in Fajardo. PR (1988).

are finely-textured impurities such as clays); and the sand or aggregate. The analysis gave approximate information and was carried out together with other analyses in order to derive the maximum possible information from the mortar sample, both for the purposes of historical research and to prepare a restoration mortar compatible with the original. However, several important factors that affect the condition and performance of a mortar are not revealed in mortar analysis. These include the original water/binder ratio, the mixing and placing method, the rate of drying, and the cleanliness and condition of the aggregates. In some ways, the most useful aspect of

[1]Capable of existing together without discord or disharmony; capable of blending into a homogeneous mixture that neither separates nor is altered by chemical interaction of ingredients.

gravimetric mortar analysis was the identification of aggregates for matching. If we had wanted a more detailed information on the components of historic mortar, various types of instrumental analysis would have been necessary.

Step 2:

Particle Size Analysis - A soil consists of an assemblage of discrete particles of various shapes and sizes. The types and relative proportions of these particles give the soil a particular character and behavior. The aim of particle size analysis (or particle size distribution tests) was to group these particles into separate ranges of sizes and so determine the relative proportions, of each size range, by their dry weight.

Particle size distribution tests can be divided into two basic groups: sieving procedures for 'coarse' particles (gravel and sand) and sedimentation procedures for 'fine' particles (silt and clay). Particle size is usually given in terms of equivalent particle diameter and definitions vary according to the standard consulted. This analysis was utilized to characterize the particle size distribution of the aggregate in the mortar.

Detail of side facade showing final result of compatible finishes for plasters and lime washes. Lighthouse at Las Cabe2as tie San Han in Fajardo. PR (1991).

<u>Restoration Project - Cuartel de Ballajá (Ballajá Military Barracks</u>): (1989)

Location: El Motto, Old San Juan, Puerto Rico
Owners: Public Buildings Authority, Commonwealth of Puerto Rico
Architects: Otto Octavio Reyes Casanova, AIA - Arquitectos
Conservators: Jeanne Marie Teutonico, ICCROM
Historic Preservation Consultants:
Agamemon Gus Pantel, Ph.D. and Beatriz del Cueto, AIA

Project Description: Cuartel de Ballajá, the largest single building within the wailed sector of Old San Juan, was constructed as a Military Barracks by the Spanish Government during the mid 19th century. The massive building which encompasses the largest interior patio in Old San Juan, also served as a military hospital and as government offices prior to its complete vacancy in the mid 1970's. Having been transferred to the Government of P.R., it was deemed that the building be preserved and restored so it could be converted into public exhibit areas.

Aerial view of El Morro grounds In Old San Juan. PR. with Ballajá Military Barracks in the center of the photo (U.S. Corps of Engineers. 1924).

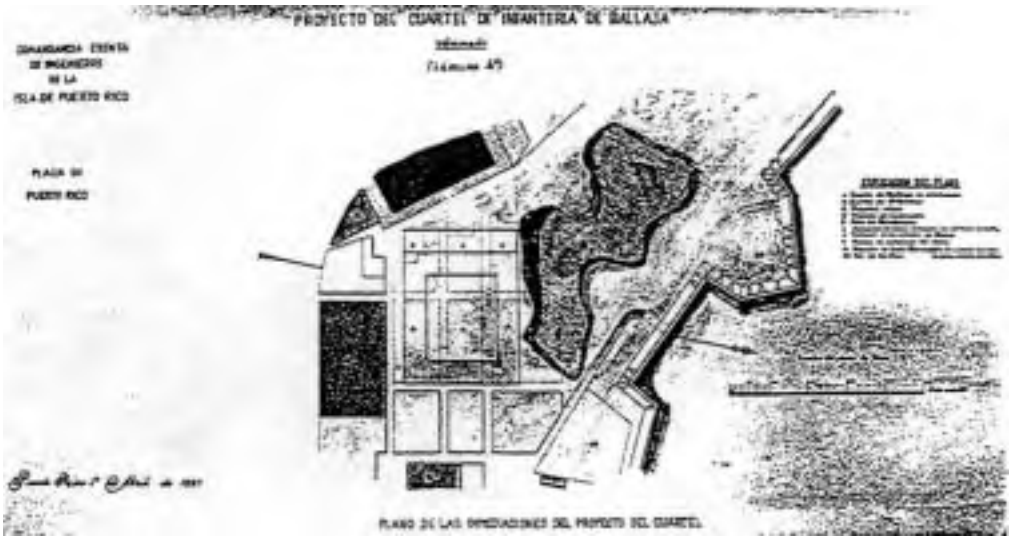
<u>Answers Sought:</u> Although the building's structural walls were of rubble-masonry construction, wooden elements were part of every building space and area, whether structural or ornamental. There were wooden roof beams

and slats, turned balusters for the balcony areas, interior screens and partitions, and also included all doors and windows of the building, some of which had ornamental perforated transoms. Therefore, as important elements within this conservation project, wood species had to be identified in order to seek replacement components of the same wood type, or to be able to find a different but compatible species that could withstand specific climatic problems such as constant rain exposure.

<u>One Example of an Analysis Carried out to obtain an answer:</u>

WOOD:

Cross Sections and Identification of Wood - It was necessary to identify a species of wood before deciding upon a treatment or substitution. There are basic procedures for the preparation and interpretation of wood samples which do not require elaborate equipment. However, in this complicated case, accurate identification required the assistance of an expert and a specialized institution. A basic understanding of the analytic process, however, enabled the architect to specifically request the information relevant to the restoration that was required.



FUNDAMENTAL ANALYSIS ACCORDING TO MATERIAL TYPE:

The afore-mentioned examples of analyses and tests are some of the more common, according to building material type and the information being sought. These analyses have been included so as to indicate several of the types of tests which can be carried out in a basic architectural conservation laboratory. They yield some of the basic information often needed in a preservation/conservation project. Nevertheless, it is important to clarify that other analyses are available and required in specific cases and should be used on a case-to-case basis. What is important to understand is that analysis, not intuition or "feeling" is the correct process by which scientific and historically correct answers and solutions to conservation issues can be achieved. There is no better, nor more reliable method than analysis, since each individual building and/or element will have a slightly distinct set of characteristics not visible nor documented in the historic record. This is what makes historic buildings special, sets them apart from mass-produced structures and gives them a character of individuals.

An Architectural Conservator or a Conservation Architect should be able to enumerate the recommended tests after the initial research and documentation phases of a project and for each specific case. Please see the Reference portion of this section for important sources that may be consulted.

Interior view of a second-floor space within Ballajá Military Barracks in Old San Juan, PR, before intervention (1987).

SECTION B: NEW INTERVENTIONS

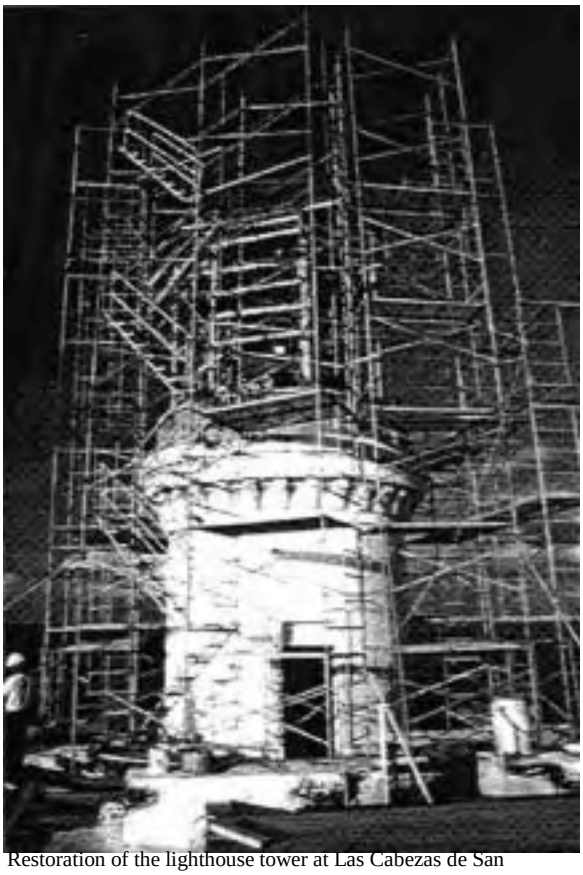
B.1 Intervention Design - Specialized Plans and Specifications

INTRODUCTION:

There are opposite views regarding interventions[1] to historic buildings:

The Wrong View:

1) that the standards of pre established construction industry formats which usually entail construction drawings, technical specifications and bidding documents should be completely disregarded and that these specialized projects be directed by an experienced master builder utilizing "traditional" construction techniques without any guidance from the above graphic or written documents, or



Restoration of the lighthouse tower at Las Cabezas de San Juan in Fajardo, PR (1990)

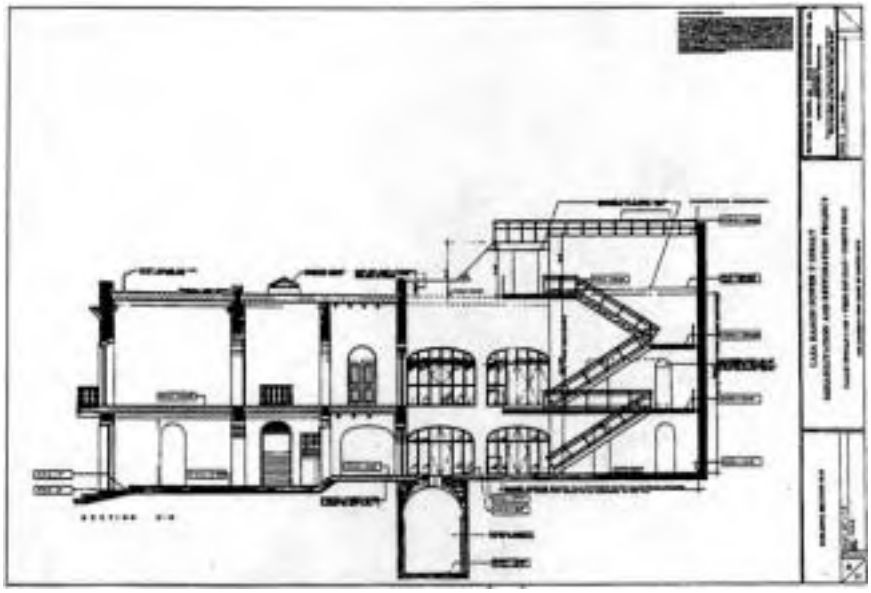
The Correct View:

2) that the traditionally common known formats already established by the construction industry consisting of construction drawings, technical specifications and bidding in a modified version to

[1] Interventions can be: restorations, rehabilitations, reconstructions. preservation, conservation. stabilization, and even new construction. Please refer to Section A.1 for the definitions of these terms and for clarification of different processes involved.

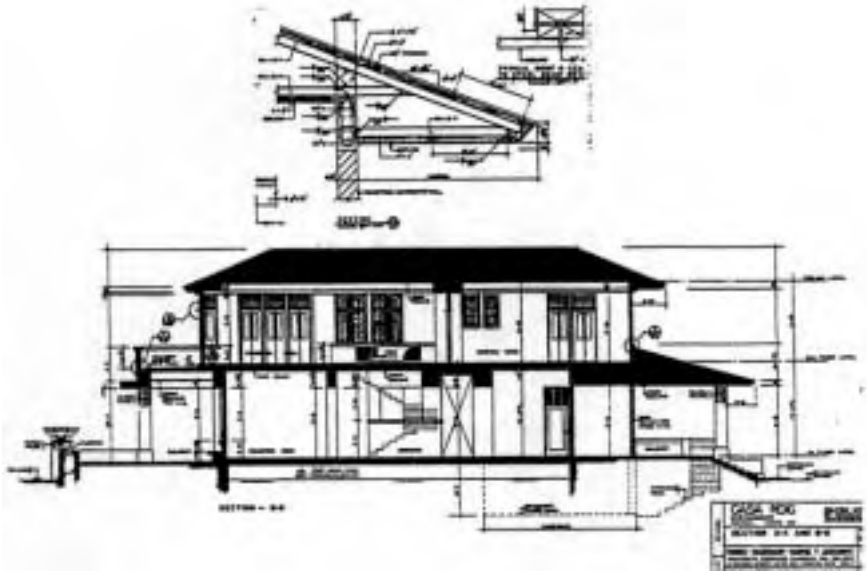
include the specific and specialized information needed in an intervention to a historic building which is very different to that of new construction.

