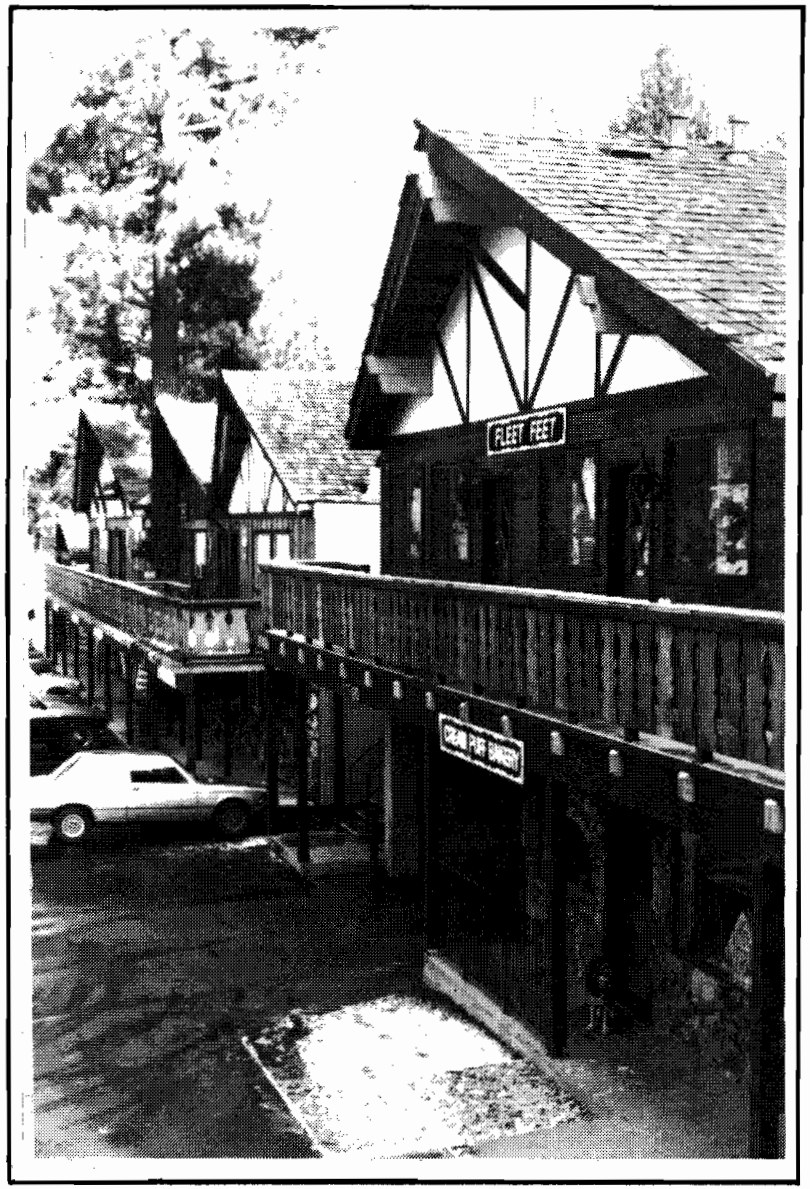
SIERRA DESIGN GUIDE



El Dorado County

Planning Department

Adopted October 26, 1982

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Prepared: August 1982
Project Leader: Jake Raper

FOREWORD

As El Dorado County's population grows, there is a desire of the community that the standards of building design and aesthetic quality remain high. Well-designed buildings and landscaping enhance the visual character of an area, reflect the values of a community and increase business and property values.

The community is concerned about maintaining the scenic quality of the area, as well as providing the safety and welfare of the citizens. These qualities are affected by building design and the blending of structures to the building site.

For these reasons, the Board of Supervisors has adopted a design review ordinance which includes design guidelines for development in the foothills, as well as the Sierra.

To insure that a proposed project meets the development policies of the area plans, the developer and El Dorado County staff will compare the proposed project design with those established development policies.

The implementation of the requirements for Design Review and area plan should assure pleasing and appropriate development for the community.

DESIGN REVIEW

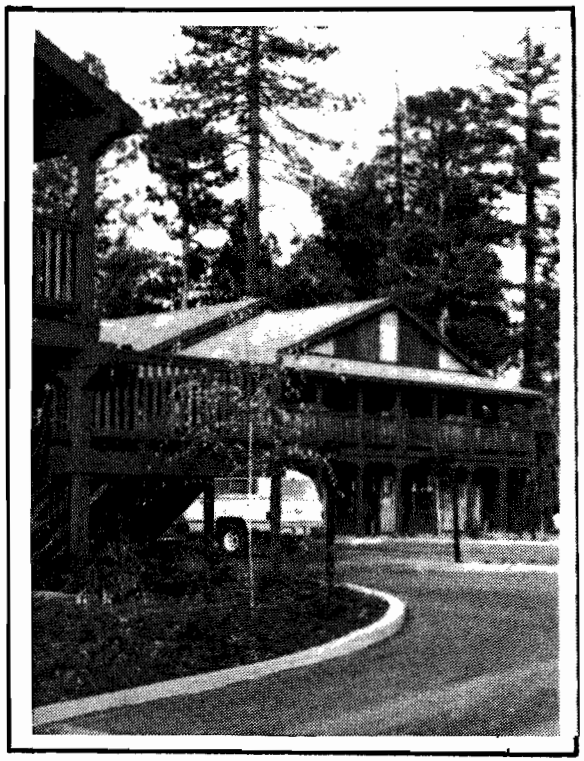
The Design Review ordinance is intended to regulate design, as well as establish aesthetic considerations within designated districts judged to be of special interest, natural beauty or which contribute to the County's character and tourist economy.

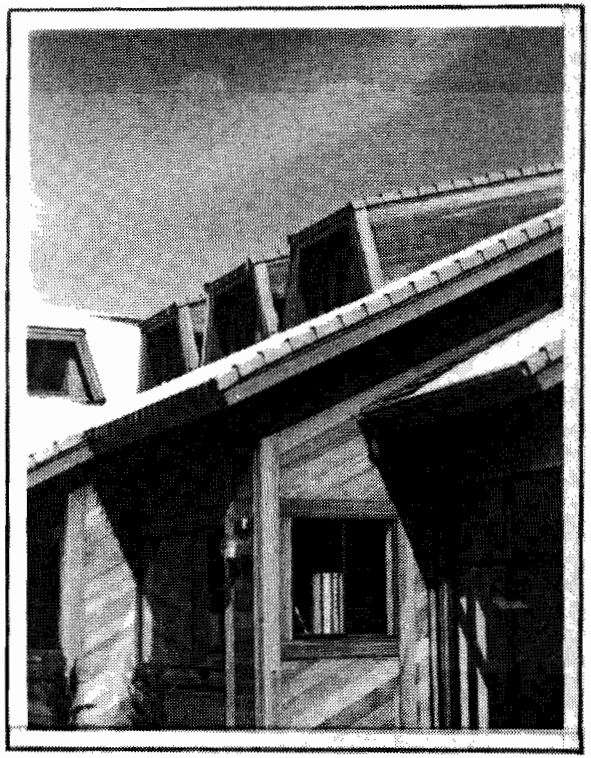
The Sierra Design Guide describes the architectural styles and standards which the Board of Supervisors would like to see typified by new construction in the area. It applies only to sites and buildings within districts defined and designated on County zoning maps as "Design Sierra".

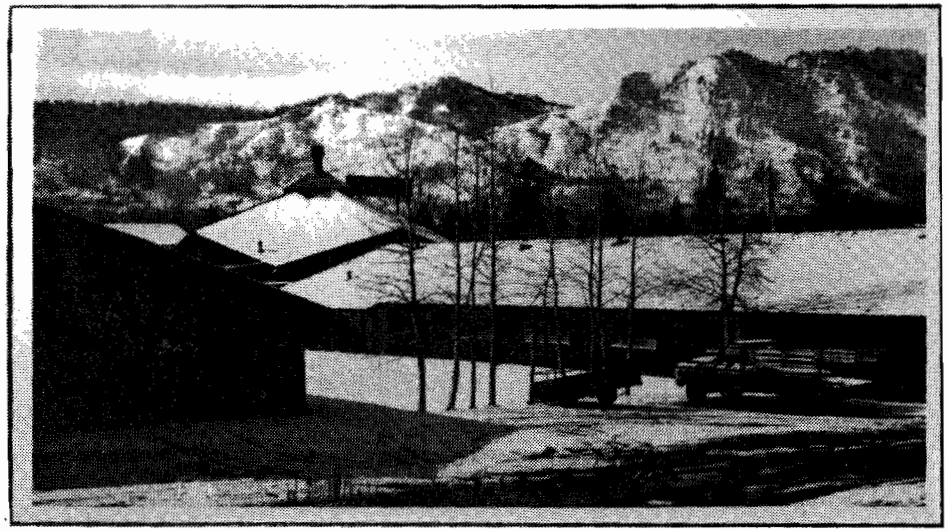
The ordinance requires a developer to submit detailed site and building plans. He is advised to hold informal talks with County officials in advance to determine what information is required and the necessarry amount of detail.

