Conceptual Summary

Unit Spatial Sequence

- living
- dining
- entry
- kitchen
- toilet
- family

Formal + Informal

Cluster Arrangement

- lv.
- dn.
- bd.
- b.
- bd.

View: active

View: passive

Access: car

Point Bearing
- over slope
- over ground
- minimum grading

Plan
- follow exist contours
- allow for drainage
Activity Frequency

High

Dining

Kitchen

Family/ Den

Bed

Bed

Bed

Bath

Circulation

Living

Low

Special Qualities

den - dining - living

Kitchen - bath - family

Open

Bed

Hall

Bath

Bed

Closed

Living

Family

Kitchen

Section
Approach to building

Modes of arrival
- car
- bike
- motor bike
- foot
- boat
- golf cart

Special Environment

Sequence
- access
- main road #1
- loop parking #2
- walk thru trees #3
- Unit #4
Multi-Use Space

Time

Season

Lighting

- minimum opening
- maximum light
- maximum view

direct sun

summer sun

winter sun
Circulation
Cluster

vertical circulation

double loaded scheme

Unit

dining room, den, living

kitchen, hygiene, family

Community

people, car

public, semi-public, semi-private, semi-public
PRELIMINARY DESIGN

HARRISON WOOD
AN ENERGY EFFICIENT RESIDENTIAL AND RECREATIONAL COMMUNITY

THESIS
E. ERNSTBERGER-L.A.
D. GERST-ARCH.
D. REDDINGTON-ARCH.

D.W.R.
Preliminary Design

Preliminary clustering arrangements soon indicated that parking was going to be a major constraint due to the highly sensitive existing environment. Parking must be based on several stringent criteria such as:

1. Maximum of 5% slope.
2. Minimum grading: conform to existing grade.
3. Loop access system required.
4. Double loaded drive: required minimum depth of 64 feet.
5. No trees through drive dimension of middle 24 feet.

Because of these constraints, the parking had to move up the hill to the edge of the existing tree line. At this location the existing grade was just over 5%, so grading could be held at a minimum.

The clustering arrangement of the units themselves, required a linear orientation. This was due to:

1. Required parking arrangement.
2. Direct visual and physical participation with both golf and lake/hill environment.
3. Required square footage on south facing facade for insolation.
4. Required green belt along the lower slope.
5. Minimize major ground interruptions.

The access to the units was kept to a simple network of above grade wood decks. This network was complimented by the
existing understory trees which can remain and still allow
even enough insolation to make the solar systems work. These trees
will lose their leaves during the autumn season and allow
plenty of winter sun into the units.

The network of wood decks is met by a vertical circulation
element at the unit. Five story units have an elevator and
three story units have a stairway for their main vertical
circulation element. Entry to the units is articulated by
the different levels (entry at each half level).

The major structural elements consist of a precast con-
crete post and beam system. The floor slab consists of precast
concrete hollow-cove floor units 8 inches thick. The advan-
tages of using this floor system are:

1. Economical.
2. Fast on-site erection time.
3. Provides HVAL distribution.
4. Provides fire barrier between units.
5. Provides good unit separation.

The post and beam super structure are connected by a pinned
steel joint. The south facing beam is a one foot thick by
nine feet high by thirty-six feet long precast concrete beam.
This beam acts as the solar collector and storage unit. The
system is a trombe wall or passive solar system. The reasons
I choose this type of system are:

1. Operates naturally (without mechanical distribution).
2. System is as advanced today as it will be years from now.
3. Overall economy.
4. Summer cooling.
The south facing beam is double glazed with a space of one inch cavity between the glazing which fills with insulating beads. These beads are moved by forced air through tubes held in the mullions. In the winter these beads are automatically shot into the cavity at sundown and shot out at sun up. During the summer the beads are shot into the cavity during the sunny hours and shot out at night. This allows for the sun to be reflected during the day and reverse radiation to occur at night.

The unit itself is organized around an active side (south side) and passive side (north side). The active side functions to serve the passive side. The kitchen, laundry, bath and other heat producing elements are on the active side. The dining and living areas are on the passive side. The passive side has a balcony which overlooks the forest covered hill and, in the winter, the lake. The family room occurs on the active side to compliment the living activity and has a balcony looking east or west. The wet core becomes the central element in which the activities are organized around. Between the wet core and the kitchen is a small green house. This element acts to allow controlled direct south sunlight into the unit. It also houses the auxiliary heating system: a great pump.

The ceiling height varies from 7 feet in the kitchen to 9 feet in the living room. However, there is no permanent partitions between the rooms. This allows for more flexibility in room arrangement. The exterior walls are either insulating space (closets, head storage, etc.) or heavily insulated. The moveable glazed opening have shutter systems to protect from heat loss.
The interior finish material are:

1. Floors - hardwood, ceramic tile or quarry tile.
2. Ceiling - drywall painted white.
3. Walls - drywall painted white.

The exterior material stained ceder horizontally fixed to emphasize the horizontallity of the building. The roof is shake ceder shingles. The mullions are dark brown.