The dangers in the first option are evident in that there is limited control to the work, placing all the responsibility solely on the people in the field without any benefit being left behind about the process, other than the end result itself; or "restored" building. At the time of intervention, historic buildings most often are upgraded to include modern conveniences as well as to meet the prevalent Building Codes of the area where the building is located. The designer or person proposing the intervention into the building, must take into consideration not only to restore the building's aesthetic features, but also how the rehabilitation of its spaces and incorporation of up-to-date technological aspects (such as plumbing, electricity and air conditioning), will affect the historic fabric in question. For properties open to the public, compliance with the "American with Disabilities Act" (ADA) of 1990, is mandatory, requiring that buildings be made accessible to the physically impaired.



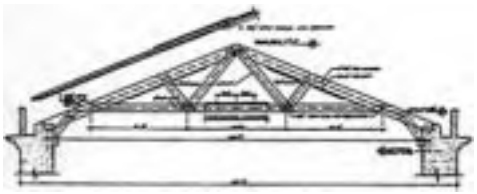
Longitudinal section through Casa Ramón Power y Giralt showing proposed interventions (1993). Beatriz del Cueto and Otto 0. Reyes Cassanova, Architects and Historic Preservation Consultants.

The intervention into a historic building should be guided by a set of construction drawings where all the previous phases stated in this Manual such as Research (Section A.3), Documentation (Section B.2), Inspection (Section B.3), Materials Analysis and Laboratory Work (Sections B.4 and B.5), are reflected and somehow incorporated either graphically (drawing or photo) or in text form. The commonly



Building section and detail of Casa Roig showing connections between new steel roof truss and interior traditional finishes. Humacao, PR (1985). Torres, Beauchamp, Marvel y Asociados with Otto O. Reyes, Architects.

utilized construction drawing and specification format provides a workable and on-site accessible set of documents that can include as much information as possible on a given project set. This way, both the experienced and un-experienced builder or restorer will have all the needed information at hand at the project site where it is most needed. In addition, this set of documents provides any future researcher or student the benefit of a tangible record where the proposed correct intervention is detailed. It provides the documentation of the prescribed and proposed intervention process, which will add one more link in the history of the building's construction. These documents should be submitted, reviewed and commented upon by the

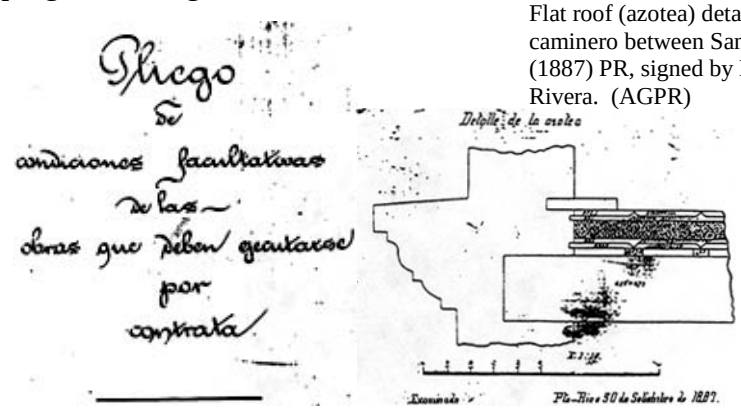


Cane Garden Project showing modern truss and split-ring connectors. South Shore St. Croix, USVI (1992). Frederik Gjessing and William Taylor, Architects.

pertinent local government agencies such as the Planning and Building Department, Fire Department and Historic Review Boards or Institutions where applicable, for compliance to the local or state regulations governing the site. This is a known and proven workable format that will not be alien to the professional in the construction industry, even though the information will be considerably different. So, let us look then at HOW the information will differ from a regular set of construction documents?

19th Century Official Spanish Government Project Formats for Public Works

In order to compare and evaluate the means and methods utilized at present in the preparation of a set of construction documents, an extensive list of construction records pertaining to public projects undertaken by the Spanish Government in Puerto Rico during the 19th century was researched and examined. There was much construction activity during this historic period, since it was then that the 'sugar cane boom' took place, bringing with it prosperity and economic growth to Puerto Rico. The Spanish government also set out on an expensive Public Works program during this time.



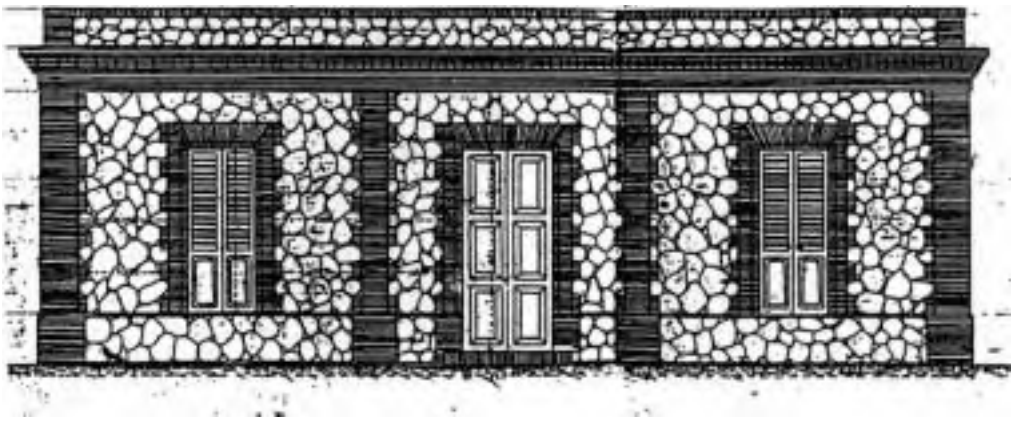
Flat roof (azotea) detail in a case de caminero between San Juan and Caguas (1887) PR, signed by Engineer Rafael Rivera. (AGPR)

Contrary to our present formats, the historic documents revised, which dated from the mid to late 19th cent., were found to have very few technical or construction drawings while the descriptive texts accompanying these were extremely lengthy. It has been documented that due to a lack of a local experienced labor force and the absence of professional training centers for the different construction crafts at the time, the people utilized for construction work in Puerto Rico during this period were mostly prisoners, who were forced to work in public projects as punishment. This could be one of the reasons for the excessively long texts, detailing construction

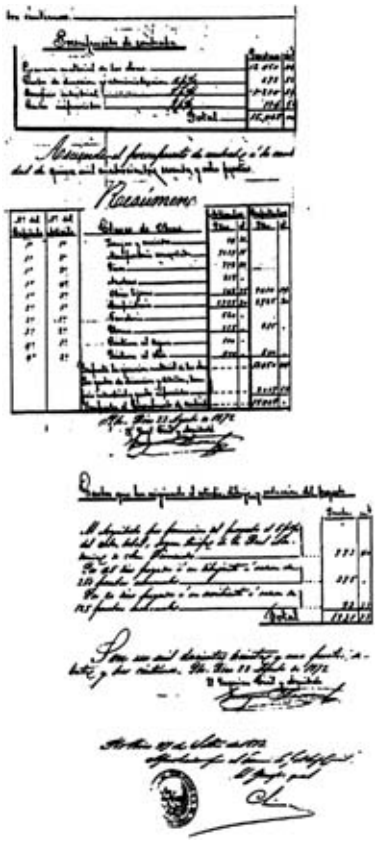
processes in a sometimes overly repetitive a manner. This repetition could have been for the express benefit of the un-trained or inexperienced labor force.

This format was consistently applied through time, and throughout the island of Puerto Rico in spite of how inaccessible some of these towns might have been to one another during this period. To date, we have been unable to trace the exact provenience of the format detailed herein or from which specific Spanish Royal Decree (Real Orden) these were derived (as was customary at the time). In these public project Construction Specifications of the Spanish Government in Puerto Rico, there were four basic documents which were more or less detailed, depending on the experience of the Project Engineer (who was usually the author), the transcriber, or of the labor force. Construction projects were detailed within the four following documents classifications:

Document no. 1 -	*Memoria Descriptiva* (Project Justification and Explanation)
Document no. 2-	*Dibujos o Pianos* (Drawings or Plans)
Document no. 3 -	*Pliego de Condiciones Facultativas* (Project Conditions and Specifications)
Document no. 4-	*Presupuesto* (Budget)



Casa de caminero with exposed cut stone construction (1888) in Puerto Rico.



Project budget for a new butcher shop (1872) in Cabo Rojo, PR. Signed by Civil Engineer Enrique Berrocal. (AGPR)

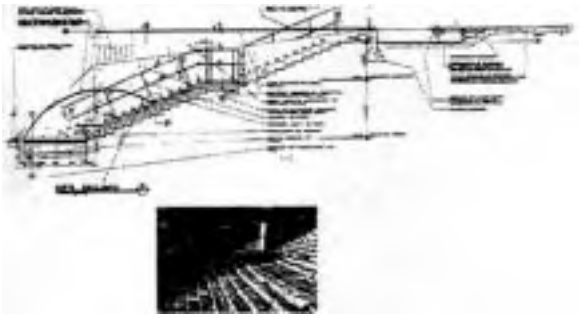
Even though the various documents examined contain similar information such as the qualities required of the different construction materials (lime, rubble-masonry, stone, wood, brick, sand, paint and hardware, among others) and also detailed information about construction methodology (such as how to build a wooden interior partition or how to build a brick flat roof), there are clear specifications on the preference of certain materials over others due to the project's location or their location within the project. As has been stated in Section B.1, the availability of the building materials sometimes dictated the final form and morphology of the structures in a distinct region. In the area where a building was to be constructed there could exist, for example, "better and superior clay for the making of bricks" and this availability provided the basic motive for selection of material and frequency of use to expedite construction; whereas in other areas this material would have to be imported and the Work therefore delayed and more expensive due to transportation costs. Oftentimes, if good limestone or sandstone was available nearby, this material would be quarried in large quantities and stone would prevail as a main construction material over others.

There is also the specificity of material sources stating which quarries produced the preferable stone or where the "pitch pine" would be imported from (usually the United States). In the particular construction project of a cast-iron market place for Yauco, for example, the provenience of the oil paint is specified as England, while the ornamental cast-iron elements themselves were ordered from France.

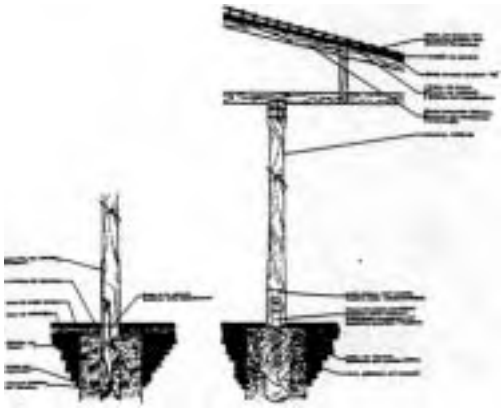
In many ways similar to numerous incomplete sets of present-day construction documents, there is no direct link or connection between the visual design and its verbal description or clarification. There was in the past, and continues into the present, a dire need for either more explicit drawings or even more extensive and elaborate texts.

Present-Day Construction Documents

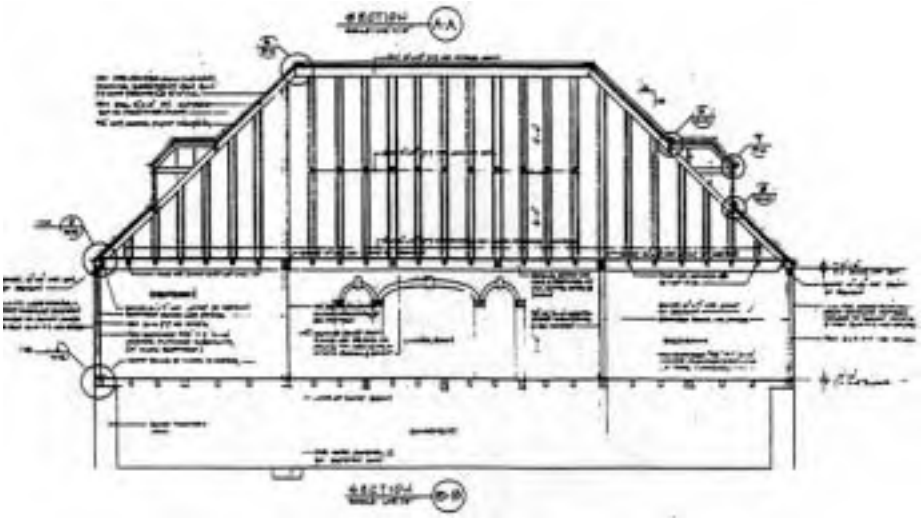
The most commonly accepted modern Construction Document formats, published and disseminated by the American Institute of Architects, state that "the general conditions (of the project) stipulate that the architect must furnish written interpretations in the form of drawings or other documents (specifications) for proper work execution" (Kemper, 1979). The General Conditions as well as the Owner-Architect Agreement should provide all the conditions and provisions to be met for a specific project, while the construction document set provides clear and precise graphic and written details about it.