The detailed site and building plans must include landscaping, along with elevations of proposed buildings and information on such features as signs. Those plans are submitted to the County's Planning Department which forwards them to the Building Department for plan check review.

The County Planning Director shall, with the aid and advice of an Area Design Review Committee where established, review the submitted plans and determine whether they meet the Design Review ordinance, the development policies of the general plan and this Design Review Guide.







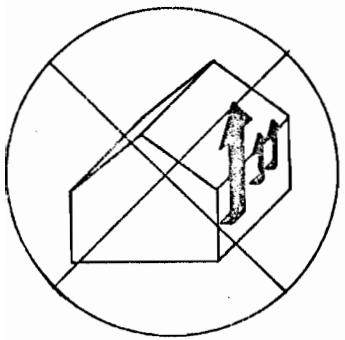
THE SIERRAS

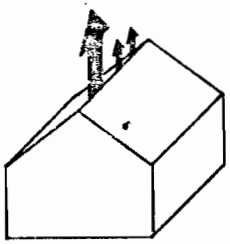
The Sierras are a fascinating and beautiful, as well as a hostile environment. Heavy snowfall and extreme fire hazards are among the natural elements that must be carefully considered before development occurs.

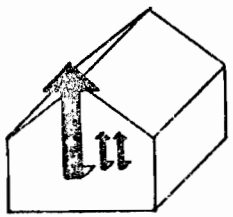
Winter Design Considerations:

Prior to development in the Sierras, the developer should consider the effects of ground frost, sun glare, runoff of melting snow, ice damming, erosion and drainage, and problems resulting from snow loads on the roofs. Each of these design constraints has a unique effect upon development. Ground frost causes shrink-swell action on the soil causing foundation failure. In the thin air, the sun glare is intense and increased by reflections off the snow.

Runoff from melting snow may result in severe drainage and erosion problems. Ice buildup, or ice damming, as it is called, can be especially serious on roofs where it can lead to problems of overloading of overhangs, shearing off of vents and heavy leakage.



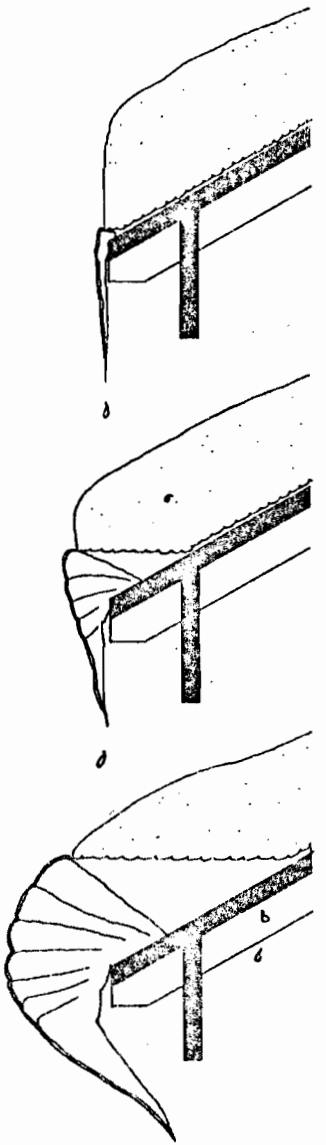




This buildup can also occur in the eaves of a pitched roof. The snow nearest the roof surface, heated by the building below and further warmed by the blanket of snow above, melts and runs towards the eaves. But at the eaves, the roof is coldest and the melting snow meets the outside cold. So it again freezes to form a line of icicles which, in a few temperature swings, will become a dam, backing up water on the roof.

Snow loads on roofs need particular consideration because they seldom occur uniformly. Sierra snow typically slips off the south side of even a low pitched roof, but remains on the north. Wind will strip snow from the ridge of a roof while it continues to build up at the eaves. Roofs often carry heavy snow on the overhangs and little inside the wall line due to a combination of ice damming and wind stripping of the ridge.

The Uniform Building Code that is most commonly used in the Sierra makes reference to snow load requirements. The designer must refer to Section 2305 (d) of the Uniform Building Code.



Summer Design Considerations

High Fire Potential

The Sierras pose a high fire danger during the summer months. The unique environmental setting of the Sierra attracts many tourists, campers and people desiring to settle in the mountain setting. The natural vegetation and the conifer forest provide a high buildup of fuel for fire. The low humidity, high temperature, frequent thunderstorms, tourist's camping and outdoor activities of local residents may create the potential for the setting of forest fires.

The developers should carefully consider utilizing fire retardant materials when constructing industrial, commercial and multi-family developments in the Sierras. The developer should also contact local fire departments, California Department of Forestry (CDF) and the US Forest Service for educational materials on fire safety design and recommended construction materials.

DESIGN CONSIDERATIONS

SITE

Aesthetics

The natural environment of the Sierras is unique and beautiful. The builder/designer should therefore consider aesthetics in the design.

Through the skillful use of different materials, the buildings should be designed to harmonize with each other and the environment. The different building materials of stone and wood are appropriate to building in the area and need to be skillfully blended with each other and with the setting of forest and mountain.

Structures should be located and constructed in such a manner as to both preserve and take advantage of scenic views and the many unique environmental settings occurring in the Sierras.

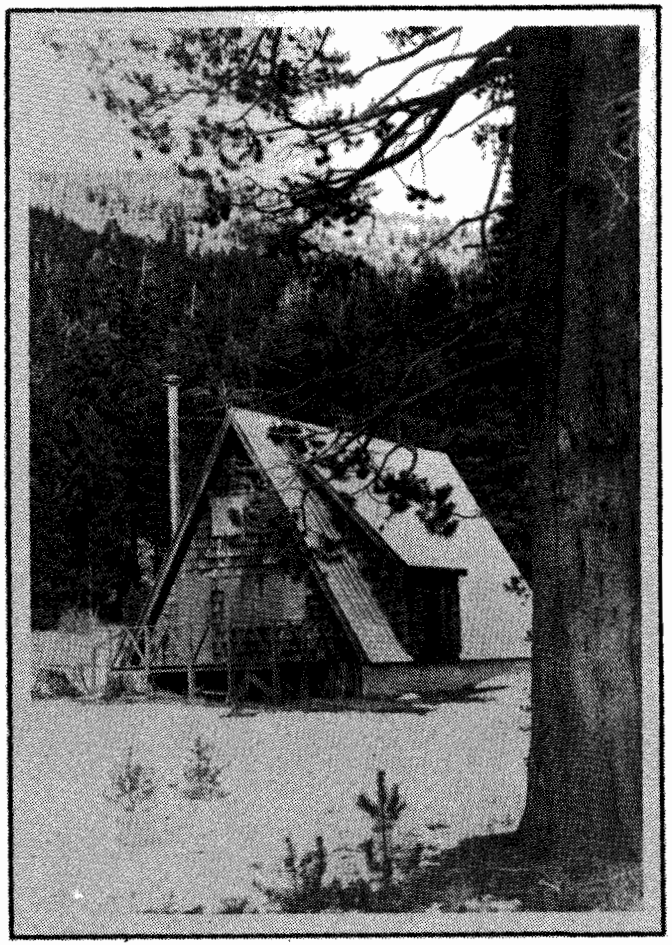
Winter Design Considerations

Snow Problems

Avalanches are a potential danger in mountain country. Avoide areas of known hazard and remember that major grading and tree removal can create hazards where there were none.

Snow removal or storage is essential. Plans should allow for winter snow storage and removal by heavy equipment. Snow can "creep" down hill and exert a considerable pressure on walls and foundations. Siting of structures at the base of slopes can become a problem.

Ground frost and the freeze-thaw cycle can also ruin foundations. Ensure that a new building does not block the normal drainage pattern of melting snow. In this situation, water can back up against the foundation, freeze and eventually build up enough pressure to push the building off its base.



Erosion

The climate, altitude and highly erosive soils of the Sierras combine to form a very fragile environment. All site preparation should minimize any changes to the land.

The developer should remember that moist Sierra soils are shallow and susceptible to heavy erosion by snow melt and spring rains. Where vegetation is removed, it may take decades to regrow and soil, once disturbed, is slow to restabilize.

Developers should contact their local Resource Conservation District or call the Soil Conservation for advice and assistance in erosion control.

