09 Oct 1970

# Austin Oaks 68

Franklin B. Johnson

J. Neils Thompson

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by

Franklin B. Johnson,[1] J. Neils Thompson,[2]
Robert I. Carr, Jr.,[3] and David W. Fowler[4]

The University of Texas at Austin with a grant from the U. S. Department of Housing and Urban Development, on September 25, 1968 instigated a crash program to construct ten low cost single dwelling houses in an experimental project. Federal Housing Administration selected these ten houses from a list of 88 builders from across the country. Construction of the ten houses was begun in October. The houses were completed and the project dedicated by President Johnson on December 14, 1968. The houses were sold to selected low income families, who began occupying the houses in early February 1970.

Project Scope - The role of the University of Texas was to contract with the selected builders for the erection of ten low cost housing systems, contract for site preparation, contract for utilities construction, observe and document in every respect all phases of construction, document all costs, and evaluate the various engineering and architectural characteristics of all systems. Also required was a study of community acceptance priority during and after construction of these houses and the recording and evaluation of the acceptance from time to time of the occupants of the houses.

Project Organization - A team of University of Texas and other local personnel was organized to supervise and maintain control over the various phases of the project. Over twenty faculty were involved cutting across areas of architectural engineering, civil engineering, mechanical engineering, electrical engineering, sociology, psychology and architecture.

Principal project personnel were as follows: Prof. J. Neils Thompson, Administrator; Dr. Franklin B. Johnson, Director of Engineering Studies and Evaluation; Prof. R. I. Carr, Construction and Cost Analysis; Dr. D. W. Fowler, Structural Analysis; Dr. J. T. Houston, Material Analysis; Prof. Elmer Hixson, Acoustics; Prof. Wayne Long, Mechanical Engineering; Dr. James A. Williams, Sociological Studies; and Prof. Robert G. Mather, Architectural Studies. In addition William B. Saunders, A.I.A., of Austin, Texas, served as coordinator of problems related to construction of utilities and liason with city officials.

The full cooperation, aggresive action and dedicated efforts of many, including HUD and F.H.A. officials, the builders, the city officials, the city utility crews, the landscape contractor, the University of Texas faculty and administration, and many others enabled the accomplishment of the preparation of the site and the construction of the houses in one month.

House Construction - The builders used new and old techniques, technologies, and materials to produce low-cost houses. Each builder designed his own house. Some were constructed in place, some were constructed in a plant (prefabricated and moved to the site) and some were partially constructed in a plant and partially on site. They ranged from conventional frame construction to precast concrete, to concrete block, to semi-mobile type and to panelized construction. The houses were constructed on a site that was formerly under the U. S. Department of Agriculture. The tract was subdivided into ten lots arranged around a community parking lot (Fig. 1). A brief description of the ten houses and their construction materials and methods follows.

