

FINAL ENGINEERING REPORT - March 1962

PROCEDURE FOR ENGINEERING AND CONSTRUCTION OF MODEL

A. Upon commencement of this project, a survey was started to permit evaluation of sources of information to correctly portray the city. This survey consists of: Visits to public and private libraries as well as the municipal library; conferences with aerial photo companies; visits to photo libraries, public and private; conference with private and public information bureaus; conferences with printed map makers and map supply houses; and visits to various city departments. This survey, although substantially complete, will not be terminated until all necessary information is in our hands.

As a result the following items have been decided upon as constituting necessary information in the most economical net form:

1. Land Book Vol. 1, 2, 3, 4, Bronx (1961) G. W. Bromley & Co., Inc. Two of these volumes are in scale of 1"-100' and will be used thus. Two of these volumes are in scale of 1"-160' and will be photostated into the scale of 1"-100'.
2. Land Book Manhattan (complete 1961) G. W. Bromley & Co., Inc. This volume is in scale of 1"-160' and will be photostated into the scale of 1"-100'.
3. Fire Insurance Maps Richmond (319 Maps) 1961, 4 volumes Sanborn Map Co., Inc. 235 of these maps are in scale of 1"-100' and will be used thus. The balance of 84 maps will be photostated into scale of 1"-100'.

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4. Fire Insurance Maps - Queens and Brooklyn (3,397 Maps)
1961-44 Volumes Sanborn Map Co., Inc. None of these maps
are in scale, but photostats in 1"-100' will be supplied to us
directly from Sanborn.
5. Vertical Aerial Photographs of New York City complete flown
1961 and 1962 in scale of 1"-300'. Aero Service Corporation
(Philadelphia). 1 set minimum overlap coverage.
6. Diagonal Aerial Photographs of New York City. These will be
obtained from many sources including Departmental Photo
Files, Port of New York Authority, Libraries and custom
photos from Aero Service Corporation.
7. Index Maps of City Owned and Operated Facilities City Planning
Commission (35 Maps).
8. Contour Maps of Metropolitan Area. U. S. Geological Survey
(15 minute quadrangle, 19 maps).
9. The City of New York Official Directory.
10. Departmental information from each of the major departments
of the City. This information includes official facilities lists,
prints and photos of major facilities.

B. The above listed items are utilized in preparing model size and
outline. They determine the types and sizes of houses to be modeled as

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well as ultimately the quantity of each. With the aid of these items, this report is prepared.

C. All information is being catalogued to conform to a breakdown based on the 272 sections constituting the model.

D. The engineering preparation for shop work is done simultaneously with the shop work as an integrated work unit. One section (#25H) covering parts of Richmond and Brooklyn just north of the Narrows Bridge will be built as a production prototype. Section frames are constructed, including "water layer", jig custom built for this job. Shore lines and contours are projected directly onto the section, from the Geodetic Survey Master Map, and onto rigid foam blocks. These blocks are then cut and sculptured to the marked contours. The contours are mounted onto the sections and checked.



Next the contoured sections are surface treated with Epoxy Resin and put back onto the jig to have major then minor roadways marked thereon. These markings are matched with adjacent sections marking and checked against latest road information (including field checks) and then modeled.

Land books and insurance maps in scale of 1:1000 are next utilized as templates, together with diagonal and vertical photos and auxiliary information to place houses, block by block. Prior to this all special

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houses having been independently built. Work is now checked. Next, vegetation and special items, are added to model sections based on vertical aerial photos and rechecked. Last, lighting effects (Indicator lights and ultra violet light paints are added to suitable prepared areas). Model is again checked including lighting effects, match of sections, etc., and is passed as complete.

Engineering involves suitable preparation of information for shop use, checking, listing drawings of special features to be custom built, and planning of efficient shop techniques.

A final engineering report for a project such as this is final only in that it portrays the methods of construction, general materials and typical topographic details. Specific topographic items such as numbers and shape of contours, houses, roads, trees, etc., will be determined at time of construction and will be modeled in detail comparable to sample and typical drawings. The drawings constituting part of this report depict general construction and typical details.

END

GENERAL CONSTRUCTION

MAP BASE

The entire map base consists of 272 individual sections. Each full section will be constructed of a 4' x 10' x 3/4" thick Formica Flakeboard panel with 2 x 4 Douglas Fir lumber and 3/4" thick rigid Urethane Foam framing. There are 186 full sections. The remaining sections, which vary in size, smaller than a full section, will also be constructed of 1/2" thick Formica Flakeboard with 2' x 4' Douglas Fir lumber and 3/4" thick rigid Urethane Foam framing. Weldwood glue will be utilized to fasten framing to Formica Flakeboard.