Cut and fill areas must not be started so late in the season that they cannot be completed and revegetated or paved before the snows come, or there will be serious erosion the next spring.

Removal of trees should be discouraged. The developer should cautiously design the project to fit onto the site, preserving as much natural vegetation and as many mature trees as possible.

Developers should contact local agencies for local information on groundwater tables. Groundwater levels tend to fluctuate between summer and winter; and this has caused difficult maintenance problems after the building has been constructed. Roof runoff should also be considered in the building design.

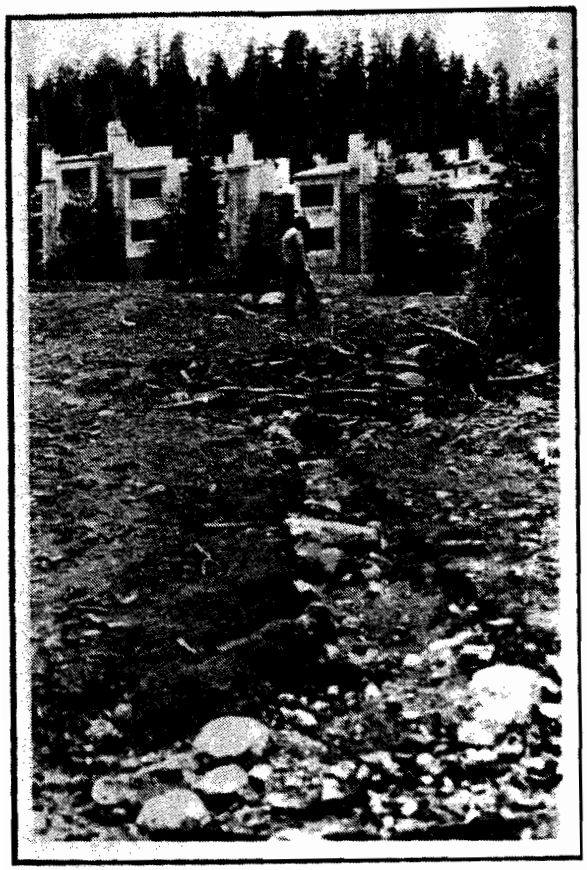
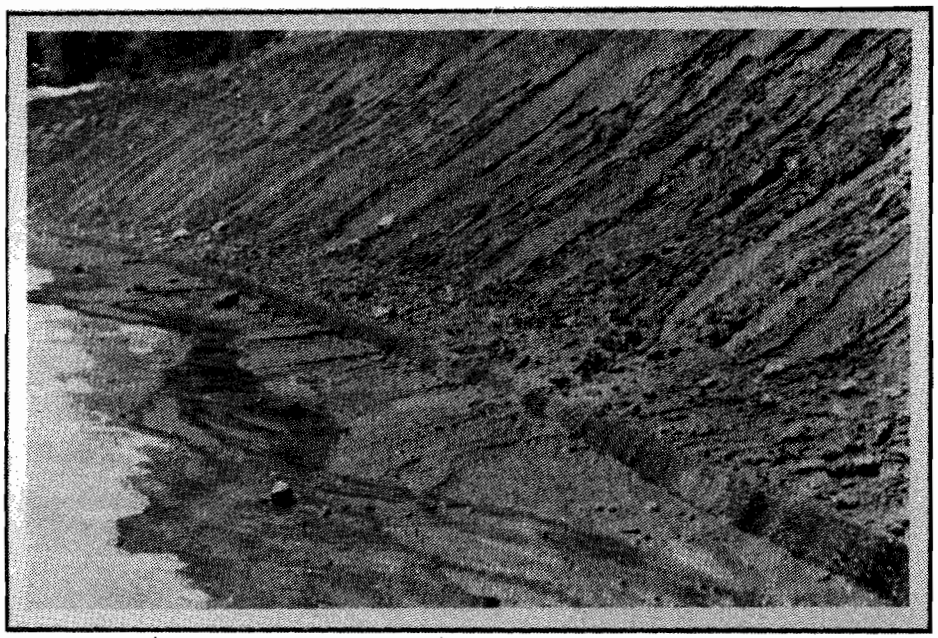
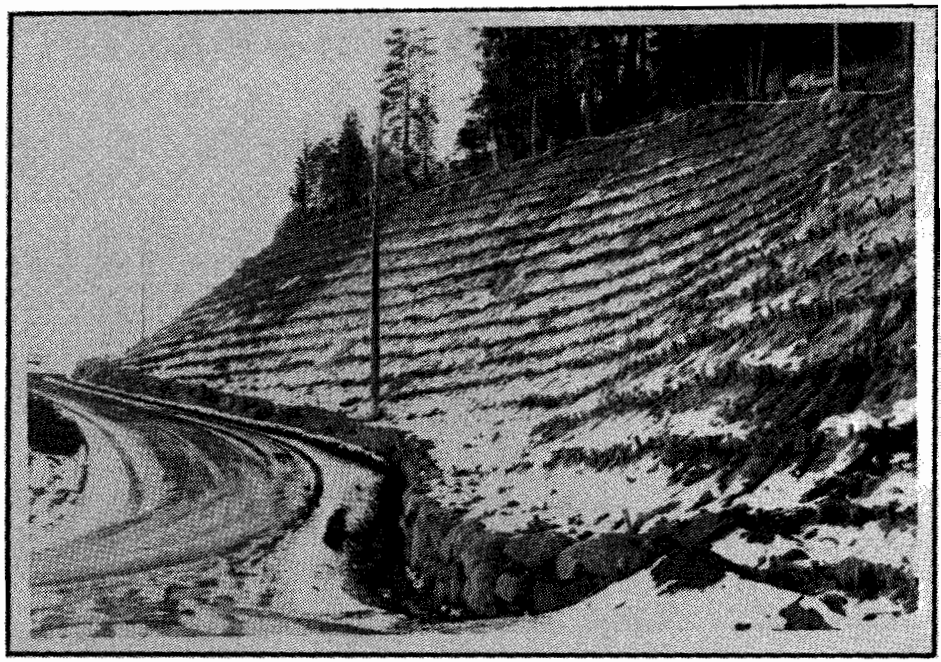


Figure A. Erosion caused by uncontrolled drainage flowing across highly erodible fill area.

Figure B. Rock lined drainage channel designed to correct problem pictured in Figure A.



Eroded and accumulated sediments at toe of oversteepened cut slope within Rubicon Properties subdivision, Lake Tahoe Basin, during the summer of 1975.



Oversteepened cut slope after application of mechanical and revegetative erosion control techniques with an estimated 80-90% effectiveness in reducing erosion rates. Picture taken in the summer of 1977.

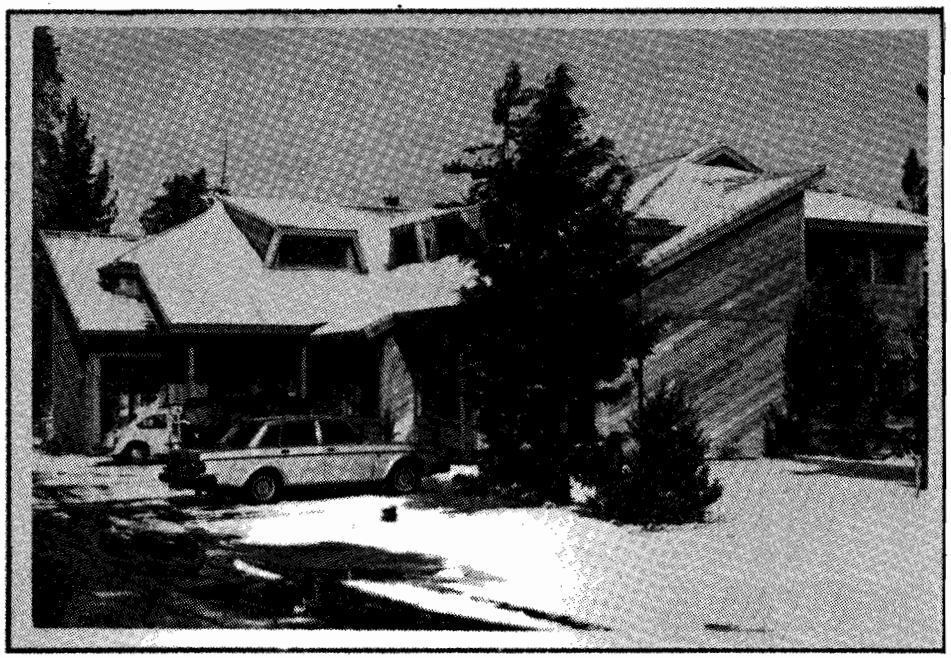
Orientation

South-facing roofs will lose their snow quickly. Bear in mind that unshielded, south-facing windows will produce high heat and radiant buildup inside that cannot be handled by normal ventilation.