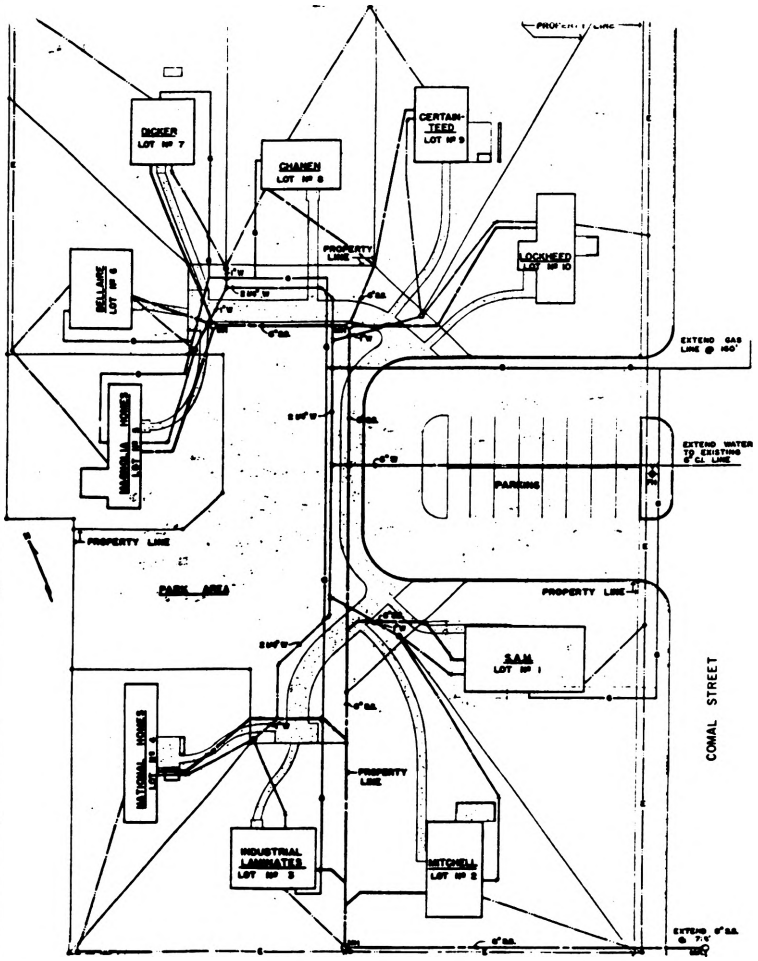



Figure 1

[1] Head and Graduate Advisor of the Architectural Engr. Div. of Civil Engineering Dept. at University of Texas at Austin.
[2] Professor of Civil Engineering and Director of Balcones Research Center at University of Texas at Austin.
[3] Assistant Professor of Architectural Engr. at University of Texas at Austin.
[4] Associate Professor of Architectural Engr., University of Texas at Austin.

Lot 1-SAM Industries - This house has 1080 sq. ft. with five bedrooms and one and a half baths. The house was factory built in St. Petersburg, Florida. The house is fabricated on a welded steel floor frame. Plywood stressed skin panels fabricated with continuous plywood sheets glue nailed to wood framing were used for wall and roof panels. The walls and ceiling were coated with "Samkote", the roof with a silicone finish and the floor with a vinyl acrylic finish. The house was manufactured in two longitudinal sections. Wheels were attached to the steel frame of each section, and the units were hauled from St. Petersburg to Austin. The sections were set side by side on concrete block piers, aligned and bolted together. Work not completed at the factory was then completed at the job site.

Lot 2-Neal Mitchell Association - This house has 770 sq. ft. with two bedrooms and one bath. The major innovative feature is the precast concrete frame and roof panels. Precast concrete columns were set into concrete footings. Precast concrete beams were bolted to the columns and precast concrete roof panels span between the beams. A concrete floor slab was poured around columns above footings. Frame exterior walls span between columns on the exterior and hollow core gypsum board "Structicore" make up the interior partitions. Lightweight concrete was poured above polystyrene foam on top of the precast roof panels. The roof was sprayed with fiberglass and painted with an elastomeric coating. Exterior plywood walls were oiled and interior walls were painted. The ceiling was sprayed with an acoutic finish and the floor was covered with vinyl asbestos tile.

Lot 3-Industrial Laminates - This house has 770 sq. ft. with three bedrooms and one bath and is supported on a pier and beam foundation. Time for construction was 4 days. Exterior wall panels, prefabricated in a plant by the builder, were constructed of aluminum clad plywood, polystyrene cores, and prefinished mahogany. The roof has trussed rafters sheathed with plywood with a built-up roof. Interior wall surfaces are prefinished plywood, the ceiling is suspended acoustical panels and the floor is vinyl asbestos tile over a plywood subfloor.

Lot 4-Town Patio Homes - This house has 658 sq. ft. with three bedrooms and one bath. The time spent in on-site construction was 4 days. The house was manufactured in a factory in Lafayette, Indiana, and trucked to Austin. The house was lifted from the trailer to the pier foundation with a crane. The house has an all wood frame with fiberglass insulation in the floor, walls, and roof. The exterior wall surface is an aluminum skin over plywood, and the interior partitions and ceiling are surfaced with prefinished gypsum board. The floor is sheet vinyl over a plywood subfloor, and the roof is galvanized sheet metal over plywood.

