*fourth bedroom with closet
*outdoor living
*outdoor storage - 200 c.f.
*parking for 2 cars per unit (36-42 cars)
total square footage 1600-1700 s.f.

4.6

AMENITIES AND CONSIDERATIONS
*refrigerator/freezer
*stove/oven
*garbage disposal
*washer/dryer
*dishwasher
*carpet
*aerial antenna with hook-in
*private entry
*waste receptacle (garbage)
*outdoor living space (garden, balcony)
*shower/tub combination
4.7

COMMUNITY CENTER

function: amenity to compliment apartment environment, provide for physical and recreational needs of apartment dwellers, operational requirements

equipment and information

* rental office
* manager's office
* secretarial, accounting, book-keeping
* maintenance and security office
* banquet/party room
* kitchen/bar
* game room (billiards, cards, table tennis)
* service dock
* concessions/sales
* meeting rooms
* parking for employees and visitors

0.5-1% of total required parking (161-322 cars)

* storage

Total square footage: 5,000 s.f. (est.)
4.8

DAY CARE FACILITY

- function to provide a community facility for apartment renters with children. If both parents work, a facility is provided for supervision and instruction of children during these working hours.

- equipment and information
  - *5 classrooms (200-240 children)
  - *playroom
  - *library/reading
  - *kitchen
  - *cafeteria
  - *storage
  - *service
  - *pick-up, drop off

- *parking for 5-7 employees (5-7 cars)

- total square footage: 5,000 s.f. (est.)
4.9 RECREATION FACILITIES

function facilities to provide leisure and relaxation activities for apartment dwellers, activities to accommodate all age groups

equipment and information
*tennis courts 7,200 s.f. each(2)
*racketball courts 2,250 s.f. each(1)
*basketball courts 3,100 s.f. each(1)
*volleyball courts 2,830 s.f. each(1)
*playground facility (division of age groups)
*park areas and courtyards

total square footage 25,000 s.f. (est.)
5.1
SPACE RELATIONSHIPS - MASTER PLAN

COMMUNITY CENTER

RECREATION AREAS

DWELLING UNITS

PARKING

DINING

OUTDOOR SPACE

BEDROOM

ENTRY

LIVING

KITCHEN

TOILET

STORAGE

BEDROOM
6.1
FUNCTION
The primary function of an apartment complex is to provide a secure living environment for a large group of people (mostly unknown to each other) with a series of private, semi-private, public, and semi-public spaces. Transition, sociological implications to design, relationship with environment. A secondary function is to provide necessary amenities to fulfill sociological needs.

6.2
FLEXIBILITY
There is little flexibility within the apartment complex. Most of the flexibility will come within each dwelling unit - where each renter can personalize his own living environment. The spaces within an apartment should be de-
signed so as to be flexible and accommodate various functions as well as an option of furniture layouts. Growth and change within the family structure should also be considered.

6.3 CIRCULATION

Circulation within the complex becomes critical when dealing with vehicular drives, parking, pedestrian paths, and their inter-relationship with the dwelling units. The division of public, semi-public, private, and semi-private spaces is critical to the success of the complex. Another issue of importance is the circulation into and within the complex. Ideally, every unit should have a private, enclosed entrance. A third critical area of circulation is within the apartment. Since space is minimal, circulation should be also minimal, yet adequate to provide
functional movement between spaces. A fourth and final issue of circulation is between apartment, recreation areas, community center, day care facility, and playground (relationship with parking areas).

6.4
BUILDING CORES
Mechanical shafts and plumbing walls should be combined for maximum economy; not only for units above and below, but also side to side. Sound proofing between units, structure, electrical, h.v.a.c.

6.5
EXPANSION CAPABILITIES
Because of the nature of the building type, the only expansion capabilities are if the same design concept is ap-
plied to another site of similar context. Even then, various surrounding implications will change the project. Therefore expansion is not feasible in this apartment complex. Expansion within the unit should be a design criteria to allow for flexibility of renter (change and growth).