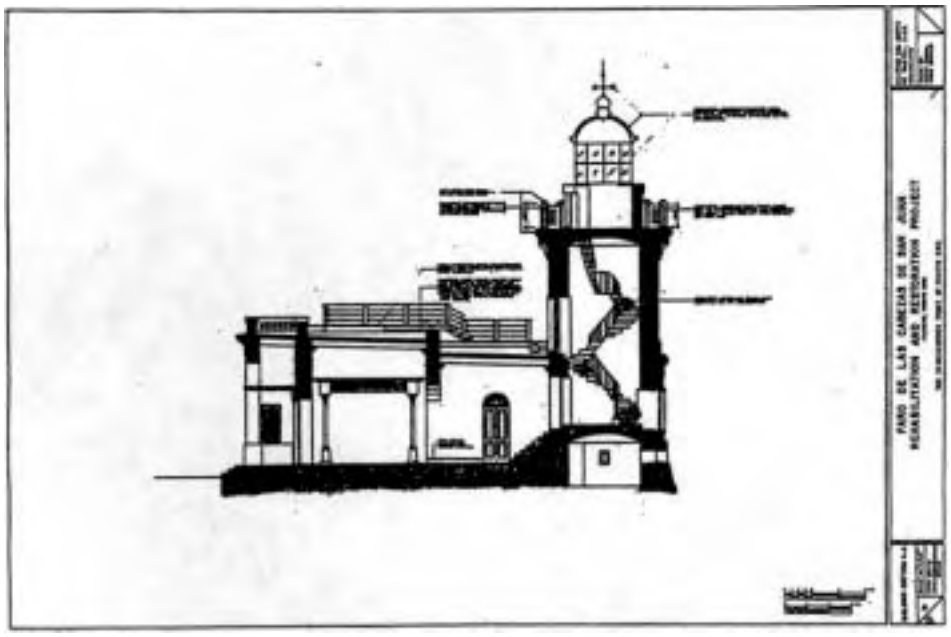
Old cemetery restoration in Mayagüez, PR, where historic stairs were stabilized while two steel side stairs were "floated" over the historic fabric to comply with contemporary saftey codes and requirements. Rigau + Penabad, Architects (1994).



Restoration work carried out in Porta Coeli Church in San German, PR, to stabilize the structural members and replace the existing non-traditional roof with Royal Palm wood planks for the interior ceiling and knee ceramic tile for the exterior covering. Izquierdo, Rueda & Associates with the ESCO Group (1996).

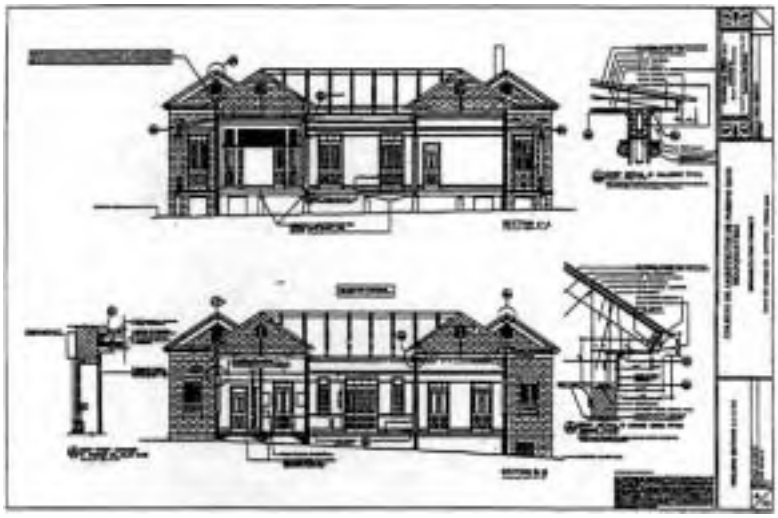


Annaly House Reconstruction Project section at Estate Annaly in St. Croix, USVI. Chalgub – Lanio Architects, Inc. (1990)



Longitudinal section through historic lighthouse at Las Cabezas de San Juan at Fajardo, PR, snowing present interventions, specifically the addition of a wooden steel deck on the rooftop as an observation deck for visitors. Beatriz del Cueto de Pantel, AIA. (1990)

The CSI (Construction Specification Institute) Format is a general system widely used for specification writing. It details up to 16 sections which are placed together as related groups. These, in addition to the aforementioned documents, are widely utilized as reference material in the United States and commonly followed in Puerto Rico and the U.S.V.I. for construction work in all types of projects.



Sections and details through the Colegio de Arquitectos de Puerto Rico Rehabilitation Project in Santurce, PR. Beatriz del Cueto, AIA, Architects and Historic Preservation Consultants (1992).

Nevertheless, for a project dealing with historic architecture, in addition to the basic information provided in the above present-day format, a middle ground must be reached regarding the need for additional information, such as work that should be carried out in phases due to continued building occupancy, or dismantling and re assemblage instructions of an ornamental pressed-tin roof for example. Contrary to modern terminology, “demolition” should rarely be used in a set of preservation drawings. Terminology such as “dismantling” should be more common and is preferred for its implications as will be explained in Section C.2 of this Manual.

The recommended process then is, one of more drawings that will clarify specific processes, using detailed notes and photography the actual drawing sheet. Specific intervention procedures should be clearly detailed. This process guarantees that the drawing set, which is always present at a project site, contains all the necessary preservation information both in process and in materials. The specification book then, will only detail the basic construction information which is common to the construction practitioner. This avoids the common problem that occurs when the Spec Book is not accessible at the project site and indispensable information is unaccessible at a critical project stage.

PHOTOGRAPHY AS PART OF THE DRAWINGS:

Stampads and computer scanners, have greatly facilitated the incorporation of photography to a modern set of construction drawings. In the specific case of preservation projects, actual photographically documented conditions prior to intervention can be incorporated into the drawings themselves in a fraction of the time required a few years ago. Even though this process does not supersede extensive Documentation as explained in Section B.2 of this Manual, a photograph speaks a thousand words and the information provided by it can summarize important project aspects. A scaled photograph can give existing information, (if focused and correctly exposed) and the intervention drawings adjacent to these will provide the graphic and textual information for the proposed work.

IMPORTANCE OF OBTAINING (UP-DATED) PRESERVATION REFERENCE MATERIAL:

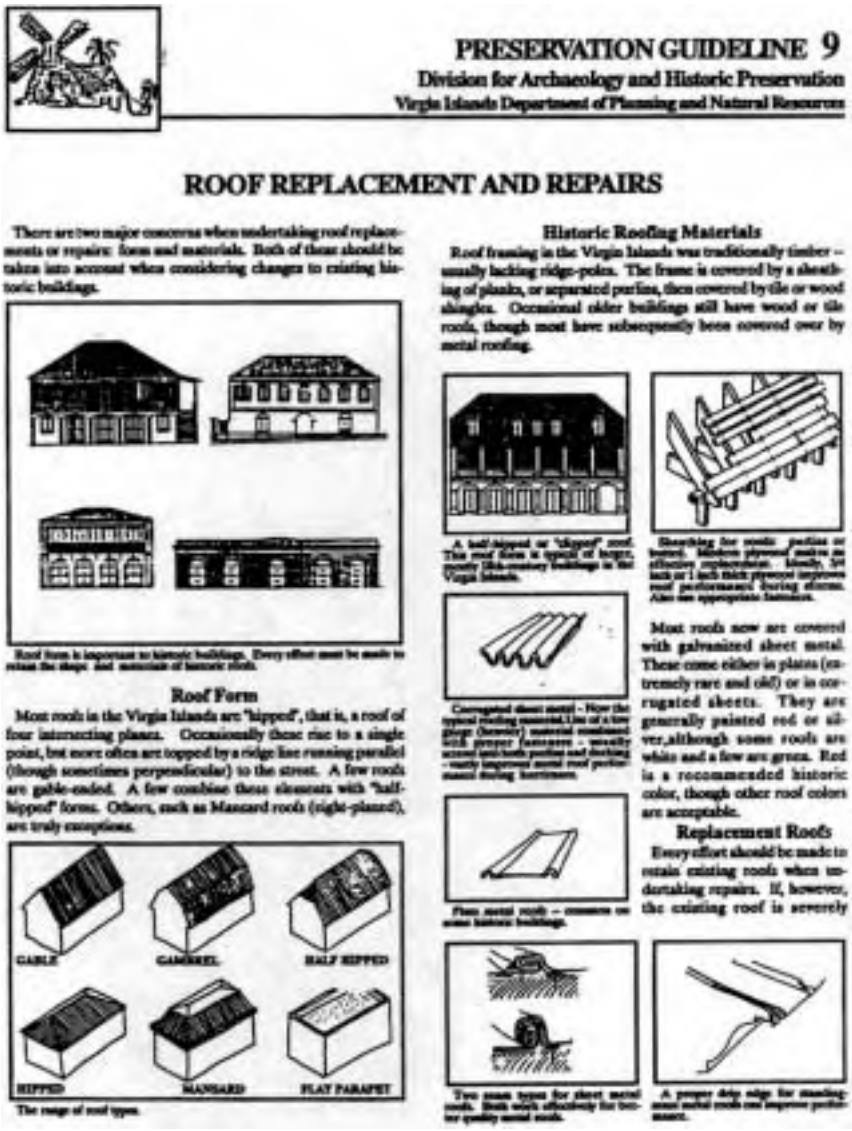
As mentioned in Section A.2, only recently (1960's in our region), has the Preservation Movement and its issues been incorporated into our daily lives. This is mainly as a consequence of legislation created for the protection of these finite cultural resources.

Presently, preservation technical information is easily available and widely disseminated. This has been possible mainly through publications and studies provided and distributed by the United States Department of the Interior through the National Park Service. Of specific importance, the Secretary of the Interior Standards for Rehabilitation and Guidelines for Historic Buildings should be consulted. In a small booklet form, these guidelines provide an easy-to-follow format of the "recommended" and "not recommended" aspects during any proposed intervention. This text has been included as an Appendix to this Manual.

As an additional aid, in the Reference part of this Section, an ample list is included of other important sources such as the National Park Service's: Preservation Briefs Series as well as Preservation Guidelines, made available through the U.S. Virgin Islands' Department of Planning and Natural Resources. These documents relate to specific subjects enumerated in this Section's Bibliography and can provide useful guidance to the person proposing the intervention into a historic property.

Up-dated literature should be checked on a constant basis due to the fact that scientific processes and testing of materials provide new information and methods for the conservation/preservation of an historic fabric, building or site. This technical information is made available through different publications, ranging from books,

periodicals, technical briefs and the Internet. State Historic Preservation Offices as well as Historic Review Boards or local Cultural Institutions in many cases have information available relating to their specific region. These offices' personnel should also be consulted as to the "Do's and Dont's" that may apply in a specific historic district or zone with regards to an individual historic building.



PRESERVATION GUIDELINE 9

Division for Archaeology and Historic Preservation

Virgin Islands Department of Planning and Natural Resources

ROOF REPLACEMENT AND REPAIRS

There are two major concerns when undertaking roof replacements or repairs: form and materials. Both of these should be taken into account when considering changes to existing historic buildings.

Roof form is important to historic buildings. Every effort must be made to retain the shape and materials of historic roofs.

Roof Form

Most roofs in the Virgin Islands are "hipped", that is, a roof of four intersecting planes. Occasionally these rise to a single point, but more often are topped by a ridge line running parallel (though sometimes perpendicular) to the street. A few roofs are gable-ended. A few combine these elements with "half-hipped" forms. Others, such as Mansard roofs (eight-planed), are truly exceptions.

GABLE GAMBREL HALF HIPPED HIPPED MANSARD FLAT PARAPET

The range of roof types.

Historic Roofing Materials

Roof framing in the Virgin Islands was traditionally timber – usually lacking ridge-poles. The frame is covered by a sheathing of planks, or separated purlins, then covered by tile or wood shingles. Occasional older buildings still have wood or tile roofs, though most have subsequently been covered over by metal roofing.

A hot/hipped or "shipped" roof. This roof form is typical of larger, mostly 19th-century buildings in the Virgin Islands.

Sheathing for metal roofing or tiered. Modern plywood makes an effective replacement. Ideally, 3/4 inch or 1 inch thick plywood improves roof performance during storms. Also an appropriate hurricane.

Corrugated sheet metal – Now the typical roofing material. Use of a low gauge (heavier) material combined with proper fasteners – usually screws and both purlins and decking – vastly improves metal roof performance during hurricanes.