Lot 5-Magnolia Homes - This house has 717 sq. ft. with four bedrooms and one bath. The time for on-site construction was 5 days. The house was manufactured using modified mobile home construction in Vicksburg, Mississippi. It was shipped in two sections; one section 12 x 50 feet and one master bedroom section 12 x 10 feet. The house has an all wood frame with exterior plywood on the outside and prefinished plywood on the inside. The floor is vinyl asphalt tile, the ceiling is acoustical tile and the roof is asphalt shingles. The section were set on concrete block pier foundations at the site.

Lot 6-Bellaire Homes - This house has 784 sq. ft. with three bedrooms and one bath. Time for construction on site was 13 days. Cinder block piers rest on poured spot footings and support a wood platform subfloor. A major innovative feature of this house is its wall and roof system. Interior and exterior walls and roof are of factory fabricated panels of enameled aluminum skins glued to both sides of Kraft paper honeycomb. The panels were shipped to the site and erected on the platform to fully enclose and partition the house. The floor is surfaced with asbestos tile.

Lot 7-Dicker Stack Sack International - This house has 616 sq. ft. with two bedrooms and one bath. Time for construction was 22 working days. A concrete slab covers the floor area of the house but the "Stack Sack" walls have a separate concrete continuous strip footing. The exterior walls are formed by the "Stack Sack" method of cement mortar filled burlap bags dipped in water, stacked and covered with sprayed-on cement mortar. The flat built-up roof is supported by exposed wood beams sheathed with plywood left exposed as the ceiling. Exterior and interior wall surfaces are painted, the ceiling surface and beams are stained, and the floor is covered with vinyl asbestos tile.

Lot 8-The Phoenix Mini House-Chanen - This house has 720 sq. ft. of area with two bedrooms and one bath. Time for construction was 20 days. The house has a slab on grade foundation, concrete block exterior walls, and 2 x 4 in. wood framed standard sheetrock interior walls. The roof is framed with trusses, sheathed with plywood and roofed with asphalt shingles. The interior and exterior walls and ceiling surfaces are painted, and the floor is surfaced with vinyl asbestos tile. The house is a conventional method of house construction typical of today's standard techniques.

Lot 9-Certain Teed Products Corporation - This house has 560 sq. ft. with two bedrooms and one bath. Time for construction was 23 working days. The wall system of this house is of major interest, since it was constructed of the extruded asbestos cement elements of the CTX post and panel system. The house has a concrete slab foundation and a truss roof with asphalt shingles. The ceiling is gypsum board and the finish floor is vinyl asbestos tile. Surface finishes on ceiling and walls inside and outside are paint. The house has a patio with storage shed.

Lot 10-Lockheed House - This house has 720 sq. ft. with four bedrooms and one bath. The major innovative features are the panel lock exterior wall system and the bathroom-kitchen core unit. The exterior wall panels are 2 in. thick, 4 x 8 ft. horizontally cast concrete. The panel lock extruded aluminum

edge strips served as side forms for the concrete and during panel erection were connected together such that a continuous wall was formed. The bathroom-kitchen core unit contains all components of the bathroom, kitchen and mechanical equipment in a prefinished unit that was hooked up to roughed-in plumbing, electrical, heating duct work, and structure. The house has a concrete slab foundation and wood joist roof framing with a built-up roof. Interior walls are prefinished hardboard on 2 x 3 in. stud framing. The ceiling is gypsum board and the floor is vinyl asbestos tile. The inside and exterior surfaces of the exterior walls were painted.

Construction Record and Cost Evaluation - The evaluation of each house in the project required detailed documentation of construction operation and costs. In plant and on site time and motion studies based upon extensive time lapse movies, project inspectors hourly records, and contractors notes and payrolls allowed a complete breakdown of labor man hours and payroll required on site for each house. Examination of all builders' invoices, plans, specifications, inspectors' counts of materials and an independent housing estimators' sources gave a material quantity and cost take off for each house. The on site labor and materials' costs were combined with factory and transportation costs to give complete estimates of house costs for various quantities of houses built on a site. The detailed reports of man hours and material quantities allow the extension of costs to other geographical areas.

Materials and Structural Evaluation - The materials, framing members, and structural components of all the houses were evaluated to determine their structural integrity. Where the FHA Minimum Property Standards (MPS) were satisfied, the materials and structure were assumed adequate. For structural systems not meeting the MPS, an engineering analysis was performed where such analyses were possible or practical. Where analytical methods were not available, structural tests were performed, in particular on sandwich wall and roof panels and panelized wall systems. These tests included transverse loading, compression, racking, and impact.