6.6

ECONOMIC EFFICIENCY

low maintenance building materials, energy conscious design, possible application of systems - building orientation, overhangs for summer shading, natural ventilation, earth-mounding, vegetation, green-house effect, heavy insulation, double glazed windows, skylights for day lighting, use storage spaces as insulation buffer zone, solar panels, heat pump, apartment unit mix for maximum occupancy, low maintenance, high quality fixtures and equipment
SPECIAL CODE AND ZONING REQUIREMENTS


*occupancy classification - Group R,
Division 1 (hotels and apartment houses)

*more than 2 stories and excess of
3,000 s.f. of floor area - 1 hour fire
resistance construction throughout

*maximum building height:
  type 1 construction - unlimited
  type 2 construction - 12 stories with
    1 hour fire wall
  type 3 construction - 4 stories with
    1 hour fire wall
  type 4 construction - 4 stories with
    1 hour fire wall
  type 5 construction - 3 stories with
    1 hour fire wall

*all stairs and exits open directly onto
  street, alley, court

*approved fire alarm system and smoke
  alarms
*all inhabitable rooms - minimum window size of 10 s.f.
*minimum ceiling height - 7'6"
*minimum of 1 wash closet
*at least one room with 150 s.f.
*minimum yard for 1 and 2 story - 3'
  (and 1' for each additional story)
*natural ventilation (1/20 floor area - minimum 5 s.f.)

Indianapolis Zoning Ordinance
*classification - U2 district
*frontyard setback - 1/3 average depth of lot or 50' (which ever is lesser)
*sideyard setback - any building more than 2½ stories high, distance to be not less than 1/6 building height
*rearyard setback - not to be less than ½ height of building

6.8
SECURITY
Security should be considered throughout
apartment complex. This aspect can in many cases determine the successfullness of the project. Security should begin on the perimeter. Parking, lighting, entrances, exits, between buildings, etc. should receive special attention. This site is located on the edge of a low-income district and in a downtown setting which could be considered a potentially higher crime area. From a psychological standpoint, if the project is integrated into the neighborhood so that it is accepted by them, it is a plus for security reasons too.
7.1 PARKING

function to provide efficient, convenient service to dwelling units, special emphasis on circulation, security, minimum distance (200 ft.), location equipment and information

*underground parking
*on-grade parking
*parking structure
*massing
*circulation
*landscape
*sociological impact
*total parking for apartments ___ 249-280 cars
*total parking for staff and employees - 15 cars
*visitor parking (5-10% required) ___ 30 cars
*total parking spaces - 325 maximum (325 spaces at 230 s.f. each)

Total square footage ___ 74,950 s.f.
7.2
LIGHTING AND LANDSCAPING
Lighting is critical not only to security, but to the functioning of the apartment during evening hours. Need adequate lighting for visibility to drive, walk; yet not glare into bedrooms, living rooms, etc. (car headlight glare should also be considered)

Landscaping: important that it does not require a lot of manicure and up keep to maintain in good condition (low maintenance) yet enough to give community a sense of pride and a degree of satisfaction in their outdoor environment. Landscaping can enhance a building and give it a greater character. Definition of space
INDIANAPOLIS REGIONAL CENTER
AND ITS PRIMARY SUPPORT AREA
EAST - WEST SITE SECTION

SCALE: 1" = 100'
Indianapolis is located in the central part of the State and is situated on mostly level or slightly rolling terrain. The greater part of the City lies east of White River, which flows in a general north to south direction. The National Weather Service Office is located at Weir Cook Airport approximately seven miles southwest of the central part of the City. From Weir Cook Airport, elevation 793 feet, the terrain slopes gradually downward to a little below 700 feet msl at the White River then upward again to just over 800 feet msl to the north and east. Street elevation at the former City Office location is 718 feet.

The climate is continental, with rather warm summers, moderately cold winters, and occasional wide variations in temperature particularly during the colder seasons. Periods of humid, muggy weather occur during the summer although usually these Gulf air masses either do not push so far north or are soon replaced by cooler less humid air from northerly latitudes. Occasionally, hot, dry winds prevail from the west or southwest for several days. The longest and most severe heat wave was in July 1936 when the temperature climbed to 100° or more for nine consecutive days. Late spring and the fall season are usually very pleasant. Periods of two to three weeks of sunny days and mild temperatures are common during the fall.