Most roofs now are covered with galvanized sheet metal. These come either in plates (extremely rare and old) or in corrugated sheets. They are generally painted red or silver, although some roofs are white and a few are green. Red is a recommended historic color, though other roof colors are acceptable.

Flat metal roofs – common on some historic buildings.

Replacement Roofs

Every effort should be made to retain existing roofs when undertaking repairs. If, however, the existing roof is severely

Two seam types for sheet metal roofs. Both work effectively for better quality metal roofs.

A proper drip edge for standing seam metal roofs can improve performance.

SAMPLE OUTLINE SPECIFICATIONS FOR HISTORIC BUILDINGS INCLUDED IN DRAWINGS:

The specification text for the documentation, dismantling, restoration and replacement of a historic ornamental tin ceiling panel is detailed herein only for explanatory purposes, and so that the breadth of detailed information recommended for inclusion on a drawing sheet can be appreciated. This text corresponds to our rehabilitation project for the Puerto Rico Architect's Association Headquarters, an early 20th century residence in the area of Santurce, and forms an integral part of the drawing sheet which details the hung ceiling work. As stated before, in a Preservation/Conservation project, a text is useless or of limited value unless accompanied by detailed drawings on the specific process. It is therefore recommended that texts be utilized in conjunction with, and never in substitution for, a drawing or graphic representation.

CITED TEXT:

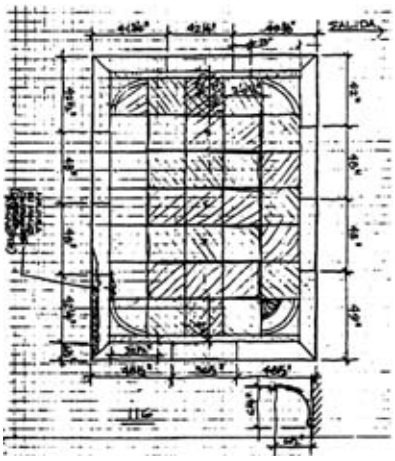
GENERAL NOTES ON TIN CEILING:

1. The existing ornamental tin ceiling and its furring framework was documented during the months of July and August, 1991 by our office.

2. Due to the advanced state of deterioration of the wooden furring framework for the tin ceilings, it is recommended that the complete ceiling be dismantled by room, following these specifications:

a) Before any work is done, strip paint off tin ceiling panels while they are still in place (method to be specified by Architect)

b) Proceed to designate each panel with the same alpha-numeric information provided on this drawing. Each space must be done individually to guarantee its correct re-installment.



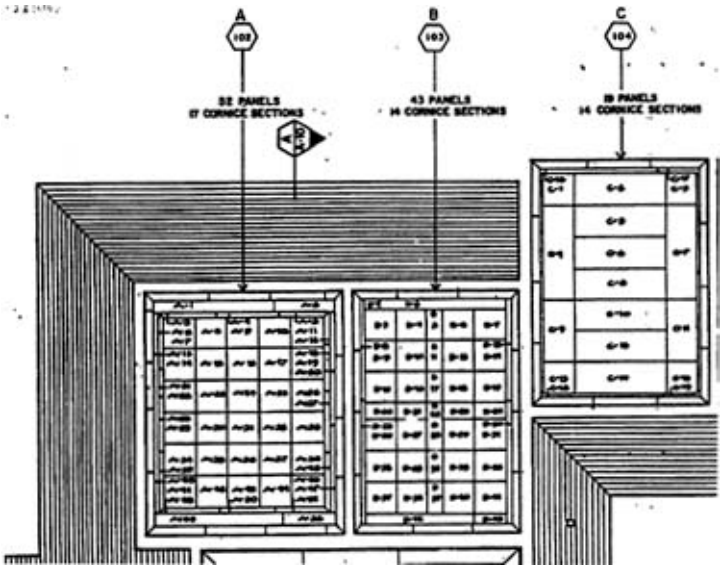
Existing condition field sketch of historic tin ceiling prior to restoration work. Colegio de Arquitectos de Puerto Rico (1992).

c) The tin ceiling panels shall be removed individually and very carefully so as to avoid unnecessary destruction of the historic material, commencing with the removal of the surrounding cornice in each space. The panels for each space shall be stored vertically and separately in a safe place during building restoration.

d) Simultaneously, while the new wooden furring framework is being re-constructed, the tin ceiling panels should be cleaned and restored, method to be specified by the Architect

e) Extremely deteriorated tin panels shall be replaced by reconstructed prototypes in fiberglass, with previous approval of the Architect. An identical pattern historic tin panel that is in good shape shall serve as a mold for this purpose.

f) The restored tin and new fiberglass ceiling panels and cornices will be re-installed using the original attachment system of 3” nails on the furring strips.



Construction drawing detail of reflected ceiling plan which enumerates individual tin ceiling panels for dismantling and re-assembling purposes. Colegio de Arquitectos de Puerto Rico Rehabilitation Project (1992).

3. There are 15 rooms with tin ceilings and 8 different patterns of these in the house.

4. The contractor shall be responsible for the verification of this information on-site during the dismantling work required.

In short, one can never specify in an intervention project to a historic building. Assumption is the most common pitfall of all interventions to historic buildings when one assumes that “how, when, or why” to do something is “obvious” to the Contractor, or worse, to the workmen on the project site.

Original (left) and fiberglass reproduction (right) of tin ceiling panels. The original historic examples in good condition were used as molds where replacement panels were needed. Colegio de Arquitectos de Rico Rehabilitation Project (1992).

SECTION B: NEW INTERVENTIONS

B.2 Selective Demolition, Removal or Dismantling

INTRODUCTION:

It is very seldom that we are presented with the opportunity to intervene into a historic building that has not had some kind or repair, addition or transformation at some point in its history. It is an unavoidable fact that historic buildings and their spaces change through time. This constructive evolution provides continuity to our traditional cities and towns even though excessive change without proper goals often results in complete destruction of the historic fabric. The only exception to this rule are residences, which having often been kept by the original family, normally resist change. As opposed to public or commercial buildings, the residence is a "home" full of collective memories which people tend to preserve.

When a conservation project is deemed necessary, it is the responsibility of the Architect or Designer to research (Section A.3) and obtain as much information as possible on the original design so as to be able to compare the present form of any element with the original. When the written or graphic data fails to give us this information, the trained eye will be able to discover the building's evolution. Where and how these changes have occurred will be recorded during the phases of Documentation (Section B.2) and Inspection (Section B.3). For example, the alteration of a roof, the closing of a door or window, or the transformation of an arched opening, can be often observed by indentations or negative imprints detected on a plaster surface.

It is after this initial work that preliminary decisions should be made, based on a Design Program which has been prepared during consultation meetings with the owners, and where the proposed use for the building or space in question has been discussed. These decisions, for example, may be with regards to what should be re-opened, reconstructed or dismantled. Some proposals may entail what portion or part of the original historic construction material or fabric should be removed, or taken apart and stored for future use in the building itself or for other historic buildings of the region. This "recycling" practice should always be considered, due to the fact that precious and hard to replace materials such as hardwood beams, historic hardware and even bricks, can be removed, cleaned, reconditioned and re-incorporated into the same or other buildings by nature of the inherent durability qualities of these materials. It is interesting to note that this "recycling" of construction material is not a new concept. On the contrary, it was a practice which has been documented as

SECTION B: MODERN INTERVENTION

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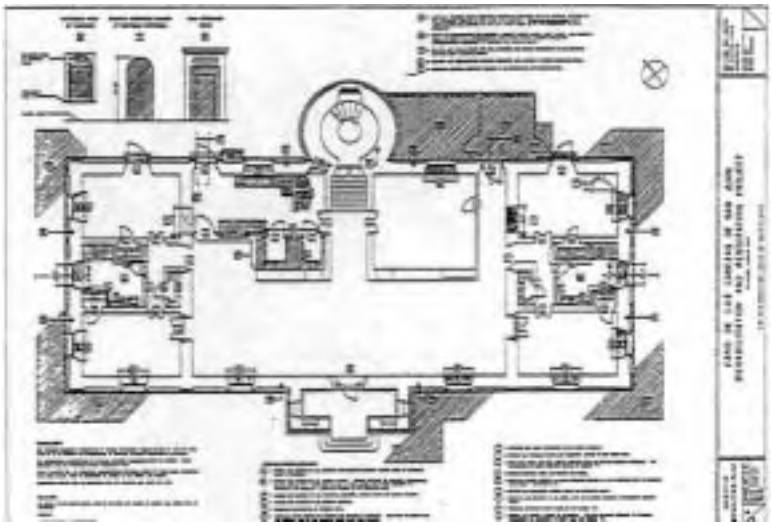
Demolition of existing structures for Plaza Quinto Centenario in Ballajá District of Old San Juan, PR (1986).

early as the 18th and 19th centuries in Puerto Rico. In a particular document of the 19th century, the benefit of selling material from demolished blocks of buildings in Old San Juan was specified. Recycling of the traditional construction materials, still in good form, was done by public auction, with such items as Ausubo (bulletwood) beams, square yards of rubble-masonry (to be re-utilized in new rubble-wall constructions), and damaged wood (which could be utilized as fire wood). In a period when conservation of natural resources was not touted as such, this material re-use was exercised in order to eliminate duplication of efforts such as stone quarrying or tree lumbering. Still useful, already pre-cut or prepared material, was considered a



Selective demolition plan for the Faro de Las Cabezas de San Juan Rehabilitation and Restoration Project in Fajardo, PR (1989)

luxury, not “second hand” material. In addition to this, the transportation logistics and costs of getting the material from natural source to project site had to be considered. If any materials or fragments of these were deemed re-usable from a project to be demolished, these materials were acquired to save effort, time and cost. This perception of “economy” was far different from our modern-day misconception that “new is better - old is poorer quality”. These were healthy construction practices even by today’s standards, and carried out during a time period when any work saved through simplification of process was greatly welcomed.

Once the decisions are made on what should remain, what (if any) should be dismantled and re-used, and what (if any) should be dismantled and discarded, it is recommended that this information be incorporated into a set of As-Built drawings in the form of extensive notes for each section and particular case. “Poché” or graphic shading and texturing of elements, walls or building sections to name a few, greatly helps in distinguishing, through visual variations, the different interventions proposed. An example of this is shown in the illustration for this Section. Once these specialized plans are completed, they will either form an integral part of the completed project set of Construction Documents, or they may stand on their own and be submitted for approvals from the different government agencies that have to comment on preservation work.

After all the information has been included in the set of drawings, the first and most important step is to collect any loose historic construction material found at the site that has already detached itself from its place of origin. These may be balusters, beams or roofing brick, among others. These should be inventoried, classified, and stored in a safe and dry place until ready to be re-utilized.

Interior patio at Casa Ramón Power y Giralt during selective demolition work in Old San Turn. PR (1994).

Roof, flooring, and tin ceiling dismantling work at Colegio de Arquitectos de Puerto Rico Headquarters restoration following selective demolition specifications. (1993)

EQUIPMENT AND PROCESS: (Recommended and not recommended)

It is important to emphasize that during the work of removal, dismantling or selective demolition of a historic building, the least harmful and least aggressive measures or procedures should take precedence and be tested first. Only if these fail are alternate and progressively harsher processes recommendable. The aim should always be the protection, preservation and salvage of as much of the historic fabric as possible, without damage or disturbance to it. During Selective Demolition, measures are also specified for the protection of important historic elements that are near or adjacent to materials that need to be removed. This is of utmost importance, because during the removal process, material that falls may inadvertently demolish other historic elements which have been destined to remain in place. In some cases, temporary plywood enclosures or boxing are required for this purpose. In other cases, moisture or water protection are specified (as in the case of the construction of a temporary roof) due to the damage that water and excessive humidity can cause to historic fabric. For specific or very large historic buildings or groups of buildings, a Work Sequence should be developed for Selective Demolition Work, since this provides step-by-step guidelines that can guarantee the protection of as much historic fabric as possible.

The first stages during a Selective Demolition Process usually entail the removal of non-historic fabric, which is incompatible with the historic. Following is a list of equipment and methods recommended and not recommended for the removal of different materials. It is important to clarify, nonetheless, that these processes should be first tested in each particular building to be conserved. Even though the basic inherent qualities and performance of these historic construction materials were taken into consideration before specifying them, un-known site-specific conditions not apparent during inspection, could prove disastrous by causing unnecessary loss. Utmost care must always be taken during this process by first isolating old and new, and only then, removing the minimum necessary. The Contractor and construction labor force that are to carry out the Work must be made aware of all of the precautions to be taken during this Preservation Process.

Non-Permitted Methods and Equipment:

It is essential to clarify, that more important than what can and cannot be used is HOW the methods and equipment are applied or used.