All concrete used in the project was tested to determine compressive strength. Materials for which no standards have been established were tested for prediction of performance. The houses were inspected periodically to determine the actual performance of the materials and finishes. The cooperation of the builders was obtained in obtaining material test results, material samples, and specifications for use of the materials.

Environmental Studies and Evaluation - An engineering study of the thermal characteristics of the ten houses was made and a comparative comfort index was developed which reflects the influence of such factors as surface area of walls, roof and windows, and the thermal conductivity of the construction and the measurement of actual temperature of wall, ceiling, and window surfaces. The comfort index was compared to the amount of energy (gas and electricity) consumed by the occupants at various times and correlated to the house configuration and construction system used.

As an acoustic evaluation three types of recommended tests were performed on each of the houses. (1) The Field Transmission Loss is an engineering evaluation of the acoustics noise isolation properties of a wall panel as constructed in the building and is useful in comparing the interior wall materials and construction methods. (2) Noise Isolation provides a measure of isolation between rooms under normal conditions where noise can travel all possible paths. (3) Insertion Loss is a measure of the effectiveness of the exterior wall in preventing outside noise from entering the house.

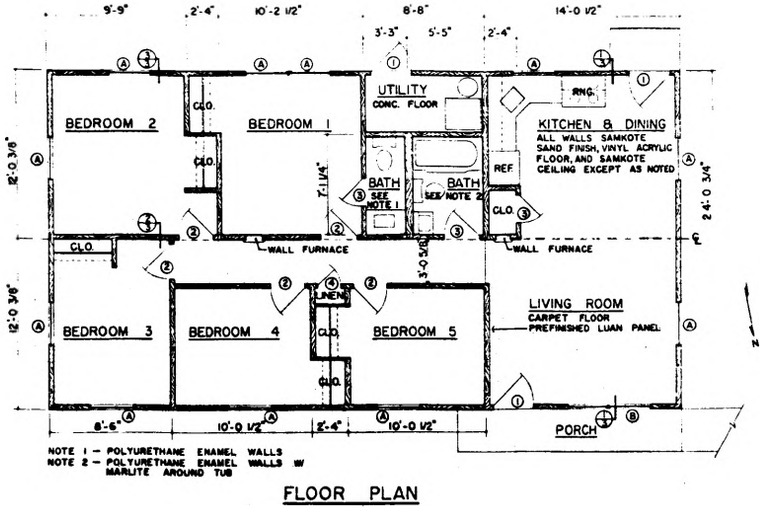
The Field Transmission Loss is clearly an engineering evaluation while the other two factors bear on the livability of a house.

Sociological and Architectural Evaluation Studies - These studies were designed to provide data and information for the following: (1) A measure of the attitude of low-income persons toward the dwelling units. This includes positive and negative attitudes toward specific aspects of each house, a general rank order of preference among the ten structures and a comparison of preferences for single family houses of this type with other housing configurations in other patterns and diversities which can be achieved by utilizing the same technological resources. For this purpose a housing center in a small temporary building outfitted with carefully devised display materials and models was developed. (2) A measure of the attitudes of certian interest groups toward the demonstration project and toward the individual houses. Interest groups include builders, realtors, political leaders, civil rights leaders and religious organizations. (3) An assessment of the characteristics of the potential market for these houses. This included both the ability to purchase houses of this type and the desire to own houses of this type. (4) The development of a commensurate method of sociological and technical data gathering so that the "hard findings" developed by the engineering studes can be meaningfully related to the sociological and architectural sudies above.

The instrument for information collection was a structured interview schedule which contained pre-coded fixed response questions, open-end questions, item check lists and, where appropriate, questions to be answered by the interviewer based upon his observation.

A highly select team of university students were employed as interviewers and given intensive training before participating in the study. The data and information collected were analyzed through use of data processing equipment available at The University of Texas.

