

AN ENVIRONMENTAL RESORT FOR CAPE COD

*Cape Cod Center for the Environment & a Sustainable Economy
with Gerard Ives Architects for Sustainable Design*

Funded with grants from the Community Foundation of Cape Cod

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Cape Cod Environmental Resort Vision Summary

Vision

Environmental tourism starts with an eco-region like Cape Cod. The Cape has an extraordinary natural environment which has long attracted visitors for relaxation, recreation, and study. A Cape Cod environmental resort could deepen the visitor's experience of the Cape's environment, while lessening the human impact on that environment. It would be a custodian of natural and heritage resources, encouraging people to live in harmony with the environment and local community.

Guests could leave their car at the resort site and not drive it again during their stay. They could wheel their luggage in carts to their rooms. Linked to nearby conservation areas by walking and bike trails, they could hike and bike, and ride an electric vehicle transit loop to other sites throughout the region. They would explore the Cape Cod National Seashore and local conservation areas, watch whales and rare birds, visit local fishermen and craftsmen, and attend plays and concerts.



View of Proposed Environmental Resort

The environmental resort depicted in this report would be located in a woodland. Canopy trees would allow strategic openings for sunshine and breezes. The resort would be landscaped to preserve indigenous plant and animal species and to provide visitors with an understanding of Cape Cod's ecosystem. A garden would provide produce for the resort. Guests could relax in vined bowers. Guests would stay in rooms, clustered in pavilions, using the latest in energy conservation, solar, innovative wastewater treatment, recycling, and environmentally-sound building materials. These units would be living demonstrations for the latest in sustainable technologies. Loft rooms would accommodate families easily.

Guests would take breakfast in the common building, which could also provide refreshments throughout the day and serve other meals to visiting groups. The sociability of an inn would be encouraged. The common building would also feature talks, slide shows, and films for visiting groups as well as the general public and would host meetings and receptions.

A successful Cape Cod environmental resort could serve as a model for other Cape hostleries.



OUTER CAPE - A SPECIAL PLACE

- An "Island" of fragile natural resources.
- A unique local economy tied to these resources.
- A recognized need for alternatives to the economy.
- A unique community with a special cultural heritage.
- Special problems of resource use such as ground water pollution.

An Outer Cape Environmental Resort Must Reflect the Region's Unique Character

The Environmental Resort Project

The Cape Cod Center for the Environment & a Sustainable Economy has undertaken a conceptual and feasibility study of environmentally-sustainable resorts on Cape Cod, with grants from the Community Foundation of Cape Cod and the participation of the Cape Cod Commission, which seeks to promote a sustainable approach to economic development for Cape Cod. The Center: 1) identified potential sites; 2) identified design and program aspects of a Cape Cod environmental resort; and 3) examined financial and development feasibility.

Cape Cod is a promising demonstration site for an environmental resort. Tourism, with retirement, is the region's chief industry, and the area possesses globally-important environmental qualities. Most environmental resorts are in the tropics. None exist on the North Atlantic coast. Cape Cod, with its whale watches, nature hikes, nature education programs, and popular enjoyment of its natural environment, has a demonstrated eco-tourism appeal. A growing topic of interest is the changing fishing industry, which the environmental resort should work at interpreting for visitors.

Besides making a profit, an environmental resort could demonstrate new technologies and practices that conventional Cape Cod hotels, motels, and inns could adopt to protect the Cape's environment, while enhancing marketability, creating jobs, and improving business efficiency. Further, environmental tourism strengthens the overall image of Cape Cod, which depends upon its natural environment to attract tourists, retirees, and entrepreneurs.

The Cape Cod environmental resort project grew out of a visit by U.S. Virgin Islands eco-resort developer Stanley Selengut in 1995. The Cape Cod Center obtained two grants from the Community Foundation of Cape Cod to undertake the study presented here. A committee of the Cape Cod Center has been working on the project since the fall of 1995. The planning process has been highlighted by a design workshop led by Boston architect Gerard Ives and involving approximately 20 participants including developers, planners, environmentalists, and tourism industry professionals. Ives has designed the innovative visitors center at the Massachusetts Audubon Society Wellfleet Bay Wildlife Sanctuary, on Cape Cod, and is involved with the Center for Sustainable Building in developing guidelines for renovated residential buildings in Cambridge, MA.