It is wise to consider the effects of seasonal shading. The shadows cast by trees can affect snow loads on buildings and icing on paths and roads in the winter.

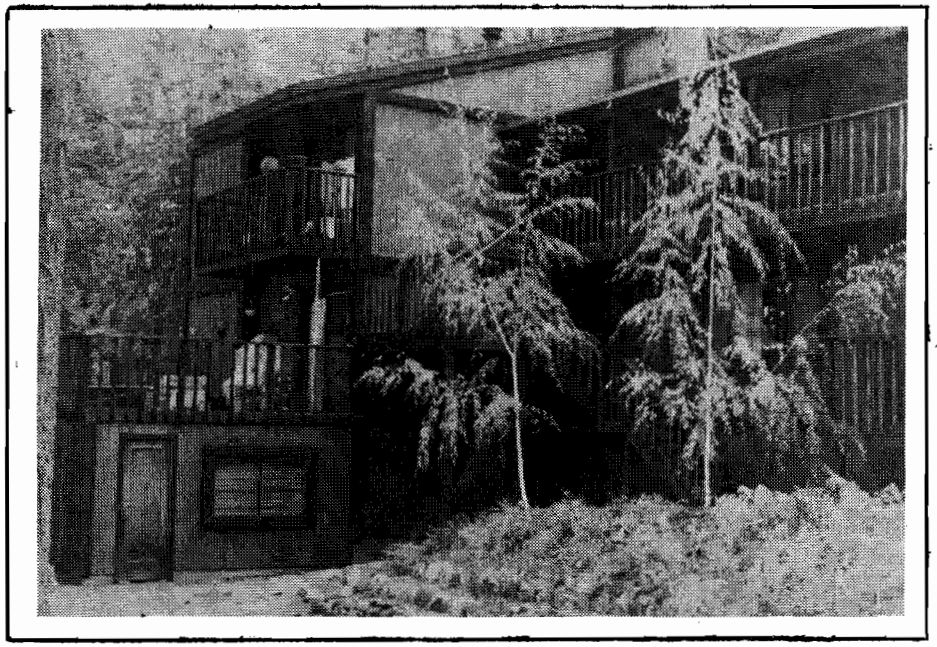
The prevailing wind direction should be considered by the developer. Wind can increase the depth of snow by drifting and its density by packing. But it can also reduce a roof load by stripping off snow along the ridge.

Solar access, both passive and active systems, should be considered by the developer when orienting the buildings on the site. Reference materials are available from the California Energy Commission and local planning agencies.



Landscaping

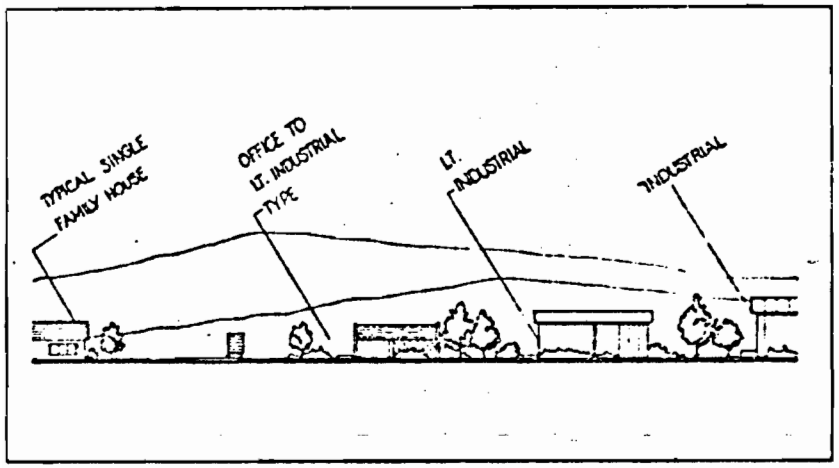
Landcaping improves the appearance of sites and buildings, helps erosion control, provides shade and can screen parking and loading areas. Landscaping, including trees, shrubs and ground cover, should be included in all development projects.*

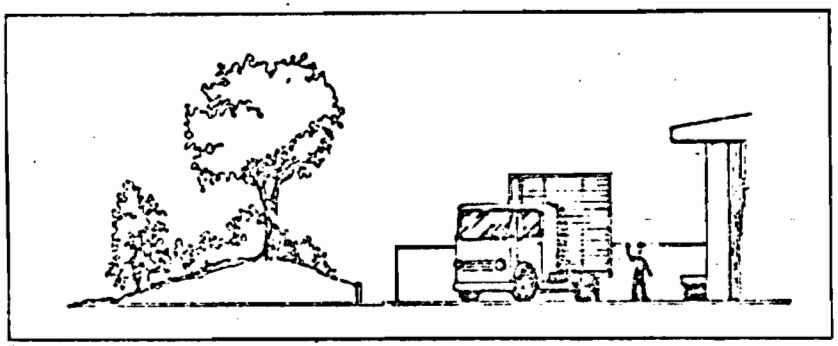


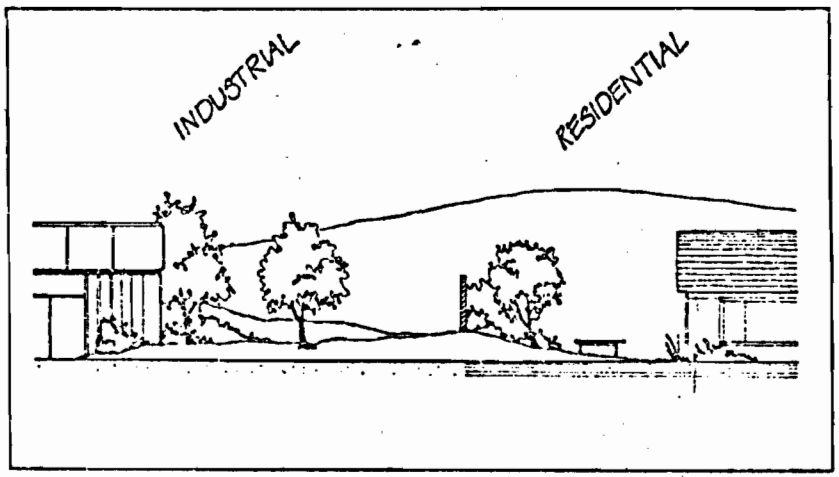
Natural plants and trees on the site should be retained as much as possible. Where new materials are introduced, they should be appropriate for the sun, wind, soil compaction, temperatures and water conditions of the site.

Planted areas and earth berms can help to visually break up large paved areas. Large boulders look good in landscaping and provide a pleasing contrast to the plant materials in mountain areas. Landscape materials and arrangements should be chosen to minimize maintenance. A method of maintenance as well as an irrigation system should be provided.

* Suitable materials are listed in the booklet, Landscaping Your Mountain Home, by the University of California, available at the Extension Service office. Also, Tahoe Resource Conservation District and El Dorado County Soil Conservation Service have plant information available. The developer should also contact local governmental agencies for required landscaping requirements.







BUFFERING

Screening and buffering may be required to reduce or eliminate the potential conflicts and nuisances that some land uses cause to others and where different land uses are adjacent to each other.

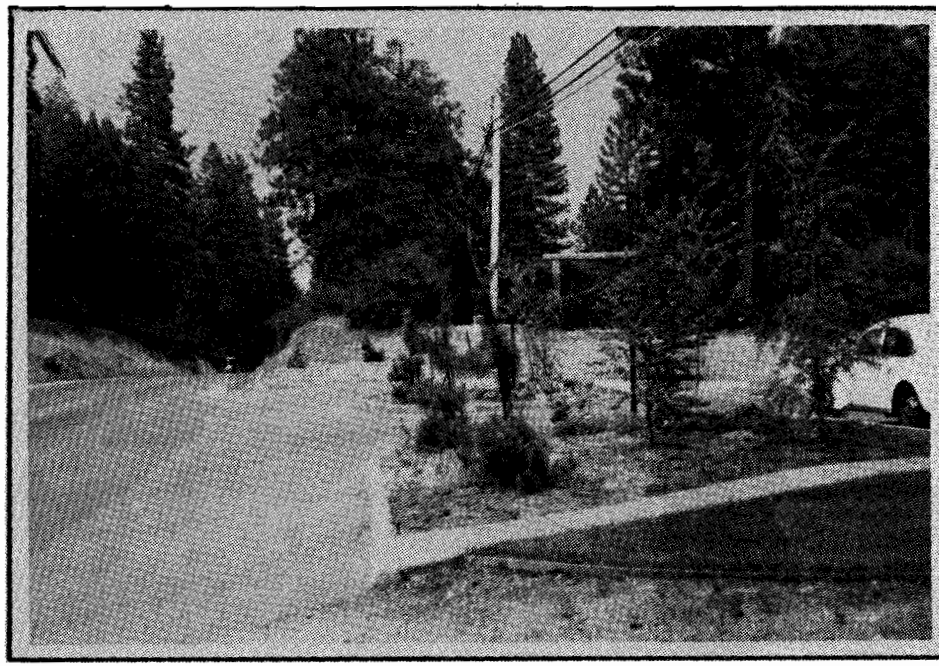
Industrial, commercial and high density residential land uses may be required to be screened from each other as well as adjacent single family residential areas by use of dense landscaping, earth berms and fences so that noise, light glare, and other visual disturbances are minimized.