Precipitation is normally adequate for good crops and is well distributed throughout the year. Rainfall of an inch or more in 24 hours occurs on an average of about once a month and lesser measurable amounts on about 10 or 12 days. Snowfalls of three inches or more occur on an average of about two or three times during the winter.

The average freeze-free period extends from April 23 to October 22. However freezing has occurred as late as May 27, and as early as September 22.

Several flood controlling reservoirs, local levee and/or channel improvements now protect most formerly flood-prone areas.
### Meteorological Data For The Current Year

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>Average</th>
<th>Extreme</th>
<th>Number of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Minimum</td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Average</td>
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<tr>
<td></td>
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<td>Snow</td>
<td>Rainfall</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>Minimum</td>
<td>Average</td>
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#### Normals, Means, And Extremes

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<tr>
<th>Temperature °F</th>
<th>Normal</th>
<th>Extremes</th>
<th>Precipitation in inches</th>
<th>Frost, snow (inches)</th>
<th>Mean, air, sea level</th>
<th>Average</th>
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<tbody>
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</tbody>
</table>

- **Temperature °C**
- **Average**
- **Extreme**
- **Number of Days**
- **Precipitation (mm)**
- **Snowfall**
- **Snow**
- **Rainfall**
- **Average**

### Notes
- **Normals** - Based on record for the 1941-1970 period.

---

**Data Corrected After Publication of This Report 1968.**
### Precipitation

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
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<tbody>
<tr>
<td>1930</td>
<td>0.75</td>
<td>0.78</td>
<td>0.82</td>
<td>0.48</td>
<td>0.70</td>
<td>0.93</td>
<td>0.70</td>
<td>0.70</td>
<td>0.93</td>
<td>0.70</td>
<td>0.70</td>
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<tr>
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<td>3.21</td>
<td>0.11</td>
<td>0.45</td>
<td>1.17</td>
<td>0.95</td>
<td>0.89</td>
<td>0.70</td>
<td>1.34</td>
<td>0.93</td>
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<tr>
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<td>1.31</td>
<td>0.06</td>
<td>0.16</td>
<td>1.21</td>
<td>1.22</td>
<td>1.11</td>
<td>0.95</td>
<td>1.44</td>
<td>0.95</td>
<td>1.27</td>
<td>0.95</td>
<td>11.90</td>
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<td>1.31</td>
<td>0.06</td>
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<td>1.21</td>
<td>1.22</td>
<td>1.11</td>
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<td>1.44</td>
<td>0.95</td>
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<td>11.90</td>
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<tr>
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<td>1.31</td>
<td>0.06</td>
<td>0.16</td>
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<td>1.22</td>
<td>1.11</td>
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<td>1.31</td>
<td>0.06</td>
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<td>1.44</td>
<td>0.95</td>
<td>1.27</td>
<td>0.95</td>
<td>11.90</td>
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### Snowfall

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<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
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<th>Feb</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
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<th>August</th>
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<th>December</th>
<th>Total</th>
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<td>0.20</td>
<td>0.20</td>
<td>1.00</td>
<td>0.20</td>
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<td>0.50</td>
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<td>0.20</td>
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<tr>
<td>1931</td>
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<td>0.20</td>
<td>0.20</td>
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<td>0.20</td>
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<td>0.50</td>
<td>0.50</td>
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# Indicates a station move or relocation of measurements. See Station Location Table.