Pneumatic hammers are excluded from use due to the extreme vibration and noise they cause. This can cause loose elements within a building to collapse.

Sand and water blasting are not to be used due to the erosion of the historic fabric that they cause. The porosity of lime mortars and bedding mortars in a rubble-masonry construction would only absorb the water causing a deleterious effect. Also, sand blasting would cause irreversible loss of ornamental detailing on malleable materials like wood, stucco or even soft brick. Unexperienced or incorrect knowledge by the high pressure equipment operator can also be very deleterious to historic fabric and materials.

Heavy concentrated loads on any given point shall also be avoided due to the fact that most historic buildings have underground cisterns, or unknown or questionable foundation structural stability, for which information is not yet complete during the early intervention stages.

No fires or explosives should be allowed on the site due to the fragility of materials and danger of unnecessary collapse.

Permissible Methods and Equipment:

Modern materials such as concrete are incompatible with historic building fabric, causing undue stresses, making that which is historic less resistant and more susceptible to destruction. These modern interventions must be removed so as to alleviate the future loss of historic material and return the building to a homogeneous whole. The first step in the removal of concrete or anything foreign to the historic fabric is isolating that which is historic from that which is modern. Examples developed in the Cuartel de Ballajá project (Reyes Casanova, 1989) include: “Acceptable separation methods are electric sawing, consecutive drilling and hand chiselling. Pneumatic hammers may be used only after the concrete is totally separated from the wall, in order to break up removed elements into smaller pieces for disposal. At any rate, sound vibrations produced by these pneumatic hammers within a room may also be damaging to historic fabric, hence, sawing might be more appropriate indoors, hammering outdoors.”

- Cut first to remove embedded materials to be eliminated.

Drilling reinforced concrete wall before removal from adjacent historic fabric in Ballajá Military Barracks in Old San Juan, PR (1988).

Loosen cement joints holding blocks together by drilling to weaken bonds and chisel to remove or dismantle elements (concrete, glass, and the likes) individually.

Remove wood intrusions by removing fasteners first and dismantling or separating elements later, not forcefully prying out.

Remove bricks to be recycled by disengaging one unit from the other, loosening their mortar joints by drilling.

Remove elements like modern windows or doors by separating them from historic fabric first, and then removing the complete unit.

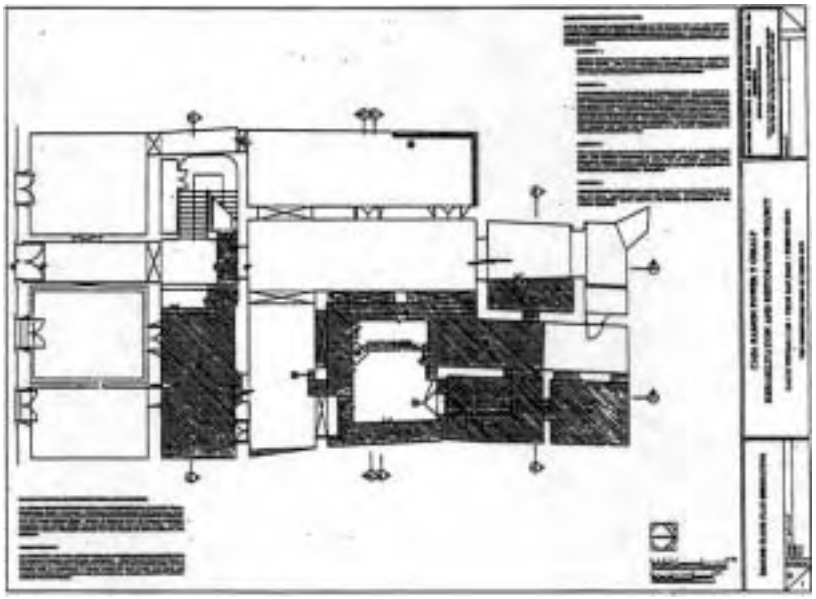
Cutting wood boards before dismantling original roof truss luring Colegio de Arquitectos Headquarters restoration in Santurce, PR (19931.

SAMPLE OUTLINE SPECIFICATIONS/SAMPLE PROCEDURES:

The text for the Selective Demolition Work on an 1 8th-20th century colonial building in Old San Juan is given herein for explanatory purposes, and so that the breadth of detailed information recommended for inclusion on a specific drawing sheet can be appreciated. This text is from our rehabilitation and restoration project for the Headquarters of the Conservation Trust of Puerto Rico. After Historic Inspection work, the building was found to be in such precarious condition due to years of abandonment and the many interventions it had undergone, that we had to divide the work of "Selective Demolition" into categories.

CITED TEXT:

> DUE TO THE DELICATE AND DETERIORATED STATE OF THIS HISTORIC BUILDING (with documented 18th, 19th and 20th century construction periods) EXTREME CARE SHOULD BE TAKEN FOR THE REMOVAL OR SELECTIVE DEMOLITION OF NON-HISTORIC OR EXTREMELY DETERIORATED HISTORIC CONSTRUCTION MATERIAL. THE FOLLOWING ARE A SERIES OF SPECIFIC PROCEDURES THAT WILL GUARANTEE THE PROTECTION OF THE BUILDING'S REMAINING HISTORIC FABRIC.



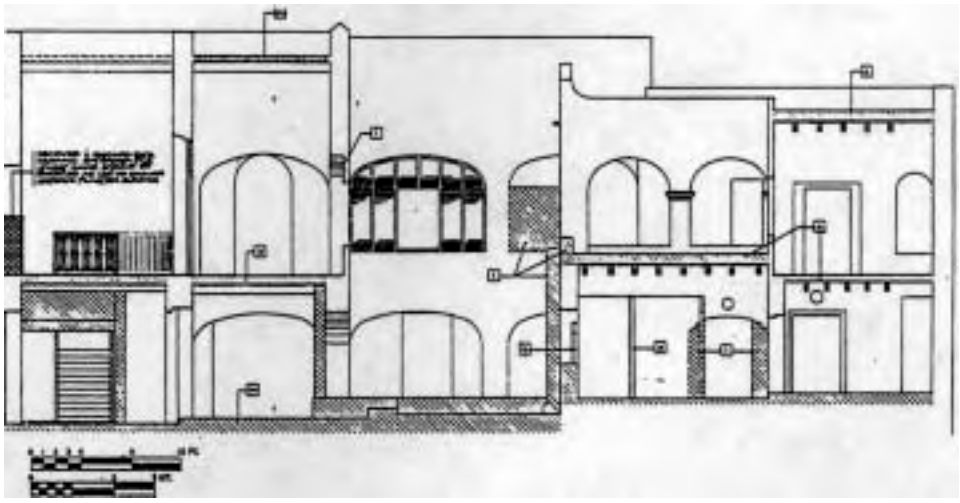
Selective demolition plan for Casa Ramón Power y Giralt as future headquarters for the Conservation Trust of Puerto Rico (1993).

CATEGORY 1:

Denotes intrusion of modem material within architecturally important historic construction fabric. Due to the protection necessary for such fabric, the removal of modem material marked can only be done in the presence of and under the physical supervision of the Project Architects.

CATEGORY 1-A:

In the specific case of the floors, on the ground level, the concrete slab should be cut in sections prior to removal. The use of a chipping hammer is not recommended due to the existence of a cistern beneath the building, the limits of which are unknown. No vibration should be induced into the surrounding area. To remove existing concrete slab from floor or roof, initially isolate it from the adjoining walls by cutting with a circular saw to separate from wall surfaces. Cut inner area into smaller portions, then remove from the building and discard accordingly.



Partial section drawing for selective demolition phase of Casa Ramón Power y Giralt in Old San Juan, PR (1993).

CATEGORY 2:

The areas marked Category 2 in the drawings are to be removed or demolished very carefully with periodic supervision of the Project Architect. Specifically regarding original floors and/or roofs, the top layers (marble, brick layers arid Ausubo beams and slats) should be removed (to eliminate weight) prior to the removal of marked or indicated beams. See Legend for this information.

CATEGORY 3:

Denotes historic construction material which is in danger of collapse or has no recycling value. Remove and discard accordingly. Care should be taken during demolition and/or removal, but this Work does not require the supervision of the Project Architect.

BUILDING CLEAN-UP:

ALL VEGETATION, IRON PIPES, ELECTRIC TUBES AND ANY REFUSE SHOULD BE REMOVED FROM THE BUILDING SURFACES OR PREMISES ACCORDINGLY. UTMOST CARE SHOULD BE TAKEN IN THE REMOVAL OF ANYTHING ADHERING TO THE SURFACES OF THE BUILDING ITSELF. IN THE SPECIFIC CASE OF VEGETATION, A BIOCIDE SHOULD BE USED TO KILL THE PLANT AND ALLOWED TO DESICCATE (DRY) IN PLACE BEFORE REMOVAL. PROJECT ARCHITECT WILL SPECIFY PRODUCT FOR THIS PURPOSE.
(del Cueto and Reyes Casanova, 1993)

SECTION B: NEW INTERVENTIONS

B.3 Cataloguing and Storage of Recyclable Materials from an Historic Building

INTRODUCTION:

Historic recyclable construction material may consist of hardware, hardwood beams, paving material such as marble or Canarian tiles as well as roofing material such as metal tiles or brick, among many others. It is often times discarded during a restoration project because its "old" or worn out appearance may not appeal to the owner who expects the building to look brand new once the proposed intervention is completed. The idea of "new is better" does not apply to construction materials like wood, brick, stone and the likes. Often, older building materials represent far superior workmanship than can be obtained in the contemporary world, or natural sources which are either no longer available or inferior in quality.

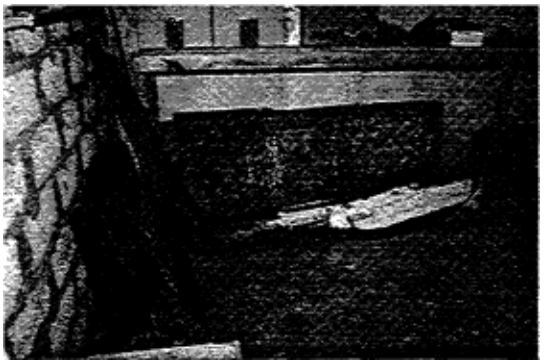
Another reason traditional construction materials are often discarded is because the Architect and/or Contractor do not have the knowledge regarding reconditioning possibilities of some of these historic elements once removed. Sometimes these construction professionals just do not want to deal with this "non-standard" task and prefer to utilize "stock" solutions from manufacturers or common suppliers. As has been explained in Sections B.1 and C.2, the reason why these materials and elements have survived to our present time is due to their inherent qualities. Therefore, the appearance is secondary when one is made aware that through careful cleaning and rehabilitation, most of these can be given a "second chance", a new appearance, and a continued strong functionality. With this action, not only the cost of new material is saved, but we assume the role of being "authentic" and faithful to the original building's design and construction. We undress the building (dismantle deteriorated elements), clean and patch it up (restore these and its historic fabric), and put it back together again (rehabilitate or restore).

The identification process of these traditional construction materials has been described in different sections of this Manual commencing with Section B.1 where traditional construction materials are identified, described and enumerated. During the Documentation (Section B.2) and Inspection (Section B.3) Phases, identification and location is determined. During the Selective Demolition Phase (Section C.2) materials are removed. Once carefully removed from their original location, the materials and elements selected for storage and future recycling into the building, must be catalogued and stored under special conditions. It must be remembered that if these are not deemed useful for the building to be conserved, these materials should

be kept as surplus for other buildings of similar construction fabric or period in our region. The traditional construction materials and elements must then be cleaned, and stored in a safe place (away from falling objects and potential vandalism) and in a location that is kept dry. If there is an excessive amount of material to be stored, this should be kept on the outside project grounds, covered by plastic tarpaulins to keep water and sun away from them. Remember, one of the greatest dangers and cause of destruction to nearly all construction material is water. In other cases, arrangements should be made to transport the material away from the project site to a safe storage place during the clean-up phases. At this alternate site, some of these materials may be reconditioned, preserved or returned to a usable state.