Project Significance - This project is highly significant as the first time such complete documentation and evaluation of different housing systems has been attempted. The final report contains the detailed findings from this project. These conclusions point toward no easy solution to everyman's low cost house. However, the engineering studies indicate industrialized procedures utilizing total or partial factory construction show promise of reducing cost and construction time as well as providing acceptable quality. The sociological and architectural studies indicate it is possible to determine and document the desires, preferences and housing needs of various socio-economic groups in one geographic area and that the approach used can be extended to similar groups in other geographic locations.

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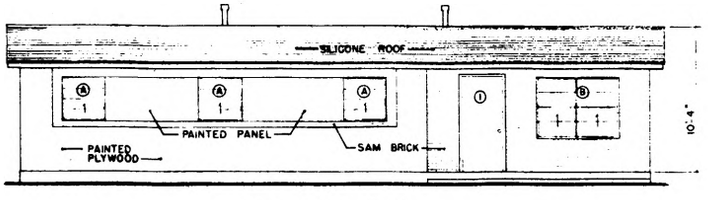
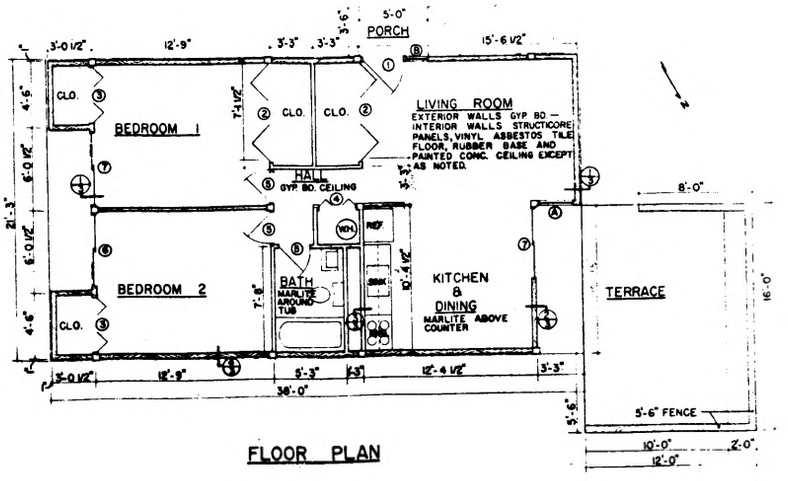



FRONT ELEVATION

S.A.M. MODEL HOME

Lot 1

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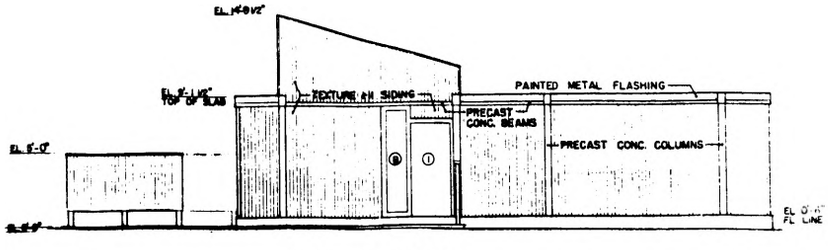
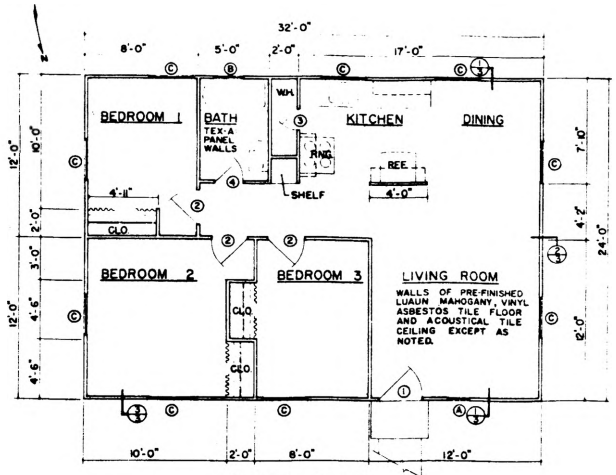