Data for 1931 includes temperatures and precipitation. For snowfall, data are from city locations throughout July 1931.
<table>
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<th>Location</th>
<th>Changed from</th>
<th>Changed to</th>
<th>Name(s)</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevations above sea level</th>
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<tr>
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<tr>
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<td>35° 45'</td>
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<td>35° 45'</td>
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<td>الة</td>
<td>35° 45'</td>
<td>86° 10'</td>
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<tr>
<td>100 E. California St</td>
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<td>الة</td>
<td>35° 45'</td>
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<tr>
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<td>الة</td>
<td>35° 45'</td>
<td>86° 10'</td>
<td>957 74 74</td>
</tr>
</tbody>
</table>

**Notes:**
- This page added to Airport 7/1/88.
- A = 40° to 10/1/89.
- B = 10/20/84.

**Airport:**
- Airport Area:
- For further information, call 703-847-3000.
- Municipal Airport

**Building:**
- Building A: West Coast Municipal Airport
- International Airport

**Elevation above sea level:**
- Thermometer raised and 78 feet.
- Elevation above sea level.
GENERALIZED SOIL LIMITATIONS
FOR URBAN DEVELOPMENT
INDIANAPOLIS-MARION COUNTY, INDIANA

Slight
Moderate
Severe

Source: Based on data furnished by the U.S.D.A.
and the Soil Conservation Service
The preparation of this map was financed in part
by a Unified Federal Planning Grant

APRIL, 1977
Dept. of Metropolitan Development
Division of Planning and Zoning
Indianapolis - Marion County, Indiana
AMBIENT AIR PARTICULATE CONCENTRATIONS
IN MARION COUNTY
1974-1975 GEOMETRIC MEAN

Concentrations equal to or exceeding primary standard of 75 micrograms per cubic meter.
Concentrations equal to or exceeding 90 micrograms per cubic meter.
PEDESTRIAN LINK TO FUTURE PARK

POSSIBLE POINTS OF ENTRY

POSSIBLE CENTRAL LOCATION FOR COMMUNITY GSR AND DAYCARE FACILITY.

LOCATE UNITS TO CREATE & DEFINE LEVELS OF PRIVACY

CONCLUSION MAP
RESIDENTS PER BLOCK

Data taken from U.S. Department of Commerce, Bureau of the Census.
SIMULATED PEDESTRIAN COUNTS (24 HOUR PERIOD)

Pedestrian counts are calculated from a mathematical model based on assumptions about Indianapolis pedestrian flow.
9.1

SPACE SUMMARY

**studio**
9-12 units @ 500-550 s.f.
=4,500-6,600 s.f.

**1 bedroom**
38-43 units @ 700-800 s.f.
=26,600-34,400 s.f.

**2 bedroom**
97-107 units @ 1100-1200 s.f.
=106,700-128,400 s.f.

**3 bedroom**
28-32 units @ 1350-1450 s.f.
=37,800-46,400 s.f.

**4 bedroom**
18-21 units @ 1600-1700 s.f.
=28,800-35,700 s.f.

*apartments (total s.f.) 204,400-251,500 s.f.*

*community center(est.) 5,000 s.f.*

*day care facility(est.) 5,000 s.f.*

*recreation facilities(est.) 25,000 s.f.*

*parking facilities(est.) 74,750 s.f.*
*total space summary 244,150-361,250 s.f.
*net building summary 214,400-261,500 s.f.
*walls 3%
  h.v.a.c. 10%
  circulation 12%
  total % = 25%
  53,600-65,375 s.f.
*gross building summary 268,000-326,875 s.f.
*site summary 188,384 s.f.
APARTMENT SQUARE FOOTAGE (STACKED 3 LEVELS) IN RELATION TO SITE

104,791 SF

135,884 SF

74,730 SF

128,564 SF

9.1

SPACE SUMMARY

studio

9-12 units @ 500-550 s.f.
=4,500-6,600 s.f.

1 bedroom

38-43 units @ 700-800 s.f.
=26,600-34,400 s.f.

2 bedroom

97-107 units @ 1100-1200 s.f.
=106,700-128,400 s.f.

3 bedroom

28-32 units @ 1350-1450 s.f.
=37,800-44,600 s.f.

4 bedroom

18-21 units @ 1600-1700 s.f.
=28,800-35,700 s.f.

*apartments (total s.f.) = 204,400-251,500 s.f.

*community center (est.) = 5,000 s.f.

*day care facility (est.) = 5,000 s.f.

*recreation facilities (est.) = 25,000 s.f.