In the case of individual elements, such as tin ceiling panels, intricately perforated wooden door transoms or marble stair risers and treads that must be restored and re-installed in their place of origin, the elements must be classified alpha-numerically, in-place, before removal for storage or restoration. Identification should be done utilizing indelible inks or paints or the materials must be tagged in such dismantling, transportation, or during an extended storage period. Cataloguing identification should be kept to a minimum size and if possible, should be done in an area of each element which can later be covered over or on an edge or side which will not show when re-installed. Care should be taken to not mark historic material in a location or in a way which will later be impossible to remove or conceal. Any cataloguing data should be transferred immediately to a set of As-Built drawings to assure original location information of a particular material. In the case of elements that can be recycled and replaced in an

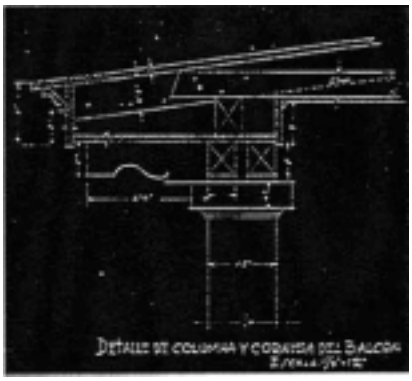
Storage of reusable historic brick conserved from dismantling and selective demolition phase of Casa Ramón Power y Giralt in Old San Juan, PR (1994).



Cleaned historic tin ceiling panels being stored for restoration and future re-installation in the Colegio de Arquitectos de Puerto Rico Headquarters during restoration (1993).

variety of locales within a historic building (such as brick, marble tiles, wooden beams or slats) or in substitute places due to their decay or deterioration, these materials may be stored or stacked carefully without any numeric classification. Such might be the case of hardwood roof beams with rotted ends which may not be re-installed in their original location due to the fact that during restoration work their length will be shortened by cutting off the deteriorated ends. The material remaining however, can still be reused as beams for a shorter span in another space, for the making of wooden slats or even for the construction of door and window frames or transoms.

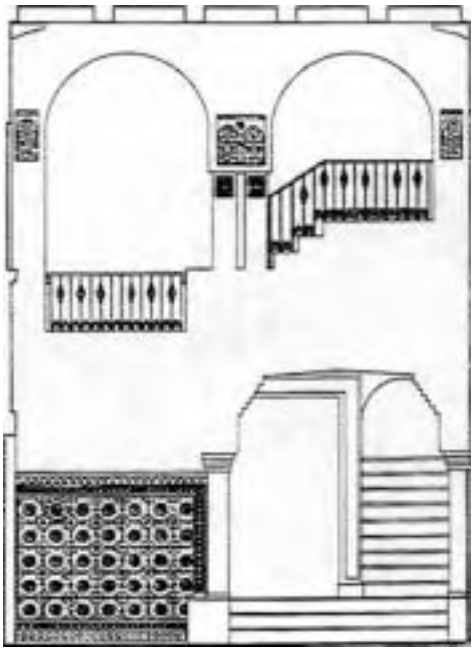
The majority of the original ornamental hydraulic-cement tiles (star-pattern) were saved and re-incorporated into the project, by utilizing new solid-color tiles of a similar composition to complete the square footage needed for restoration of the exterior floors. Colegio de Arquitectos de Puerto Rico Rehabilitation Project in Santurce, PR (1994).



Balcony roof detail of the M. Godreau Residence (1919) in Ponce. PR (AMP)

COMMONLY RECYCLABLE HISTORIC CONSTRUCTION MATERIALS:

The general list below indicates traditional construction materials that can be commonly recycled if found to be in a good salvageable[1] or restorable state. Other recyclable materials exist in historic buildings arid for this reason each building should be assessed individually.



Vestibule facade detail, reconstructed from historic documentation, of the El Mundo/Puerto Rico Ilustrado Building (ca. 1924) in Old San Juan. PR (1996).

- Hardwood doors and windows
- Intricately carved ornamental door and window transoms
- Roofing and flooring brick
- Ausubo (hardwood) beams and roofing slats
- Resinous pine wood planking (usually from floors)
- Hardware (latches, locks, hinges and others)
- Stone tiles (Canarian volcanic, marble, hydraulic cement and others)
- Tin ceiling tiles or shingles and siding
- Metal elements (anchoring devices, stirrups, tie backs and others)
- Cast-iron railings, balustrades, interior screens, roof trusses, ornament
- (and others)
- rubble-masonry material (wall in-fill composed of stone, brick fragments, sand, clay and lime) to be recycled into new rubble construction

[1] Capable of being rescued or saved from wreckage or ruin.

The reconstruction of the flat ceiling and roof utilizing recycled historic ausubo (bullet wood) roof beams. slats and brick in the Casa Ramón Power y Girth Restoration Project Old San Juan, PR (1994).

SAMPLE OUTLINE SPECIFICATIONS/SAMPLE PROCEDURES:

The text for the Selective Demolition Work on an 18th-20th century colonial building in Old San Juan is detailed herein only for explanatory purposes, and so that the breath of detailed information recommended for inclusion on a specific drawing sheet can be appreciated. This text is taken from our rehabilitation and restoration project for the Headquarters of the Conservation Trust of Puerto Rico. The building was found to be in such precarious conditions due to years of abandonment and the many interventions it had undergone, that we recommended the removal and dismantling of much of its historic construction fabric to be later recycled into the building itself. This was done, in spite of the many cases where these materials were moved to locations other than their original location within the building itself. As required, substitute or replacement historic construction material was acquired for use where extremely deteriorated historic construction material was determined un-usable (fragmented brick or marble tile for example). In most cases, these came from other historic buildings that had been demolished or from other project sites within the island of Puerto Rico where historic salvaged construction material, collected during the selective demolition process, was put up for sale and made available to interested individuals.

CITED TEXT:

SALVAGE OF ORIGINAL CONSTRUCTION MATERIAL AND/OR ELEMENTS:

All historic re-usable building material and/or elements such as Ausubo hardwood beams, marble tile, bricks, *"argamasa"* or lime bedding mortar, intricately carved arched wooden door transoms, stair and balcony iron railings, doors and/or windows with their respective hardware, and any other historic items, should be removed from their original location, classified and stored within the building premises for future re-use. The Project Architect should determine the location for the storage of these catalogued materials and elements.
(del Cueto and Reyes Casanova, 1993)

SECTION C: "YOUR FINISHED PRODUCT"

C.1 General Recommendations and Conclusions

Is it the Process or the Pretty face?

The Processes detailed in this Manual should provide the basis for the complete analysis and understanding of a historic building, structure or urban area in our region. As has been repeatedly stated throughout the text, the more complete the background knowledge acquired, the more chances available for the appropriateness of the new intervention. Basic principles to be followed should stress minimum intervention and reversibility[1], or at least, re-treatability. The ultimate goal should be to do as little as possible to ensure the building or structure's life and legibility. We must fully understand when to leave the building alone. Nevertheless, it must be clarified, that new or present-day interventions do not necessarily mean "an ultimate ideal", commonly acknowledged as a restoration or rehabilitation/adaptive use project (Section A.1). Oftentimes intervention might just mean stabilization, or a temporary roofing or support; it may just mean cleaning, or consolidating and grouting the detachment of a buildings surfaces. It may also signify a repair procedure like brick or stone (joint) repointing. The general processes included have proved to be successful, if carried out with seriousness and conscientiousness, and with the ultimate goal being the conservation and continued life of the built cultural resource we are dealing with.

Hacienda Maria Coffee Plantation in Yauco, PR.

[1] Capable of being corrected, not permanent or irrevocable. In a historic building, an intervention which can be undone (ie. including a wooden or gypsum board partition to divide a space which then can be removed at a later date without damage to the original building fabric).

It should be reiterated that the Conservation Field is inter-disciplinary, and that in order for a conservation or historic preservation project to be successful numerous professionals and tradespeople must collaborate closely. The ultimate beauty of the "finished product" must encompass a guarantee to the owner (be it private or public) that not only will the building look good, but that through the new intervention, guarantee is given on the continued life of the building or structure in a healthy manner. We must be assertive and confident about the work that has been carried out on the historic element we have dealt with, These well-cared-for elements of our built landscape should serve as living witnesses of historic periods, people that have passed through them and the continuity of our place in time. New meaning should be given to Ruskin's thoughts on how architecture is "the vehicle for memory".

Repointing and replastering exercise, on the Casa de Caminero at Juana Diaz, being directed by Conservation Architect John Fiddler (left). Architectural Conservator Jeanne Marie Teutonico explains issue of "material compatibilitv"(right). Design 203 Architectural students during fieldwork exercises from the Polytechnic University of Puerto Rico (1997).

The Issue of Compatibility:

Restoration of interiors of Casa Ramón Power y Giralt as headquarters of the Conservation 'Trust of Puerto Rico (1995).

What is compatibility and why is it important? Compatibility is defined by Webster as: "the capacity of two or more entities to combine or remain together without undesirable after effects; mutual tolerance, congruity; the capacity of components to function together." Compatible is "the capability of existing together without discord or disharmony; uniting readily and usually permanently; capable of blending into a homogeneous mixture that neither separates nor is altered by chemical interaction of ingredients."

Restoration of exteriors at the Colegio de Arquitectos Headquarters in Santurce, PR (l994).

Compatibility of Design:

Most of the conservation projects we have to work with deal with some kind of intervention into its fabric, even if this only means upgrading the building infrastructure in order to comply with present safety building Codes and Regulations. Because of this, the issue of compatibility is important in the initial design phases. This is so, because how you intervene upon the historic fabric through the actual addition or removal of elements (eg. interior partitions, a new building wing, or handicapped entrance ramp) will entail issues of compatibility. The most important concept then, is to be truthful about the new interventions. New elements or spaces such as partitions, ramps, rest-rooms, mechanical equipment and telephone areas and even complete building sections should clearly evidence their "newness". Compatibility in design must then be understood as the capacity of co-existence between the old and new. In present-day interventions, issues such as maintaining scale, proportions, rhythm and harmony with the historic resource should be

considered initially and throughout the process. New building wings should look new, yet maintain a close relationship to their historic and adjacent neighbor. Creativity, achieved through a thorough knowledge of our cultural resources is an important tool in the search for available, compatible solutions.

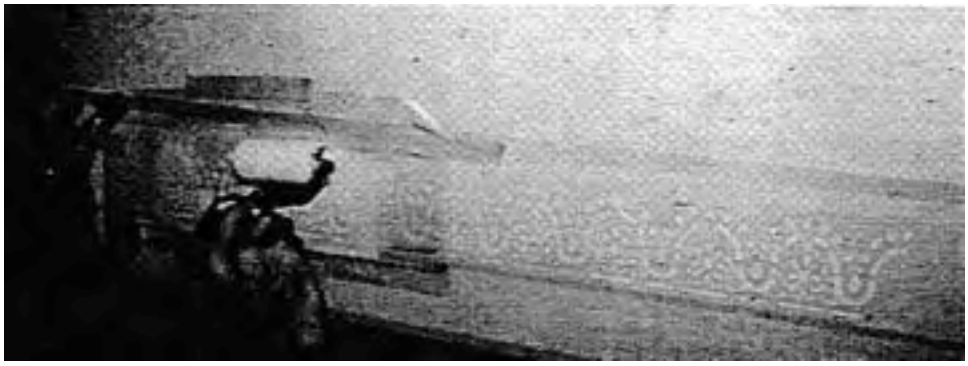
Examples of compatible modern interventions into historic fabric.

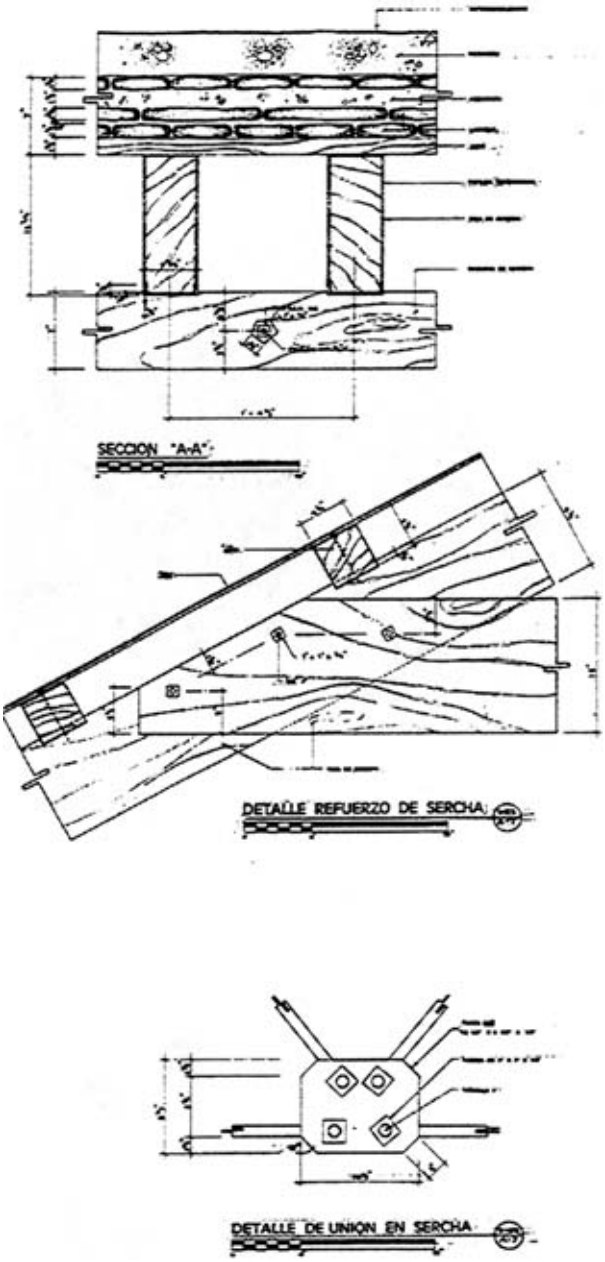
Compatibility of Materials:

Once design compatibility is achieved, then compatibility of construction materials and technology should be a primary concern. This is accomplished again, through the thorough knowledge and understanding of the properties characterizing the traditional materials and construction methodology of the specific building we are working with (Sections B.1, B.3 and B.4). The complete process does not only fulfill the goal to make the building look good (and once again become useful), but guarantees the continued "healthy life" of the historic resource. In plain words this means, except for maintenance, "if you do it well once, you will no have to go back and re-do it every year." If both (design and technological) compatibilities are achieved, the project will be successful from at economic, technological, aesthetic and theoretical point of view.