WEST ELEVATION

INTERNATIONAL CONSTRUCTION

Lot 2

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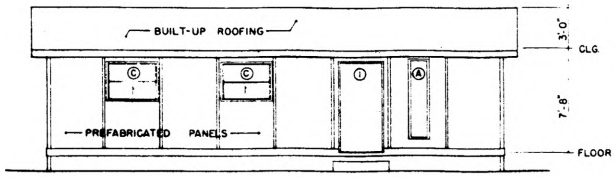
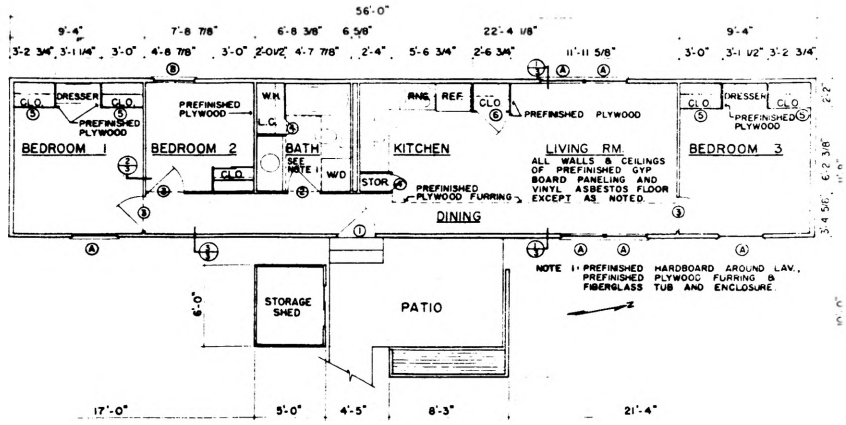



FRONT ELEVATION

I.L.C. HOUSE

Lot 3

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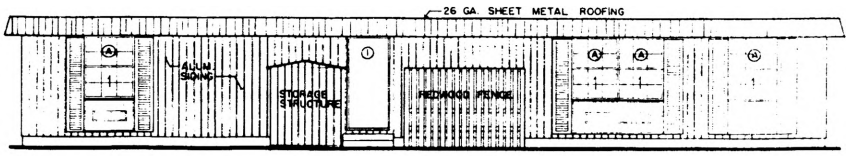
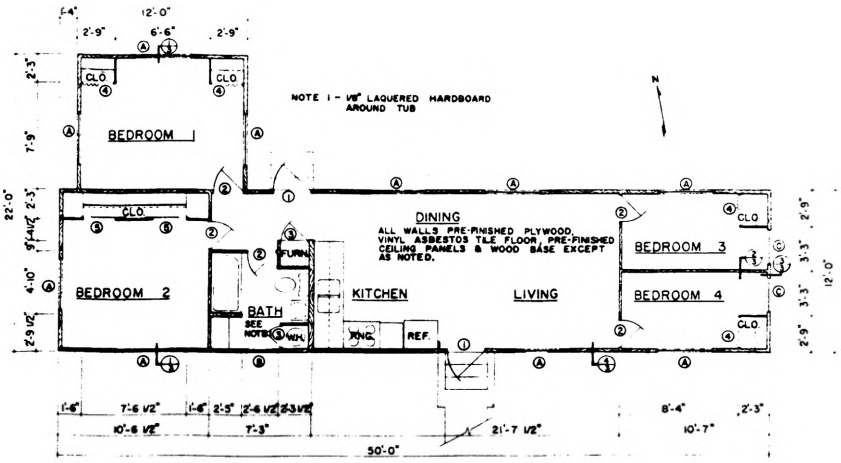