Where some types of land use front on and can be viewed from a public road, the use of buffers and other screening techiques may be required to shield areas where there is outside storage of materials and equipment.

When new developments are proposed to be located in existing neighborhoods, the project should not be sited to overlook adjacent homes. The new structures should also be located so that the buildings do not block the sun's light to the adjacent parcels.

Changes in grade, fences, walls, earth berms and dense plantings of shrubs and trees can provide permanent buffering and screening to reduce or minimize the conflicts that one type of land use may cause to another.

Preserve natural vegetation and mature trees whenever possible for buffering purposes. Revegetation should occur when natural vegetation is removed. (See: Landscaping section for suggested types.)



Pedestrian Circulation

All developments should provide pedestrian and bicycle paths. The paths should be constructed the entire width of the development. Normally, this should be located at the front portion of the parcel.

Recreation

The developer should provide play areas, open space areas and private areas, such as patios, when constructing multi-family dwellings.

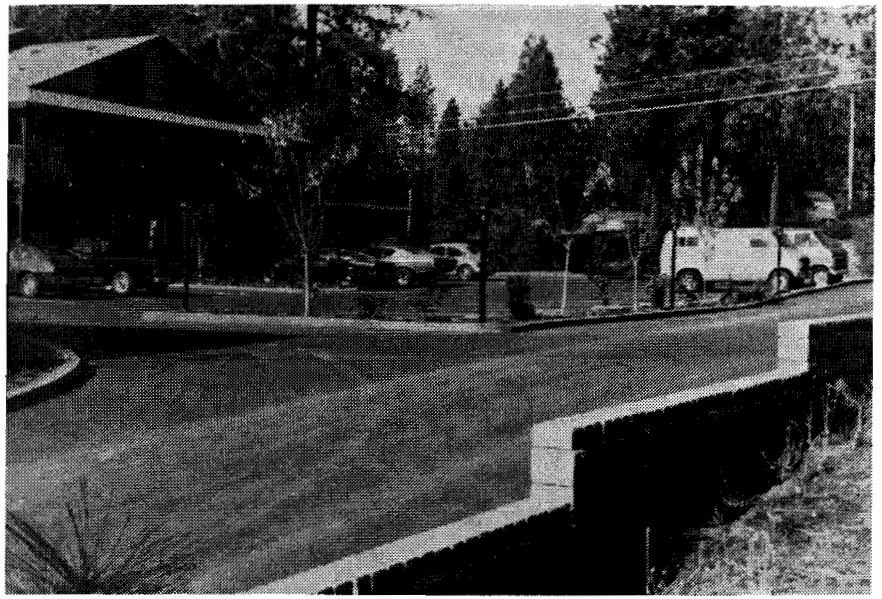
PARKING

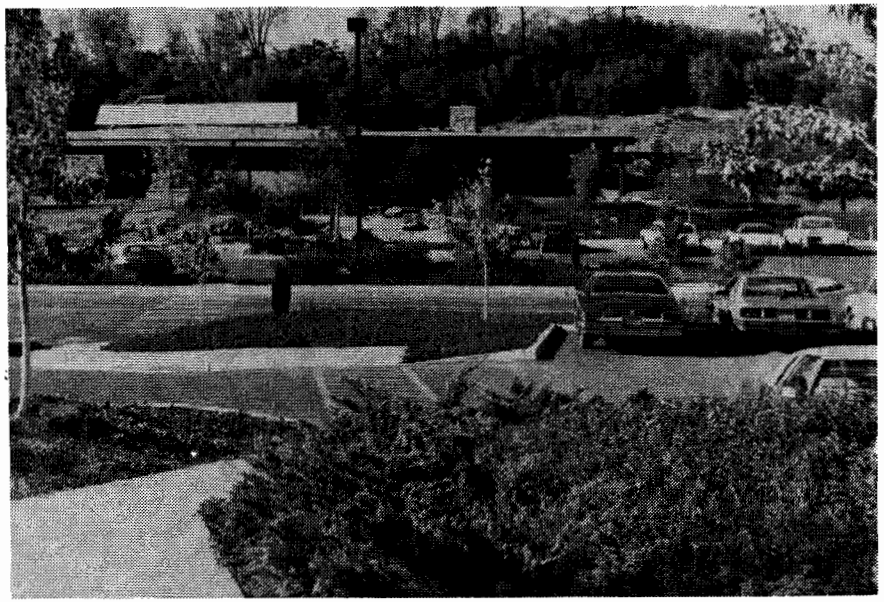
General

Designers should give careful thought to off-street parking areas. Well designed buildings lose their identity of all that is seen on approach is barren blacktop and a monotonous row of cars.

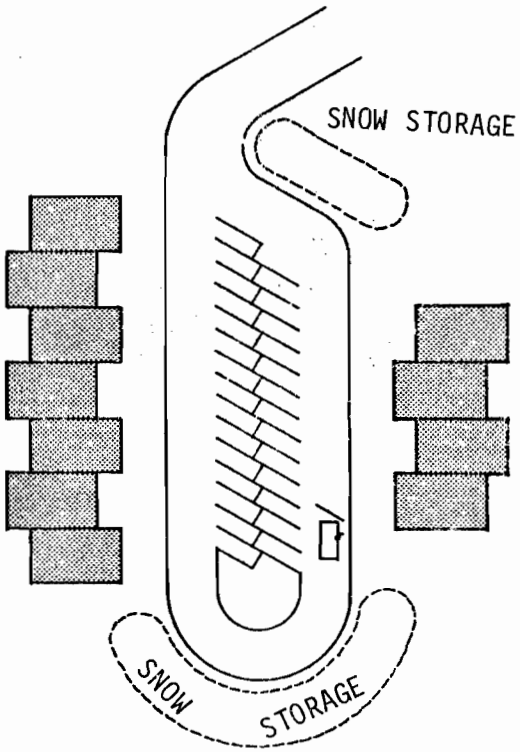
Parking lots may also contribute to the deterioration of the environment by reducing groundwater and increasing surface runoff and erosion.

Good design in parking aims at providing three elements. First, the parking area must be suited for convenient vehicular access, close to the related building and screened from neighboring buildings, roads and pedestrians. Second, there must be a practical and economic use of land in layout of parking spaces, landscape areas and vehicle and pedestrian access. Third, landscape plants along with earth berms and walls, must be designed to screen, shade and soften the impact of parking areas.





A good designer should consider locating the parking to the rear or side of a building rather than in the front. For a large development, a parking area's apparent size can be reduced by dividing it into several smaller lots or placing it on more than one level.



Outdoor Parking:

Parking lots in the foothills and the Sierras must be designed to facilitate snow removal or they will become unusable during the winter. The lot design should provide for cars to be either parked in the center and snow plowed to the edges, or the cars parked to one side and the snow plowed to the other.