Architectural Conservator Frank Matero demonstrates traditional limewash production techniques at the Casa de Caminero project in Juana Diaz. PR. Design 203 architectural students during fieldwork exercises from the Polytechnic University of Puerto Rico (1997).

Contemporary wail stenciling at Casa Ramón Power y Giralt Project in Old San Juan, PR, which replicates traditional interior decorative motifs of the 18th and 19th centuries in the Caribbean (1995).





Details of traditional construction technology from the Humacao Customs House in Puerto Rico. Drawn by Design 203 Architectural Students of the Polytechnic University of Puerto Rico (1997).

A FINAL COMMENT:

Historic Urban centers are living organisms which reflect the human imprint in which societies have evolved through time and through technological change. Buildings of different styles and construction periods grace and co-exist in narrow streets. We are told that the ways people live and use the city have changed, so the obligation is that so too, the infrastructure must evolve. The re-cycling of our traditional towns and cities through the conservation of its individual buildings and structures is not only fashionable but often a positive economic necessity. The realities of the present situation in our historic towns and the limited quality of life inherent in a great number of them are due to the basic non-understanding of their qualities. It is those same attributes that have guaranteed their permanence, made them functional and useful, and can make them so again to present societies.

Common solutions often sought to revive these historic centers are the incorporation of new uses to existing historic buildings such as fast food restaurants, jewelry stores, and tourist T-shirt outlets. These solutions may be convenient to the transient, few hours-a-day-visitor or tourist, but not to the resident, to the worker, to the real every day user of the cities, upon whom its continuity and survival is made possible and even feasible. As stated by Derek Walcott, who was awarded the 1992 Nobel Prize in Literature, a city must be "...ideal in its commercial and human proportions, where a citizen is a **walker** and not a pedestrian..." (del Cueto and Pantel, 1993)

Colegio de Arquitectos restored headquarters at night (1996)

We expect this Manual of Conservation Methodology for Historic Buildings and Structures to be of particular use in our Caribbean region. It was specifically written and put together so that prior mis-guided and un-guided practices of interventions on historic buildings might be modified to allow for a more comprehensive, and hopefully more responsible, knowledgeable approach. The information contained in this Manual should provide a basic orientation to persons involved in the construction professions and trades, as well as assist students, owners, managers and administrators of historic buildings and structures.

As our cities and towns densify world-wide, recycling of our urban centers and its elements becomes ever more important and desirable. Conservation of this built patrimony will be, in some cases, the only solution, as we run out of available space for new construction. This Manual has detailed and explained how accessible Conservation and Historic Preservation are. It has also demonstrated that we must have the knowledge and tools to carry out the work in a conscientious and correct manner. Use of this Manual is recommended as a whole, or as reference material, utilizing some of the individual Sections within it. These Sections should serve as reminders or “refresher courses” regarding the systematic approaches recommended. We should keep in mind what we have stressed from the beginning of this Manual, that it is not designed intended to provide recipes or generic formulas for conservation projects. It should guide the user in the fundamental processes which are essential in the conservation of historic structures. This Manual serves as an

CODE OF FEDERAL REGULATIONS
TITLE 36--PARKS, FORESTS, AND PUBLIC PROPERTY
CHAPTER I--NATIONAL PARK SERVICE, DEPARTMENT OF THE INTERIOR
PART 68--THE SECRETARY OF THE INTERIOR'S STANDARDS FOR HISTORIC PRESERVATION PROJECTS

s 68.1 Intent.

The intent of this part is to set forth standards for historic preservation projects, containing general standards and specific standards for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction. These standards apply to all proposed grant-in-aid projects assisted through the National Historic Preservation Fund.

s 68.2 Definitions.

The standards for historic preservation projects will be used by the National Park Service and State historic preservation officers and their staff members in planning, undertaking, and supervising grant-assisted projects for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction. For the purposes of this part:

(a) Acquisition. Means the act or process of acquiring fee title or interest other than fee title of real property (including the acquisition of development rights or remainder interest).

(b) Preservation. Means the act or process of applying measures to sustain the existing form, integrity, and material of a building or structure, and the existing form and vegetative cover of site. It may include initial stabilization work where necessary, as well as ongoing maintenance of the historic building materials.

(c) Protection. Means the act or process of applying measures designed to affect the physical condition of a property by defending or guarding it from deterioration, loss, or attack, or to cover or shield the property from danger or injury. In the case of buildings and structures, such treatment is generally of a temporary nature and anticipates future historic preservation treatment; in the case of archeological sites, the protective measure may be temporary or permanent.

educational tool for Conservation, and as such, helps in part to safeguard the future of our built past in Puerto Rico and the United States Virgin Islands.

Spring trimester 1997 Design 203 architectural students with course professors. School of Architecture, Polytechnic University of Puerto Rico.

(d) Reconstruction. Means the act or process of reproducing by new construction the exact form and detail of a vanished building, structure, or object, or a part thereof as it appeared at a specific period of time.

(e) Rehabilitation. Means the act or process of returning a property to a state of utility through repair or alteration that makes possible an efficient contemporary use while preserving those portions or features of the property that are significant to its historical, architectural, and cultural values.

(f) Restoration. Means the act or process of accurately recovering the form and details of a property and its setting as it appeared at a particular period of time by means of the removal of later work or by the replacement of missing earlier work.

(g) Stabilization. Means the act or process of applying measures designed to reestablish a weather-resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

s 68.3 General standards for historic preservation projects.

The general standards listed below shall apply to all historic preservation grant-in-aid projects; additional standards in s 68.4 for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction apply to specific grant-in-aid projects as appropriate. The Standards shall be applied taking into consideration the energy conservation needs and the economic and technical feasibility of each project in the final analysis, however, the treatment must be consistent with the historic character of the structure and, where appropriate, with the district in which it is located.

(a) Every reasonable effort shall be made to provide a compatible use for a property that requires minimal alteration of the building structure, or site and its environment, or to use a property for its originally intended purpose.

(b) The distinguishing original qualities or character of a building, structure, or site and its environment shall not be destroyed. The removal or alteration of any historic material or distinctive architectural features should be avoided when possible.

(c) All buildings, structures, and sites shall be recognized as products of their own time. Alterations, which have no historical basis and which seek to create an earlier appearance, shall be discouraged.

(d) Changes, which may have taken place in the course of time, are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected.

(e) Distinctive stylistic features or examples of skilled craftsmanship which characterize a building, structure, or site shall be treated with sensitivity.

(f) Deteriorated architectural features shall be repaired rather than replaced, wherever possible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historical, physical, or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other buildings or structures.

(g) The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials shall not be undertaken.

(h) Every reasonable effort shall be made to protect and reserve archeological resources affected by, or adjacent to, any acquisition, protection, stabilization, preservation, rehabilitation, restoration, or reconstruction projects.

s 68.4 Specific standards for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction projects.

In addition to the general standards set forth in s 68.3 the following specific standards shall be applied as appropriate:

(a) Acquisition.

(1) Careful consideration shall be given to the type and extent of property rights that are required to assure the preservation of the historic resource. The preservation objective shall determine the exact property rights to be acquired.

(2) Properties shall be acquired in fee simple when absolute ownership is required to insure their preservation.

(3) The purchase of less-than-fee-simple interests, such as open space or facade easements, shall be undertaken when a limited interest achieves the preservation objective.

(4) Every reasonable effort shall be made to acquire sufficient property with the historic resource to protect its historical, archeological, architectural, or cultural significance.

(b) Protection.

(1) Before applying protective measures, which are generally of a temporary nature and imply future historic preservation work, an analysis of the actual or anticipated threats to the property shall be made.

(2) Protection shall safeguard the physical condition or environment of a property or archeological site from further deterioration or damage caused by weather or other natural, animal, or human intrusions.

(3) If any historic material or architectural features are removed, they shall be properly recorded and, if possible, stored for future study or reuse.

(c) Stabilization.

(1) Stabilization shall reestablish the structural stability of a property through the reinforcement of loadbearing members or by arresting material deterioration leading to structural failure. Stabilization shall also reestablish weather resistant conditions for a property.

(2) Stabilization shall be accomplished in such a manner that it detracts as little as possible from the property's appearance. When reinforcement is required to reestablish structural stability, such work shall be concealed wherever possible so as not to intrude upon or detract from the esthetic and historical quality of the property, except where concealment would result in the alteration or destruction of historically significant material or spaces.

(d) Preservation.

(1) Preservation shall maintain the existing form, integrity, and materials of a building, structure, or site. Substantial reconstruction or restoration of lost features generally are not included in a preservation undertaking.

(2) Preservation shall include techniques of arresting or retarding the deterioration of a property through a program of ongoing maintenance.

(e) Rehabilitation.

(1) Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant historic, architectural, or cultural material, and such design is compatible with the size, scale, color, material, and character of the property, neighborhood, or environment.

(2) Wherever possible, new additions or alterations to structures shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the structure would be unimpaired.

(f) Restoration.

(1) Every reasonable effort shall be made to use a property for its originally intended purpose or to provide a compatible use that will require minimum alteration to the property and its environment.

(2) Reinforcement required for structural stability or the installation of protective or code required mechanical systems shall be concealed whenever possible so as not to intrude or detract from the property's esthetic and historic qualities, except where concealment would result in the alteration or destruction of historically significant materials or spaces.

(3) When archeological resources must be disturbed by restoration work, recovery of archeological material shall be undertaken in conformance with current professional practices.

(g) Reconstruction.

(1) Reconstruction of a part or all of a property shall be undertaken only when such work is essential to reproduce a significant missing feature in a historic district or scene, and when a contemporary design solution is not acceptable.

(2) Reconstruction of all or a part of a historic property shall be appropriate when the reconstruction is essential for understanding and interpreting the value of a historic district, or when no other building, structure, object, or landscape feature with the same associative value has survived and sufficient historical documentation exists to insure an accurate reproduction of the original.

(3) The reproduction of missing elements accomplished with new materials shall duplicate the composition, design, color, texture, and other visual qualities of the missing element. Reconstruction of missing architectural features shall be based upon accurate duplication of original features, substantiated by historical, physical, or pictorial evidence rather than upon conjectural designs or the availability of different architectural features from other buildings.

(4) Reconstruction of a building or structure on an original site shall be preceded by a thorough archeological investigation to locate and identify all subsurface features and artifacts.

(5) Reconstruction shall include measures to preserve any remaining original fabric, including foundations, subsurface, and ancillary elements. The reconstruction of missing elements and features shall be done in such a manner that the essential form and integrity of the original surviving features are unimpaired.

COMMONWEALTH OF PUERTO RICO REFERENCE DOCUMENTS RELATING TO HISTORIC PRESERVATION:

Busciazzo, Mario J.

1955 Los Monumentos Históricos de Puerto Rico. San Juan, Puerto Rico: Junta de Planificación del Estado Libre Asociado de Puerto Rico.

Harvey, Edwin R.

1993 Legislación Cultural. San Juan, Puerto Rico: Instituto de Cultura Puertorriqueña.

Instituto de Cultura Puertorriqueña

1974 Commonwealth of Puerto Rico Historic Preservation Plan (Preliminary) - Volume 1 - Historical Background. San Juan, Puerto Rico: Estado Libre Asociado de Puerto Rico.