*parking facilities (est.) = 74,750 s.f.
COSTS
10.1 COSTS

a. building costs
   apartment units $7,859,375.00
   (314,375 x $25.00/s.f.)
   community & day care $437,500.00
   (12,500 x $35.00/s.f.)
   total $8,296,875.00

b. fixed equipment (1% of a) $82,969.00

c. site development (15% of a) $1,244,531.00

d. total construction costs $9,624,376.00
   (a+b+c)

e. site acquisition (city owned)

f. movable equipment (10% of a) $829,688.00

g. professional fees (6% of a) $497,813.00

h. contingencies (10% of a) $829,688.00

j. administrative costs (1% of a) $82,969.00

k. total budget required $11,864,533.00
   (d+e+f+g+h+j)
10.2

FINANCING

Since the owner of this project is a developer and most likely a corporate investment, loans may be easier to establish. Various loans available are: conventional loan, F.H.A. program loan, state housing finance agencies, and family housing loans (236 program).

To analyze these loans in relationship to their application, the author has a system of "working backwards". The financier must figure an average percentage of income to be paid for housing cost (including utilities). Then, he takes an average 2 bedroom unit (850 s.f.) and figures backwards to get the amount of rent/month. With this figure, one can analyze the amount of monies available to finance the project successfully.
With a standard 2 bedroom unit of 850 s.f., a cost of $116,500, an architecture fee of $2,750, and a construction cost of $2,563,000, the total cost is $3,142,000.

Some of the problems in budgeting stem from trying to develop a budget from a.

The float issue of bond 40 year loan is $1,000,000.

Example: A $350/month for 2 bedroom assumed cash flow 6% actual $10,000.
available financing. Investment is reasonable only when there is a high ratio of loan to cost. Development of housing for investment by owner is becoming less and less attractive.
BUILDING TYPES ANALYSIS

Penn's Landing Square
Louis Sauer Associates

Sursun Corda
Washington, D.C.
Collins and Kronstad

Buffalo Waterfront Housing
Buffalo, N.Y.
Paul Rudolph

Portals
Chicago, Ill.
Booth and Nagle

Eastover Gates
Charlotte, N.C.
Wolf Associates

Marcus Garvey Park Village
Brooklyn, N.Y.
N.Y. State Urban Development Corporation
11.1

Penn's Landing Square
Louis Sauer and Associates

Project Description

This low-rise, high-density apartment (2-3 story; 50+ units/acre) is located in an urban setting (2.3 acre; 1 city block) which borders a historical district. 18 townhouses, 85 garden apartments (1-4 bedroom), all parking underground, pool, used brick to harmonize with surrounding historic district, middle income housing base, cost $21.65 per s.f.

Siting

The buildings on the site create a perimeter "fortress" of security that is a major reason for the successfulness of the complex. Interior units are closely organized among landscaped exterior spaces. All cars are safely located in an underground parking garage.
Circulation
There are 3 major points of entry into the complex, each of which are well secured. Circulation within the complex takes place through landscaped walkways and courtyards. Each apartment has a private entry which is enclosed. Within the apartment, circulation is minimal for maximum living space.

Space
Each apartment contains a combined living/dining with either a garden or balcony space. The singular-unit-depth provides for cross ventilation and (in some cases) 2 points of entry/exit. Some outdoor storage is provided (not for every unit). Some apartments are provided with double-height living rooms and fireplaces which are attractive amenities. Oversize brick is used for economy.

Structure
Masonry bearing walls, precast concrete floors, flat wood truss roofs, garage-precast concrete frame and deck
11.2
Sursua Corda
Washington, D.C.
Collins and Kronstad

Project Description
This middle-income apartment housing project is located on a 5.63 acre site. The 3-story complex has 35.5 units/acre with all above-grade parking and a designer-block facade. $15.53/s.f.

Siting
The integration of dwelling units, courtyard spaces, and parking is well thought out and defined in transition. The breakdown in mass helps to give the site more of a sense of community.

Circulation
There is one major drive-through with smaller parking lots separating the apartment units. The pedestrian circulation goes from parking lot, through courtyards, to private apartment entry. The circulation within the apartment unit has
minimum circulation for maximum use of space. The spaces are well defined functionally. Level two shows division of 2 living spaces to accommodate simultaneous activities.