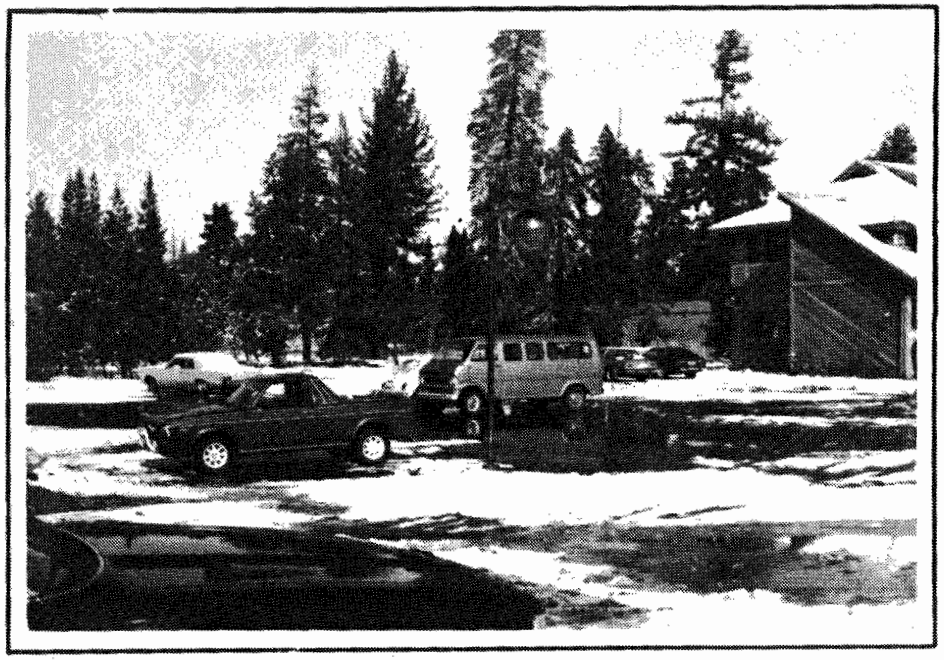
Layout of buildings, roads and parking areas should facilitate the movement of snow removal equipment. Repeated stopping, starting and reversing of plows can reduce their efficiency. With the ground completely covered, a plow operator cannot see clutter below the snow. Avoid pipes, wheel stops, berms and low railings, etc., in parking lots for the plow will often clear them along with the snow.

Design should allow for a snow blower's throw which can be as much as 100 feet and includes loose rocks which can damage parked cars and windows.

A designer should designate areas where snow can be stored and melt naturally rather than having to be hauled away at a high cost. Rights-of-way should be wide enough to provide snow storage easements.

For snow storage, consider using such areas as swimming pools and tennis courts, in addition to lakes, meadows and other natural open spaces.

Building should be set back at least 15 feet from the area to be plowed to provide snow storage space without undue buildup near building walls. Place parking areas so they are exposed to afternoon sum which will speed snow melting and avoid ice buildup.



Snow removal may be facilitated by use of radiant heating involving electric wires or pipes carrying hot liquid set in the ground. This is expensive and only justified in areas of high use and where site conditions dictate steep slopes.

Because of the slippery conditions caused by snow and ice, no road or driveway should be more than 8 percent in grade, certainly not above 10 percent. On shady, north-facing slopes or in heavy tree areas, this gradient should be reduced.

Garages

Garage parking requires careful planning. Even short driveways may be inaccessible or at least inconvenient for a snow plow. Garages need to be situated to provide for convenient, year-round access.

A large commercial or apartment building garage will have to be kept closed against drifting snow. It will need mechanical ventilation against hazardous fumes.

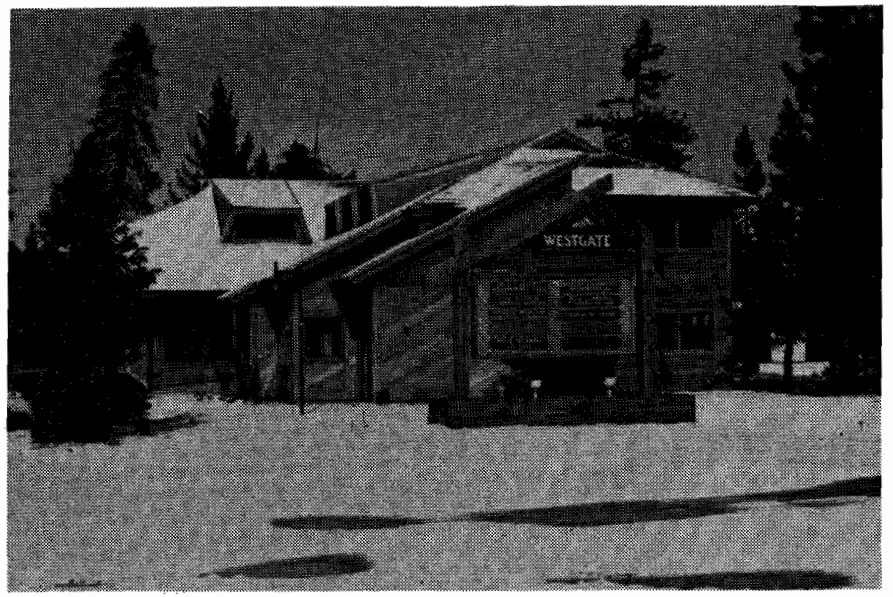
BUILDINGS

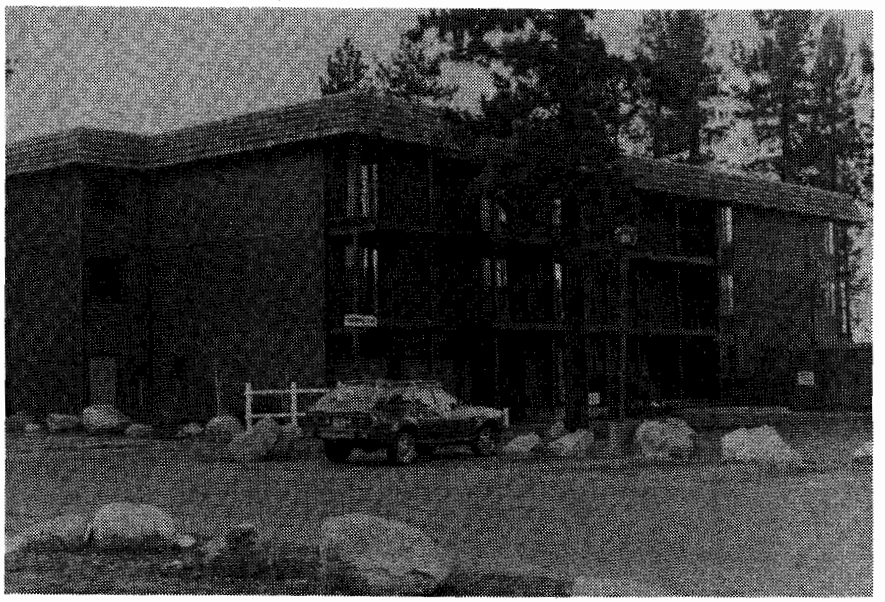
Building Design

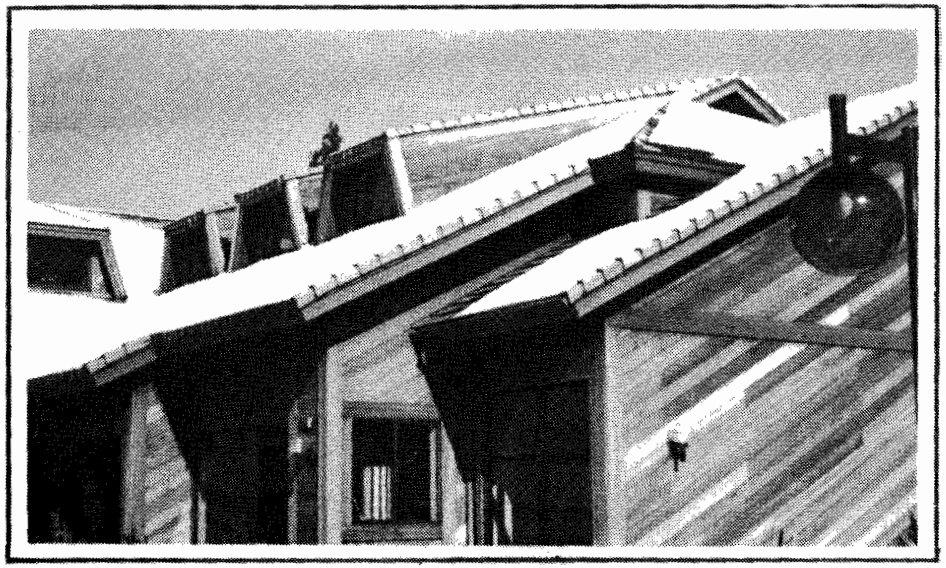
The building design should consider many points:

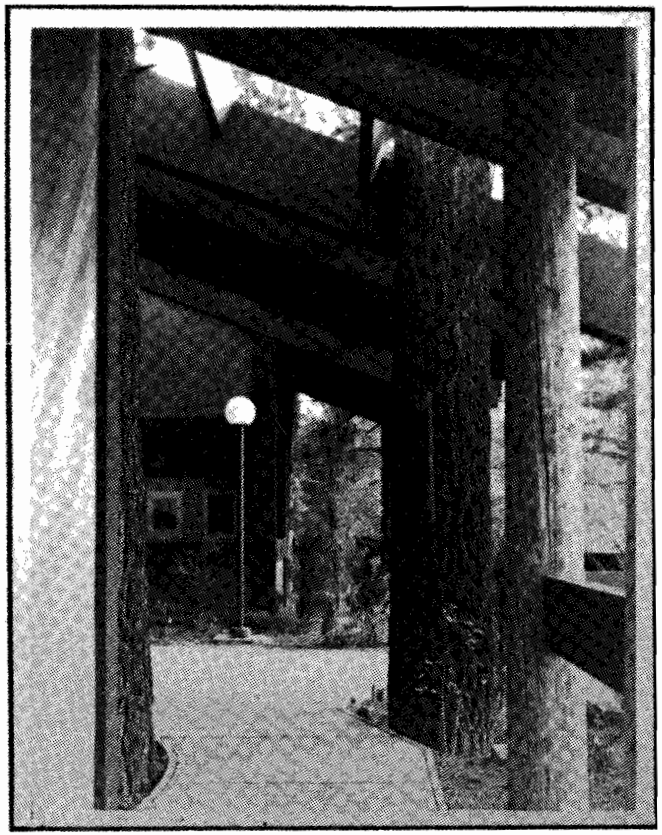
Harmony: different structures and parts of structures should harmonize with each other and the neighborhood. Buildings should harmonize with each other and the neighborhood. The different building materials of stone, wood and timber are appropriate to building in the area and need to be skillfully blended in harmony with each other and with the setting of forest and mountain. New construction should be blended with the old, or the old may be remodeled to go with the new.

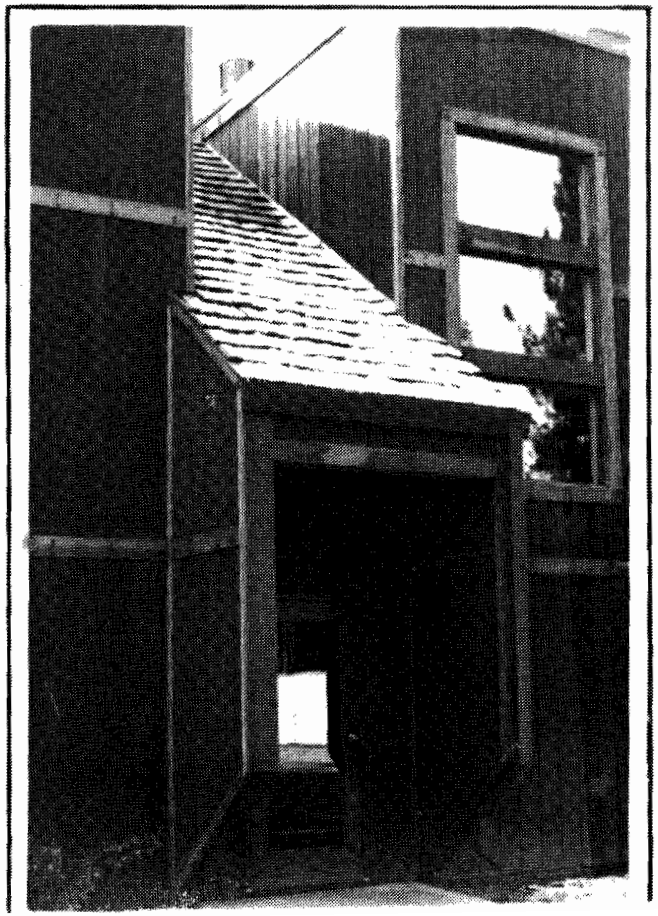
* Break up large buildings with architectural detail, especially at doors and windows.
* Ensure the identification sign is simple in style and reflects the architectural theme of the project.







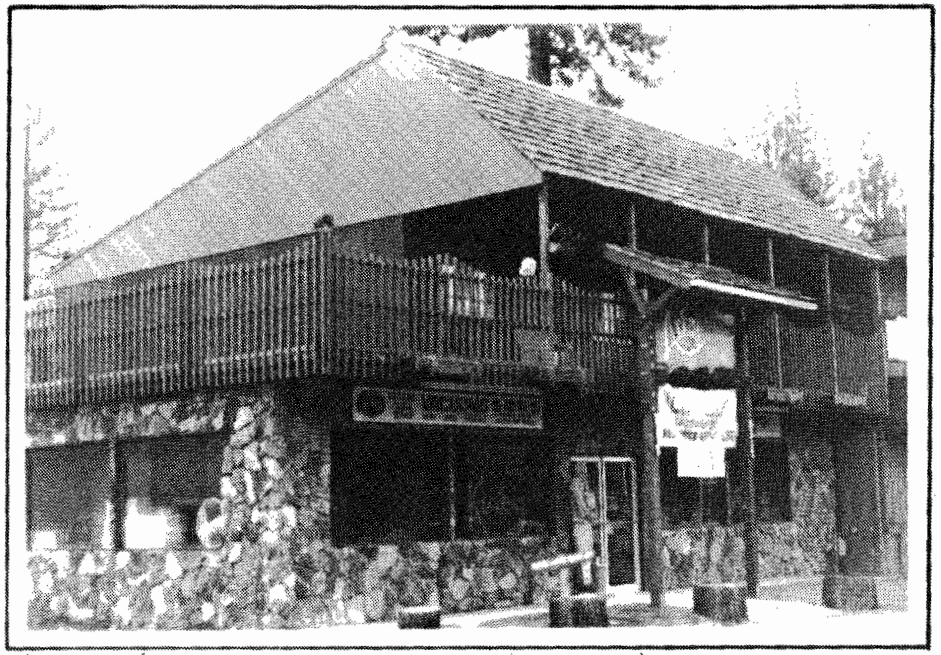


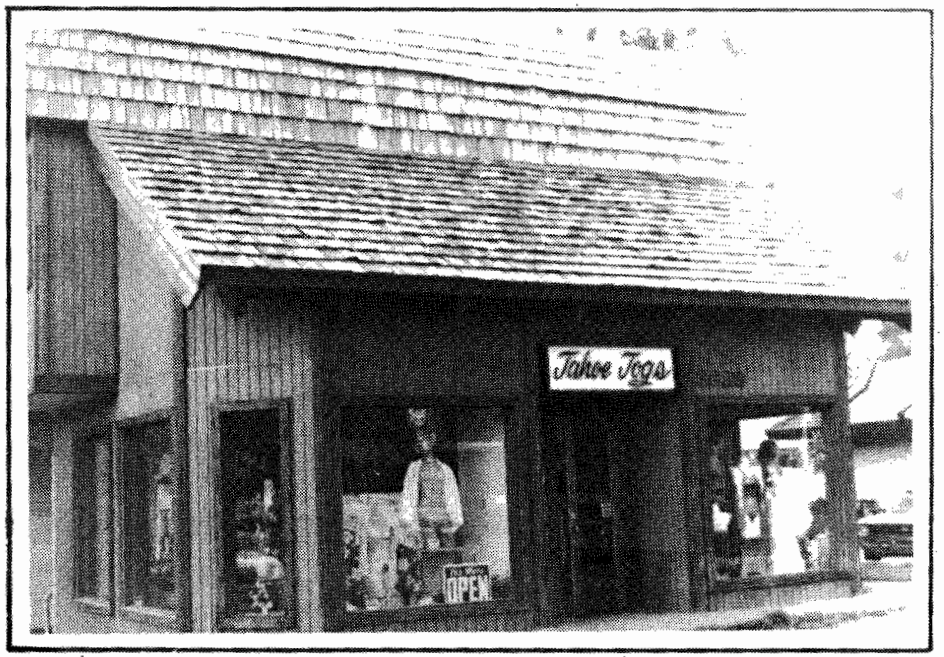


Variety and contrast of shapes and colors provide a more interesting environment.