The result is a series of buildings sited to collect sunlight and participate in both faces of the site. The unit is oriented toward leisure time living. This community is designed for a market of highly active young executives. Efficiency is the aim both in working day routines and in leisure time activities. Everything the user needs, from a good restaurant to a quality golf course, is here for the using.

The one bedroom units have approximately 1000 square feet while the two bedroom units have almost 1300 square feet. The overall environment appeals to the senses in a variety ways through several different spacial experience both inside and outside the unit. The result is a highly marketable product.
FINAL
DESIGN

HARRISON WOOD
AN ENERGY EFFICIENT
RESIDENTIAL AND RECREATIONAL
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NO.
D.W.R.
Final Design

The final design is a refinement of the preliminary design stage. Here I shall list these refinements:

1. Trombe wall/sun wall - To allow for more participation with the active side and more southern exposure, a sun wall was added on the living/family area side. This sun is controlled by balconies and heat collection occurs in the space at the floor level. Brick or dark quarry tile is the storage element.

2. Greenhouse to sunwell - The greenhouse was replaced by a much smaller opening with fixed glazing. This sunwell will allow some direct sunlight into the kitchen area, but the greenhouse area will occur around the sunwall.

3. Divided building - To illuminate the bulky appearance of the building, I divided the units at the circulation core. I added a back stairway to tie the back balconies directly to the ground. The circulation core is open to the sun and air. This more distinctly separates the unit types.

4. Orientation - To allow for more direct participation with the active and passive sides, I reorganized the balconies toward each side. The back balcony was enlarged to allow for more exterior private areas. Access from the back balconies occurs directly onto
the back stairway. The front balcony was enlarged to allow for private sunning, observation and greenhouse functions. The fireplace was placed opposite this balcony to give a sense of order to the living area. All openings occur either north, with shutter protection, or south, with bead wall protection.
APPENDICES
Building Type Study

1) To determine what is being done successfully in the
housing industry.
2) To determine what are the organizing elements.
3) To establish precedent.
4) To determine the perimeters of the housing problem.

Example 1: New Beginnings Homes
Denver, Colorado

This example consists of eighty seven zero-lot-line homes
located on 7.25 acres. The resulting density is twelve units
per acre which is very dense for single family detached
housing. Four units are organized around a court with only
twelve feet between each unit. This would seem to limit
the opportunity for exterior privacy, however, with the use
of party walls and privacy screens much privacy is achieved.
The units consist of 1,288 square feet split levels selling
for thirty one thousand dollars. Unit parking is centralized
to save space, however, the parking is located in such a
way to give users a short walk to their unit. The site is
very tight but the result is a viable, successful environment.

Example 2: Crow Canyon

This example consist zero-lot-line attached and detached
housing organized along a golf course. I shall mainly investi-
gate the attached housing in this development because all of

1 House & Home, 8/77, p. 64
2 House & Home, 6/77, p. 68
the housing problems occurred here. Each unit receives thirty feet of frontage both along the access road and the golf course. Four units are clustered together to give two inside units and two end units. Through the use of entry paths and atriums, the inside units become very light and airy in character. These units are long and narrow but emphasize leisure activities in view and adjacent functions.

Example 3: Big Canyon Townhomes
Newport Beach, California

This example consists of townhouses organized not only around a court, but also on a hilly site which overlooks a golf course. The units take advantage of the hilly site for its view and space planning implications. Parking is located out of sight under the central courtyard. Each cluster consists of seventeen units which employ balconies in response to the many views. Guest parking is located on the access road adjacent to each cluster. There are several floor plans which allow for a variety of spaces both in the exterior courtyard and interior areas. This highly viable environment resulted in the sale of every unit before construction was complete.

Example 4: Colina, South San Francisco

This example consists of ninety-two apartments located on 4.6 acre site. The site is sloping which allows for units to have an excellent view of the ocean. Parking occurs at ground level or under the units. The units are oriented along a stairway which has an open view toward the sea. This stairway

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3 House & Home, 7/77, p. 58
4 House & Home, 7/77, p. 82
allows for unique spaces to have personal entrances. This pedestrian system along with the ground level auto circulation creates a highly active system.

**Density:** This section looks at the frequency in which people are placed on the land. Primarily, density is a quantitative measure which gives us in physical terms the approximate area/person. "Density per se is not as important a predictor of satisfaction as is density combined with a number of other variables, . . ."¹ These variables are discussed in the other sections of this study. Below is an illustration from Newman's *Defensible Space* on page 61 which shows two density level and their area/person.

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¹ *Easter Hill Village*, p. 217.
Example 1

Example 2

Example 3

Example 4

Density
First Level Socializing: This section looks at the opportunities one person has to socialize with anyone in the development. The elements of this level of socializing are the major or community elements such as the swimming pool, community house or bus stop. The first major concept of socializing is sharing or participation. Specifically, this means the major roads, community spaces, etc. The second major concept of socializing is identity. At this level of socializing this concept includes similar housing types, common facade treatments, similar environmental character, etc. The third major concept of socializing refers to actual physical relationship of people to each other. Specifically, this means the housing type, the clustering of units, the orientation, etc. This level contains the broadest range socializing opportunities.