Space
Functional scheme, ample storage areas, cross-ventilation, outdoor storage units, private entry, landscaped courtyards create pleasant views

Structure
Masonry bearing wall, sloped wood truss roof, concrete floors

11.3
Buffalo Waterfront
Buffalo, N.Y.
Paul Rudolf

Project Description
High-density urban setting; 142 units, 3 story; on-grade parking, community laundry facilities, no public facility, small playgrounds located throughout project
Siting
The apartment density has a very residential scale with use of sloped roofs and off-setting plans. Circular parking lots decrease distance to dwelling units.

Circulation
Public entries share with 4 families, mostly private entries, circular parking lots would not function properly—too difficult to maneuver in, minimum circulation within apartment complex, circulation used as transitional element between spaces.

Space
All apartments have outdoor storage, outdoor living space (either patio or deck) which is large enough to be functional, entry is through a semi-private, enclosed breezeway. Apartment layout is simple and functional. Smaller third level apartments have high and pitched ceilings to visually increase volume. The units take on an interesting form.
that seems irregular and complex in nature (more individuality, personality)

**Structure**
Masonry load bearing walls, wood construction roof

**11.4**

**Portals**
Chicago, Ill.
Booth and Nagle

**Project Description**
50-3 bedroom apartments; middle-income, $18/s.f.; open, on-grade parking;
3 story structure; brick facade with flat roofs

**Siting**
This city-block site is divided up into four building complexes surrounding a courtyard with perimeter parking

**Circulation**
Pedestrian circulation is through courtyard to private entry, or stairs leading to public balcony on third level which
feeds both third and fourth level units. Perimeter parking - backing out into street could be hazardous.

**Space**

Spacially functional, courtyard is somewhat tight, upper level balconies are small.

**Structure**

Masonry load bearing walls, flat roof construction.

11.5

Eastover Gates
Charlotte, N.C.
Wolf Associates

**Project Description**

A small townhouse development in an old neighborhood with single family housing. The architects' primary concern was to create a comfortable space for both people and cars. 2 story structure, brick facade, sloped roofs.

**Siting**

Parking is well integrated into project.
Small intimate lots; well landscaped and defined, private entry; sense of community; residential quality

Circulation
Single, major drive with small well-scaled lots directly relating to apartment entry; circulation within the apartment is minimum, creating maximum use of space.

Space
Well-defined front yard-back yard space; functional cross-ventilation; historic quality-ties well into neighborhood

Structure
Masonry bearing wall, wood truss construction roof

11.6
Marcus Garvey Park Village
Brooklyn, N.Y.
N.Y. State Urban Development Corporation

Project Description
This project, currently under construc-
tion, was developed from a proto-typical model and a series of studies done on existing projects (analyzing them from a sociological standpoint). The Urban Development Corporation has developed a specific set of design criteria to be implemented on future projects. The U.D.C., after realizing that high-rise projects were not suitable for family living, (supervision of children playing outside was impossible) decided to maintain a lower scaled project. Large development units also overburden existing community facilities.

For these reasons, low-rise, high-density housing units were utilized. Some of the major criteria were security, economics, and (most importantly) a living environment that responded to sociological needs.

Siting
The site is located in a densely popu-
lated urban area. The location of units was designed to give special attention to private, semi-private, public, and semi-public spaces. Security measures were also of major importance.
50 units/acre, 626 units,
5000 s.f. community center
12,000 s.f. day care center
8000 s.f. commercial
300 parking spaces

Circulation
From parking spaces to farthest dwelling unit is somewhat extreme. Circulation within dwelling units is minimal. Spaces are well defined.

Space
Spatially, the units are economical, yet functional. There are 2 main types of units: a mews unit and a street unit. Both units contain cross-ventilation, outdoor space, views to street or garden, private or semi-private entries. Separation between dining and living provided for two separate living areas.
Structure
Masonry bearing wall with over-sized
brick, wood/steel roof structure (flat)