The framing of each section will be done in the section building jig (Drawing #NYC-705-0) to assure that all the sections are exactly the same width and all the full sections are the same length.

This operation is done to control the overall length and width of the map.

Each section will be contoured using rigid fire retardant Urethane Foam panels. The thickness of these panels will vary, depending on the contours of the section.

The foam panels will be carved and sanded to the proper contours following the character of the actual land as outlined on U. S. Geological Contour Maps and Aerial Photographs of the area. All exposed wood will be coated with Retardo, a certified fire retardent paint manufactured by Benjamin Moore & Co.

Each section will be coated with Horsey-Set/TLS, an epoxy resin to give it a strong smooth surface.

All water areas will be painted blue. City streets, highways and blocks, etc., will be laid out on the map surface for all five boroughs.

All areas outside the five boroughs, such as the New Jersey shore, etc., will be painted in stylized none detailed form.

BASE SUPPORT STRUCTURE

The support structure will consist of 497 legs. Each leg will be constructed of 1/8" steel plate with a 3/4" steel pipe vertically welded to it.

The design of 444 legs will be such as to tie three sections together. (See Dwg. #NYC-202-7). The joint of the three sections will sit on top of the 1/8" steel plate.

The design of the 53 other legs will be such as to tie two sections together. (See Dwg. #NYC-202-9).

All legs will be 34" high and each leg will have an adjustable pad which will permit the map to be leveled.

MAP SURFACE DETAIL

A. BUILDINGS

There are approximately 800,000 buildings in the five boroughs of New York City.

The bulk of these buildings are one, and two story structures. Private homes will be injection molded in various styles. One and two story tax-

payer type buildings and small industrial structures will be built of Acrylic plastic and Poplar wood in about 150 sizes. Brownstones, tenements and four, five and six floor apartment house segments will be in about forty styles, all fenestrated. In addition, there will be about twenty-four standard blocks to be used for the construction of larger buildings. These blocks will be cut to different length and will be fenestrated. The forms shown in our drawings can be used separately or in combinations.

Special buildings will include large factories, major churches, and hospitals. Skyscrapers, colleges, museums and other notable landmarks. These buildings will be custom fabricated of plastic in high detail.

Landbooks and aerial photographs will be utilized to determine the type, size and location of each building in New York City.

All buildings will be fastened to the map with epoxy adhesive.

B. BRIDGES

There are approximately 60 major bridges in the five boroughs of New York City. The bulk of these bridges will be constructed using the actual drawing of each individual bridge supplied to us by the various city and state agencies, such as Triboro Bridge and Tunnel Authority and New York State Department of Public Works, etc.

Each bridge will have its unique structure, reproduced by a process called chemical milling. This process will enable a duplication of the intricate structure of the various bridges. (Example: The cable and tower structure of the George Washington Bridge.)

C. TRANSPORTATION VEHICLES

- (1) Cars, buses and trucks will be fabricated of acrylic plastic colored red, green, black, white, yellow, blue and tan. They will be mounted with an adhesive to major roads and highways in random traffic pattern.
- (2) Railroad cars and subway cars will be fabricated of acrylic plastic and will be mounted with an adhesive. Trains will be depicted on major tracks, railroad and subway yards throughout the model.
- (3) Boats, ships, barges, ferries and tugs, will be cast metal and fabricated, and will be permanently mounted to the model.
The harbor scene will depict a typical New York Harbor scene.
Ship waves will be painted on.

D. ROADS, BLOCKS & PARK AREAS

Will be painted onto the surface of the map. They will be painted as follows:

- (1) Local Roads-----Dark Gray
- (2) Highway & Parkways-----Light Tan
- (3) City Blocks-----Off White
- (4) Urban Blocks-----Green
- (5) Parks-----Green (UV paint if city owned) Special attention will be given to ball fields and other recreation areas duplicating their character.

E. WATER AREAS

All bodies of water which surround the five boroughs of New York City will have a textured surface to simulate waves as seen from a high altitude. All water areas will be painted blue.

F. RAILROAD TRACKS

All railroad tracks will be painted onto the surface of the map.

G. TREES AND OTHER VEGETATION

All trees and other vegetation will be made from sponge like Urethane Foam (A nonorganic plastic). Latest aerial photographs of the city will be used as a guide for placing this vegetation.

H. LIGHTS

Small lights will be mounted onto buildings (See Dwg. #NYC-504-1), which represent city facilities. (See separate "City Facilities Listing".)