Second Level Socializing: This level of socializing considers the opportunities for interaction at a neighborhood level. The units in a neighborhood will typically share such elements as secondary roads, sidewalks, tot lots, etc. Through these activities the users will become aware of at least everyones' face at this level. Users at this level will also interact due to identity. Perhaps all of the housing types in this neighborhood are the same or the facade treatments are similar. Users will also interact simply due to the physical relation they have with other users in this neighborhood. The units may be clustered around a courtyard or perhaps the units are townhouses oriented along a single road. The opportunity for
FIRST LEVEL SOCIALIZING
lasting relationships is somewhat greater at this level of socializing due to the frequency of interaction.

**Third Level Socializing:** This level of socializing considers the opportunities of socializing between one unit and his immediate neighbors. Users at this level interact quite frequently. They share such elements as party walls, driveways, landscaping, stairwells, etc. Each user establishes a personal identity due to the way he personalizes such elements as entrance, balconies, frontyard, etc. The physical relationship one unit has to another is very important at this level. Unit clustering and housing types play an important role in the success of socializing at this level. Typically, the most lasting relationships occur at this level.

**Exterior Privacy Levels:** This section considers levels of privacy achieved in the exterior spaces. Every unit needs exterior space. However, this exterior space must contain elements which establish or define private space from public space. These elements will define a boundary within which the user maintains his territory. Landscaping and screening devices are typical examples of such territorial boundaries. These boundaries must also establish an entrance statement. The orientation and physical relationship of the building to exterior space must compliment these exterior private areas. This exterior privacy must also be articulated in a manner which establishes levels from private to less private. These privacy levels must be used in conjunction with third level socializing elements to allow for the choice of socializing or not.
Example 1

Example 2

Example 3

Example 4

THIRD LEVEL SOCIALIZING
Example 1

Example 2

Example 3

Example 4

EXTERIOR PRIVACY LEVELS
Entrance: This section looks at entrance statements from the access point to the unit. The entrance establishes the initial response from the user, and often this response is the most lasting. The sequence of space from any adjacent activity also becomes critical. The success of the housing image and character has a strong correlation with the success of the entrance statement. The entrance must also have the opportunity for personalization. Aside from the main entrance, secondary entrances are important. Such entrances often open onto private exterior space. This tie establishes a flow of space or an extension of interior onto the exterior.

Interior-Exterior Privacy Relationships: This section considers the opportunities for contact between interior and exterior space. Basically, this relationship is a result of the physical components between interior and exterior space. These components will stimulate some awareness of the exterior. For example, fixed glazing will establish visual contact but not environmental or physical contact. Sliding glass doors establish visual, environmental and physical contact while party walls provide for little or no contact. This relationship is also a result of one space's physical relationship with another. Generally, we can say that this relationship is a smooth progression from private to public. Physical access between spaces indicates similar levels of privacy.
Example 1

Example 2

Example 3

Example 4

INTERIOR-EXTERIOR PRIVACY RELATIONSHIPS
Function: Each section considers the function of each interior space. Function is the simplest and possibly the oldest way of looking at housing. Generally, we can say that public interior spaces are located close to the main entrance. Private spaces are located away from the main entrance but may have secondary entrances looking onto private exterior space. Most housing is organized around some function. Perhaps the circulation is emphasized, or the view from the living room. Zoning according to function is common in all housing. Sleeping activities are typically zoned away from living activities. Considering the limited number of activities or functional spaces in a typical housing unit, we can say that this generally is not a hard problem to solve.
Problem Analysis

This section analyzes the housing problems. In many respects this could be considered schematic design. However, this study is conducted at a point in the design process when we have not finalized our master plan. Therefore, we considered many more possible solutions than we would ultimately have.

This study was conducted to:

1) determine the extent of the physical problem.
2) determine which issues would become major design issues.
3) determine which housing situations posed the toughest design problem.

The potential solutions I chose to document were those which posed the greatest design problem. By choosing the problem in this way, my final design can be a response to the area which has the greatest constraints. In this way, my final design can be responsive to any problem which might occur and can establish precedent in regard to any housing problem on this site.

This study was organized around the four density ranges. Vegetation and land contours are the major landscape constraints. The existing contours were employed to utilize the potential view, wind control, insulation and space planning opportunities. The vegetation was considered in terms of shade, overall environment and sensitivity to
interruption while density was studied in relative terms of approximate unit area per acre.

Due to these density ranges, privacy levels became critical. Essentially, the density range established the privacy opportunities. The units themselves remain similar, but the exterior activities are very different in terms of privacy. Higher density housing will need more emphasis on private exterior space.

The building potentials and constraints were also studied in terms of energy. The major issues are:

1) building envelope
2) insolation potential
3) thermal storage
4) natural ventilation
5) sun direction

The specific parcel of land and its characteristics become critical. For example, a north slope poses more of a problem in terms of sun collection than a south slope.

This study will sight the parcel of land and density range which pose the greatest problem. It shall also tie down exactly where the problem lies and how the major problems are integrated.
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