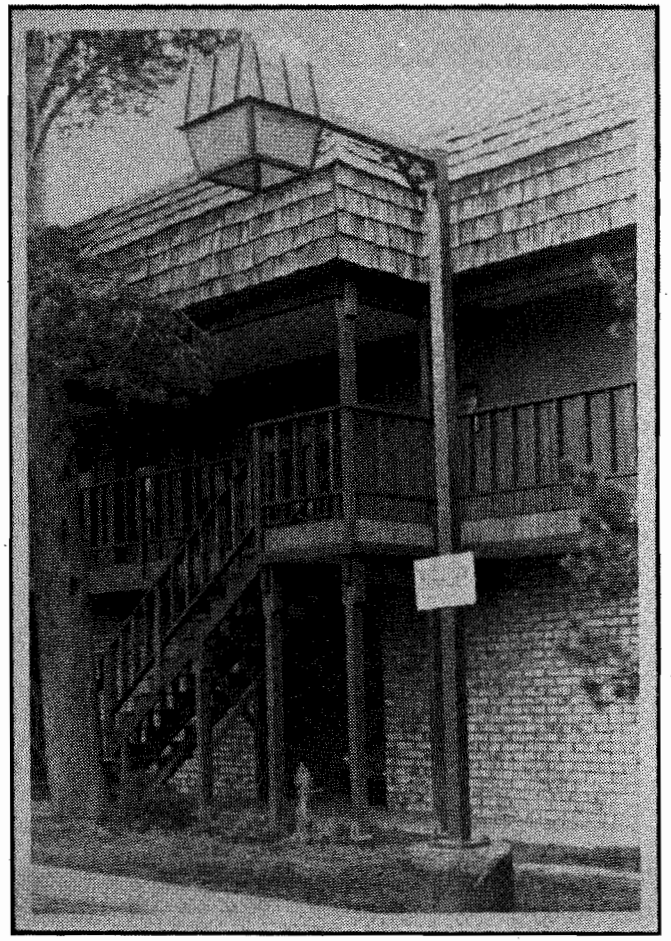
Materials: the use of different materials in a design should be skillfully blended. Wood is the most popular, as it blends well into the natural setting of buildings in the mountains. Different building materials of stone, wood, as well as metal are considered appropriate building materials. All outside wood is subjected to severe weathering by the mountain climate and needs careful drying, sealing and protecting.

Roofs: roofing materials such as cedar shakes and redwood shakes blend well into the forest environment. They can create a fire hazard and a designer should consider alternative roofing materials. For practicality, asphaltic shingles, metal or tile are a better choice. There is an aluminium roof system on the market which looks attractive, is available in warm colors and compares favorably in price with cedar shingles.





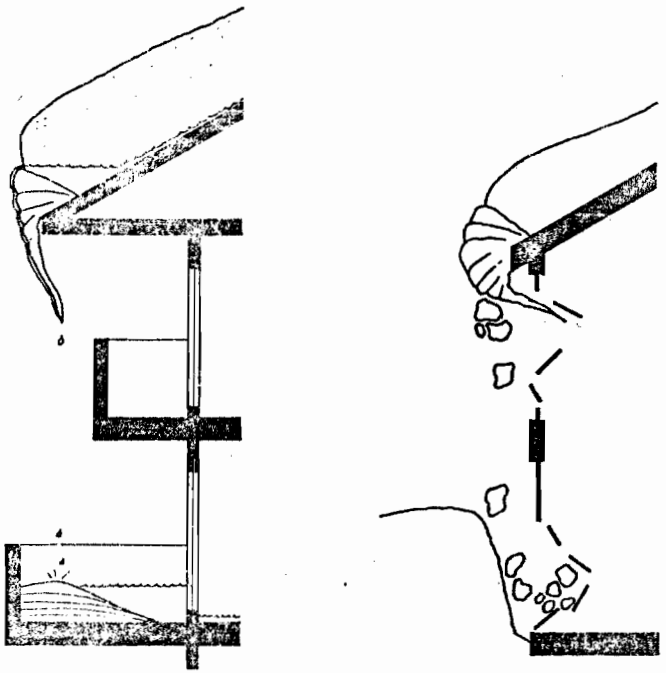
Develop roof lines with interest and variety. The pitched roof is the most popular design because it sheds snow the fastest. It also creates greater problems with ice damming in high elevations. The flat roof can be designed to be almost free of ice damming by running the drains up inside the buildings so they stay heated. The designer should avoid complex roof shapes because they accentuate the problems of snow dumping and calculation of roof loads.

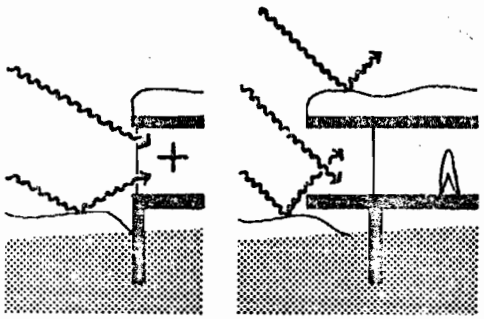


Roof Vents and Flues: Roof vents and flues should be placed near the ridge line or on a flat section, so as not to be sheared off or blocked by snow and ice. An alternative is to run them through a side wall, and turn them up.

Foundations: For foundations in the Sierras, the perimeter wall is recommended because it permits a freeze-protected crawl space for utilities.

Pole foundation structures are generally more expensive





than the perimeter type. They also make it difficult to protect heating and plumbing lines and produce dry ground beneath the structure which is subject to erosion by spring runoff.

Utilities: Utilities should be installed underground to avoid icing and for aesthetic reasons. If telephone or electric service comes in overhead, it should approach at the ridge line of the roof so that it cannot be broken by snow sliding from the roof. Mechanical equipment and utilities should be designed so that all equipment, including meter boxes, are a part of the structure and adequate screening should be provided.

Balconies and Windows: Roof designs should ensure that snow cannot be dumped onto balconies, doors or walkways, Wet snow, falling from 30 feet, can endanger life and limb besides collapsing structures. Even a drip line from the eaves can produce dangerous icing where people pass.

Balconies should be protected by roof overhangs and doorways by porches. Porches also help to prevent the introduction of snow and rain into a building when the door is opened. Windows need shielding by a combination of overhangs, shutters and drapes. Glass is subject to breakage by falling snow at the first floor and by inturning icicles at the eave lines. Windows absorb a large amount of heat by day due to the relatively unfiltered sunlight plus reflections off the snow and they lose al lot of heat at night into the clear cold skies.

Energy Conservation: Design should minimize the need for mechanical heating and cooling. Wherever possible, use sunlight for heating and illumination, and natural ventilation for shading and coolness.

SIGNS

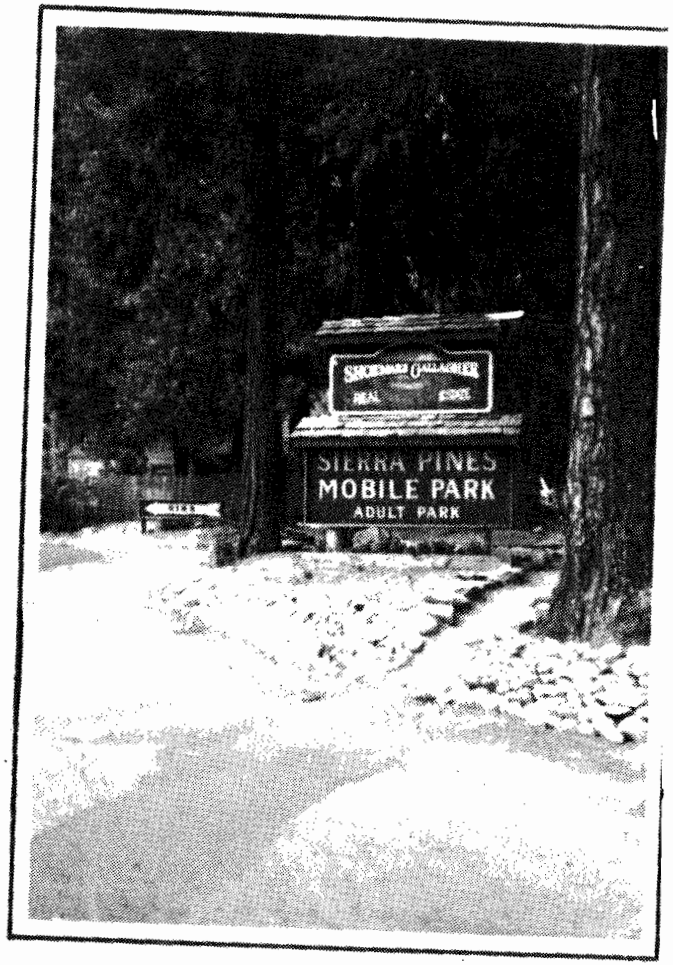
Signs are a necessary aid to commercial enterprise but need to be handled as carefully as the building and site.

Design Capability: Signs, their materials, size, color, lettering, location and arrangement should be an integral part of the site and building design and compatible with the surroundings.

Consistency: Keep signing consistent in location and design throughout a development. This includes shopping centers.

Restraint: Signing should be simple, restrained and subordinate to the overall project design. A sign should attract and identify, but not dominate the site.

Types: Wall signs, graphic symbol signs and low profile, free-standing signs are encouraged. Flashing, moving and rotating signs are prohibited by County ordinance.

Simplicity: Signs should use a minimum copy, suitable lettering and avoid garish colors, materials and shapes.

Lighting: Subtle lighting and landscaping can enhance a sign's setting and draw attention to it. The light source should be screened. Plastic, neon or other non-rustic sign materials should be discouraged. An excess of signs or wrong placing confuses a potential customer and destroys the sign's purpose.