Junta de Planificación, Gobierno Estado Libre Asociado de P.R.

1993 Reglamento de Sitios y Zonas Históricas (Reglamento de Planificación Número 5 - Revisado), Santurce, Puerto Rico: Oficina del Gobernador.

1996 Listado de Sitios y Zonas Históricas Adoptadas por la Junta de Planificación. Santurce, Puerto Rico: Negociado de Planes de Usos de Terrenos, Junta de Planificación.

UNITED STATES VIRGIN ISLANDS REFERENCE DOCUMENTS RELATING TO HISTORIC PRESERVATION

Bredsdorff, Peter et. al.

1980 Three Towns - Conservation and Renewal of Charlotte Amalia, Christiansted. and Frederiksted of the U.S. Virgin Islands. Copenhagen, Denmark. (English translation by Hanne Ringsted) Danish West Indian Society.

Chapman, William

1981 Source Book for Buildings and Structures (A Resource Manual for the V.1. Inventory of Historic Places). St. Thomas, USVI: Division for Archaeology and Historic Preservation, Virgin Islands Department of Planning and Natural Resources.

Chapman, William and Jeanne Strong

n.d. Preservation Guidelines (1-16). St. Thomas, USVI: Division for Archaeology and Historic Preservation, Virgin Islands Department of Planning and Natural Resources.

Harrigan, Terry V. (editor)

1993 "Searching…., Saving Our Past for the Future". Government of the Virgin Islands of the United States: Division for Archaeology and Historic Preservation, Third Quarter 1993.

Taylor, William, Frederik Gjessing, et al.

1984 Frederiksted Preservation. St. Croix, USVI.

Taylor, William and William Chapman

n.d. Preservation Guidelines: A Simple List of Do's and Dont's for Historic Buildings and New Buildings in Frederiksted. Frederiksted, St. Croix, USVI: Divsion for Archaeology and Historic Preservation, Virgin Islands Department of Planning and Natural Resources.

The Virgin Islands Code

1968 Volume 4A, Title 29, Chapter 3 (281-285) on the Creation of the Virgin Islands National Historic Site and Corresponding Regulations.

SUGGESTED READINGS:

American Institute for Conservation of Historic and Artistic Works (AIC)
1996 "Guidelines for Selecting an Conservator". Washington, D.C.: AIC.

Ashurst, John
1983 Mortars. Plasters and Renders in Conservation: A Basic Guide. London, England. Ecclesiastical Architects' and Surveyors' Association. (Second edition to appear in late 1996)

Ashurst, John and Nicola Ashurst
1988 Practical Building Conservation. Volume 3: Mortars, Plasters and Renders. Alderslot: Grower Technical Press.

Barret Kennedy, C.
1990 "Videographic Documentation, Analysis, and Manipulation - A New Tool for Cultural Resources Management" in APT Bulletin - The Journal of Preservation Technology (Association for Preservation Technology) 22(1&2): 97-103. Ontario, Canada.

Borchers, P.
1977 Photogrammetric Recording of Cultural Resources. Washington, D.C.: National Park Service.

Chambers, AIA, J. Henry
1985 Rectified Photography and Photo Drawings for Historic Preservation. Washington, D.C.: U.S. Department of the Interior.

Chapman, William
1981 Source Book for Buildings and Structures (A Resource Manual for the V.1. Inventory of Historic Places). St. Thomas, USVI: Division for Archaeology and Historic Preservation, Virgin Islands Department of Planning and Natural Resources.

Chapman, William and Jeanne Strong
n.d. Preservation Guidelines (1-16). St. Thomas, USVI: Division for Archaeology and Historic Preservation, Virgin Islands Department of Planning and Natural Resources.

Clysdale, A.
1990 Chemicals in Conservation: a guide to possible hazards and safe use. Scotland: Scottish Society for Conservation and Restoration.

Comite International de Photogrammetrie Architecturale (CIPA)
1972 Photogrammetrie des Monuments et des Sites (Photogrammetry of Monuments and Sites), Saint-Mandé, France: UNESCO.

del Cueto de Pantel, Beatriz
1986 "La Intervención en un Edificio Histórico: Los Conceptos Fundamentales", en Plástica 2(15): 73-82. San Juan, Puerto Rico.

1990 "De la Vivienda y lo Vivido en la Ciudad de San Juan: Evolución de la Arquitectura en Puerto Rico desde el Siglo XVI hasta el Siglo XIX", en Estudios sobre Arquitectura Iberoamericana. Sevilla, España: Junta de Andalucía, Consejería de Cultura y Medio Ambiente.

Feilden, Bernard M.
1994 Conservation of Historic Buildings. Great Britain: St. Edmundsbury Press Ltd.

Fidler, John
1980 "Non-destructive Surveying Techniques for the Analysis of Historic Buildings" in ASCHB Transactions 5: 3-10. London, England.

Gárate Rojas, Ignacio
1994 Artes de la Cal. Madrid, Espana. Ministerio de Cultura, Dirección de Bellas Artes y Archivos - Instituto de Conservación y Restauración de Bienes Culturales.

Harris, Cyril M.
1975 Dictionary of Architecture and Construction. New York: McGraw-Hill Book Company.
1977 Illustrated Dictionary of Historic Architecture. New York: Dover Publications, Inc.

Hawley, G.G.
1981 The Condensed Chemical Dictionary. New York: Van Nostrand Reinhold Company.

Hoke Jr., AIA, John Ray (Editor in Chief)
1988 Architectural Graphic Standards. New York: John Wiley & Sons.

Holmstrom, Ingmar and Christina Sandstrom
1972 Maintenance of Old Buildings. Stockholm, Sweden: Statens Institut for Byggnadsforskning.

Jester, Thomas C. (editor)
1995 Twentieth Century Building Materials - History and Conservation. New York: Mc Graw - Hill Companies.

Kapsch, Robert J.
1990 "HABS/HAER: A User's Guide" in APT Bulletin - The Journal of Preservation Technology (Association for Preservation Technology) 22(1&2): 22-34. Ontario, Canada.

Kemper, Alfred M.
1979 Architectural Handbook - Environmental Analysis. Architectural Programming. Design and Technology, and Construction. New York: John Wiley & Sons.

Letellier, Robin (Guest Editor)
1990 Heritage Recording Issue in APT Bulletin - The Journal of Preservation Technology (Association for Preservation Technology) 22(1&2). Ontario, Canada.

Letellier, Robin
1978 "Architectural Photogrammetry applied to Heritage Recording" in APT Bulletin - The Journal of Preservation Technology (Association for Preservation Technology) 10(3): 78-83. Ontario, Canada.

Marston Fitch, James
1990 Historic Preservation - Curatorial Management of the Built World. Charlottesville: University Press of Virginia.

1996 "Murder at the Modern", Manuscript.

1996 "The Battle for the Past: Preservation versus Historicism, Post Modernism and the Theme Park", Manuscript.

Massari, Giovanni
1993 Damp Buildings Old and New. Translated by C. Rockwell. Rome, Italy: ICCROM.

1971 Humidity in Monuments. Rome: ICCROM.

McKee, Harley J.
1970 Recording Historic Buildings. Washington, D.C.: U.S. Department of the Interior, National Park Service.

Muir, G.D.
1977 Hazards in the Chemical Laboratory. London: The Chemical Society.

Newmark Kay, Gersil
1992 Mechanical & Electrical Systems for Historic Buildings. New York: McGraw-Hill, Inc.

Parrott, Charles
1980 Access to Historic Buildings for the Disabled: Suggestions for Planning and Implementation. National Park Service, Washington, D.C.: U.S. Government Printing Office.

Rossol, M.
1990 The Artist's Complete Health and Safety Guide. New York: Allworth Press.

Rutenbeck, T.E.
1981 "Monitoring Structural Movements" in Cultural Resources Management Bulletin 4(1): 14-16. Washington, D.C.: Department of the Interior.

Shugar, G.J., R.A. Shugar and L. Bauman
1981 Chemical Technician's Ready Reference Handbook. New York: McGraw-Hill.

Simmons, AIA, H. Leslie
1989 The Architect's Remodeling. Renovation. & Restoration Handbook. New York: Van Nostrand Reinhold.

Standards for Accessible Design: ADA Accessibility Guidelines (ADAAG).
1991 Washington, D.C.: U.S. Department of Justice.

The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings
1990 Washington, D.C.: U.S. Department of the Interior, National Park Service - Preservation Assistance Division.

The UNESCO Press
1981 Appropriate Technologies in the Conservation of Cultural Property. Switzerland: United Nations Educational, Scientific, and Cultural Organization.

Teutonico, Jeanne Marie
1988 A Laboratory Manual for Architectural Conservators. Rome, Italy. ICCROM (International Centre for the Study of the Preservation and the Restoration of Cultural Property). Presently under revision.

Torraca, Giorgio
1982 Porous Building Materials - Materials Science for Architectural Conservation. Rome, Italy: ICCROM (International Centre for the Study of the Preservation and the Restoration of Cultural Property).

U.S. Department of the Interior, National Park Service
1970's-90's (titles of specific issues relevant to this Section are included) Preservation Briefs 1-37. Washington, D.C.: U.S. Government Printing Office.

U.S. Department of the Interior, National Park Service
1989 Recording Structures and Sites with HABS. Measured Drawings (HABS/HAER Guidelines). Washington, D.C.

U.S. Department of the Interior, National Park Service
1990 Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation - HABS/HAER STANDARDS. Washington, D.C.

U.S. Department of the Interior, National Park Service
1994 Recording Historic Structures & Sites for the Historic American Engineering Record (Draft). Washington, D.C.

Beatriz del Cueto, AIA is a licensed Architect and Historic Preservation Consultant, Principal of her own Architectural firm in San Juan, Puerto Rico. Through her projects, she has been the winner of various design and research awards in the field of historic preservation, which include: The American Express Preservation Award for the Caribbean in 1991, 1994 and 1996; the American Institute of Architects' Design Awards from the Florida and Caribbean Region in 1994, and the Puerto Rico Chapter in 1993 and 1995; Commercial Renovation Designer of the Year Award; III Architectural Biennial of the Caribbean, and the I, II and II Architectural Biennials of Puerto Rico; and Architect of the Year Award by the Puerto Rico Realtors Association. She has done research and lectured extensively on the subject of historic preservation in Puerto Rico and the Hispanic Caribbean, and her articles and architectural projects have been published in prestigious magazines such as ARCHITECTURE, FLORIDA ARCHITECT, COMMERCIAL RENOVATION, PLASTICA, QUE PASA, and SAN JUAN REAL ESTATE, as well as in local Puerto Rican newspapers.

Ms. Del Cueto holds a Master of Arts in Architecture with a concentration in Historic Preservation and a Bachelor of Design degree, both from the University of Florida at Gainesville, and has been a Participant at the Preservation Institute: Nantucket, as well as a graduate of ICCROM (International Center for the Study and the Preservation and Restoration of Cultural Property) in Rome, Italy.

Among the many honorary positions held, she was President for the Puerto Rico Chapter of the American Institute of Architects, State Architect under the State Historic Preservation Office of Puerto Rico, and is State Preservation Coordinator for the Commonwealth of Puerto Rico under AIA National. She also acts as a Reviewer for the Getty Grants Program, Architectural Conservation Grants for Latin America and the Caribbean. Del Cueto is currently carrying out research on traditional construction technologies in the Caribbean and directs the Historic Preservation Program of the Polytechnic University of Puerto Rico in San Juan, where she is also a Faculty Member.

Agamemnon Gus Pantel, Ph.D. is an International Heritage Management Consultant and has had extensive experience in the fields of cultural resources management in the U.S. federal system, Puerto Rico Commonwealth, U.S. Virgin Islands, and throughout the Caribbean Basin since 1972. Dr. Pantel holds graduate degrees in anthropology and archaeology, with post graduate training in architectural conservation is sues at ICCROM. He has served as Deputy State Historic Preservation Officer for Puerto Rico and has been instrumental in the design, development and drafting of the Commonwealth laws and regulations regarding archaeology and historic preservation. At present he is Project Conservator of the Urban Train project for metropolitan San Juan, a practicing consulting archaeologist, and Faculty Member at the Polytechnic University of Puerto Rico School of Architecture.

Roberto Garcia, M. Arch. is a Graduate Architect, and an Historic Preservation Field Specialist who has been Supervisor of major preservation projects in Puerto Rico. Mr. Garcia has had extensive experience in field methods for interventions into the fabric of historic buildings, and in the development and preparation of compatible modem construction materials and finishes. He is presently based in Ponce as an independent consultant in architectural conservation, and is a Faculty Member at the Polytechnic University of Puerto Rico, School of Architecture.