FRONT ELEVATION

TOWN PATIO HOME

Lot 4

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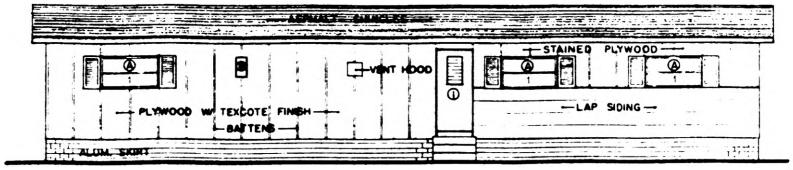
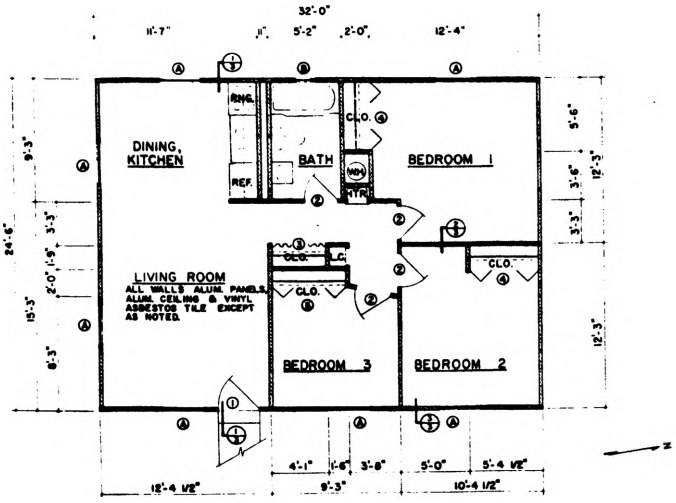



SOUTH ELEVATION

MAGNOLIA HOMES

Lot 5

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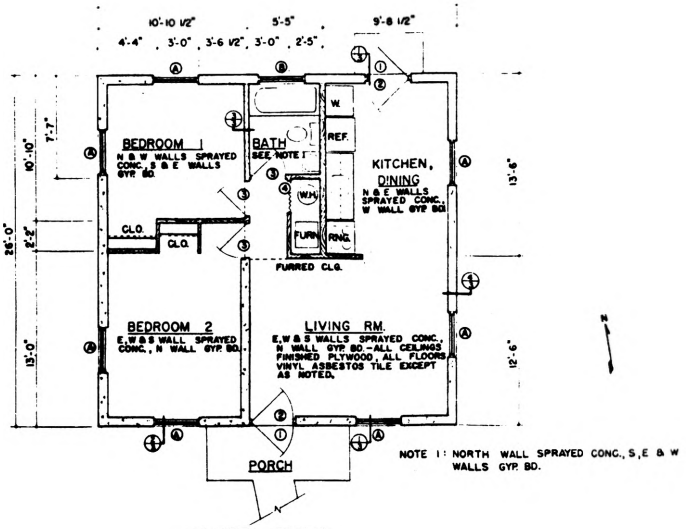


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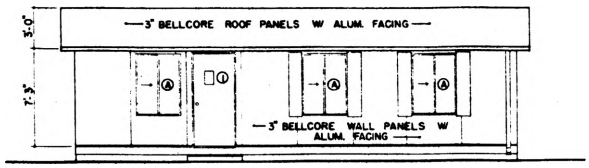
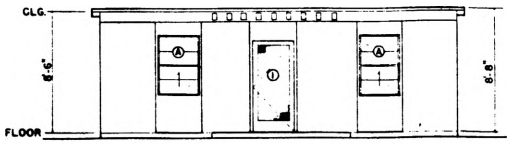



EAST ELEVATION

BELLAIRE PRODUCTS

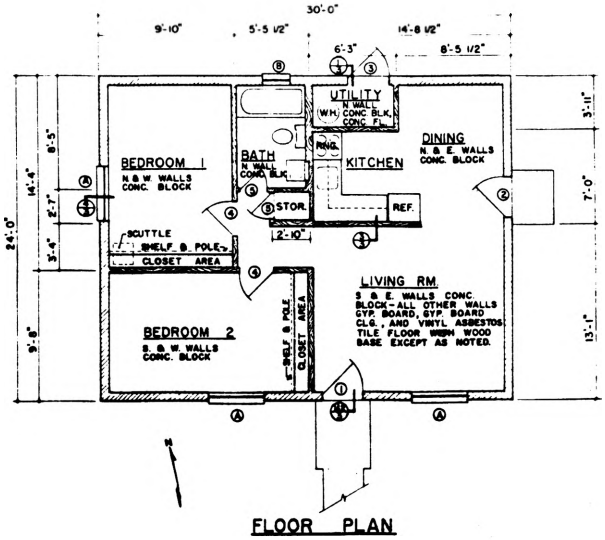
Lot 6




SOUTH ELEVATION

DICKER STACK-SACK

Lot 7

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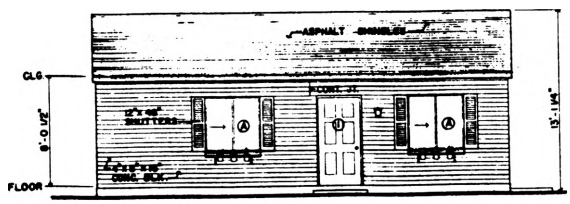
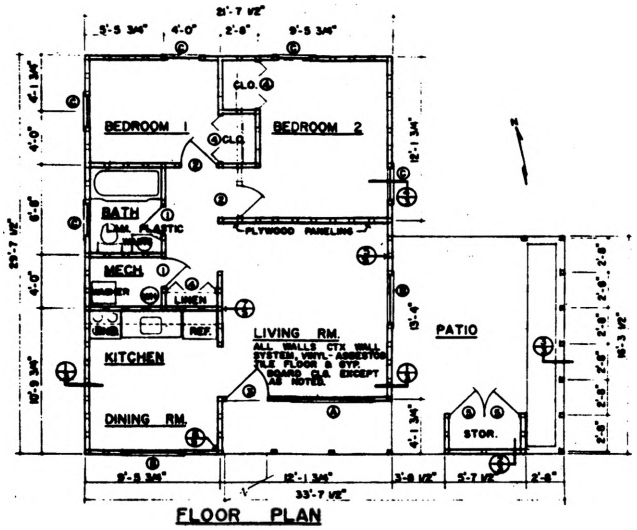



FRONT ELEVATION

THE PHOENIX MINI-HOUSE

Lot 8

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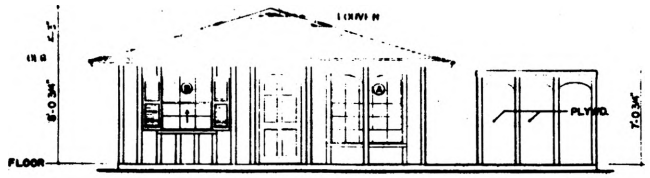
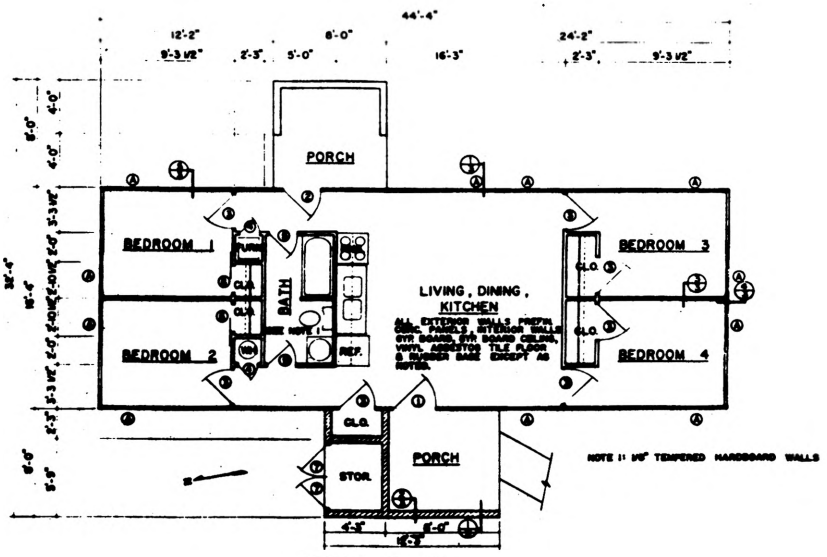



FRONT ELEVATION

C.T.X. HOUSE

Lot 9

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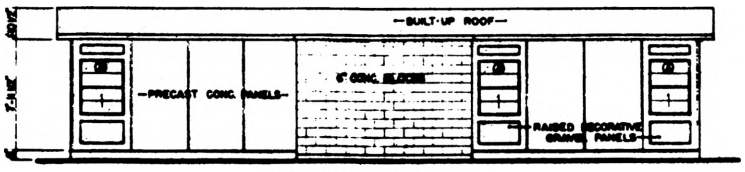


WEST ELEVATION

LOCKHEED HOME

Lot 10