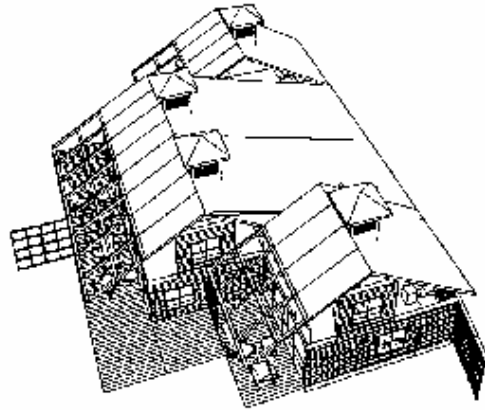
Major Findings

- The Environmental Tourism Experience--The Cape Cod environmental resort would offer a full program of nature hikes and cruises, bike trips, and talks, partnering with existing organizations which offer programming like the Massachusetts Audubon Society Wellfleet Bay Wildlife Sanctuary, Cape Cod National Seashore, and Center for Coastal Studies.
- Sustainable Tourist Development--Implies no or minimal net impacts on the environment and infrastructure. Ideally, units should either be redeveloped or existing units should be replaced when new ones are built. Resort should promote regional economic development by using local produce, seafood, crafts, recycled goods, and other area products and services.
- Site Availability--Since Cape Cod is a relatively developed region, few prime sites exist on Cape Cod for building a new environmental resort. The best prospects are either rehabilitating existing facilities or new construction. The rehab option minimizes new visitor impacts and can convert some of the region's 700+ hotel/motel/inns to more sustainable practices. New construction is appropriate where net impacts are minimized. One benefit of new construction is that it allows development of the most comprehensive approach to sustainable design.
- Model Conversion and New Construction Plans--This report proposes plans for a new 16-room facility and renovating an existing 70-room motel. The conceptual plans are for a new 15-room facility because the optimal size of such a resort, in terms of impact and financial feasibility, is between 12 and 40 rooms.
- Sustainable Design--Sustainable design elements for an environmental resort include energy conservation, active and passive solar energy, innovative wastewater treatment that reuses wastewater, environmentally-benign building materials, recycling, environmentally-sensitive landscape design.



"Green" Transformation of Morand Resort

Green Transformation of an Existing Motel



Design for Room Cluster at New Environmental Resort

- Auto-free Transportation—The resort will stress biking, hiking, and pooled transit with vans, potentially using electric vehicles.
- Eco-Tourism Market Niche—Eco-tourism is growing 30% per year world-wide, while tourism in general is growing by 6-8%. Cape Cod already has strong environmental draws with whale watching, Cape Cod National Seashore, and many conservation preserves.
- Economic Feasibility—To be economically feasible, acquisition, construction, and operating costs should be kept below industry averages. The most feasible projects may be rehabilitation of existing facilities or construction on sites where acquisition costs have been kept low. Smaller, family-run facilities would be most able to keep operating costs low.

The report projects that a 16-room environmental resort could cost in the area of \$1,760,000, depending upon land costs, and produce potential revenues of \$373,000. After operating expenses and debt service, income could amount to over \$70,000. A 24-room facility could produce approximately \$125,000 in income.

What Is a Cape Cod Environmental Resort?

Cape Cod needs a vision for tourism which is more in tune with the region's outstanding natural environment, which lessens visitor impacts on the fragile environment, which meets a changing market's interest in nature and the outdoors, and which is capable of overcoming the overcrowded, over-commercialized impression of certain areas of the Cape.

Sustainable Tourism Development

The ideal of sustainable development is that there should be no net negative impact on the place it is located. Some fear that Cape Cod already has too much tourism, especially in the summer, and that nothing should be done to encourage it further. There is particular concern about encouraging any additional automobile traffic and any further consumption of scarce open space. The Cape Cod Commission's Regional Policy Plan requires for development to make no net new impact or mitigate its impacts. Further, the Commission's recently-completed Capacity Studies for the Monomoy Lens Area of the Cape (Dennis, Harwich, Chatham, Brewster, Orleans) and the Outer Cape (Bastham, Wellfleet, Truro, Provincetown) have found that these towns have a limited capacity to absorb further development, especially in relation to transportation infrastructure and groundwater resources. These Capacity Studies indicate the importance of limiting development impacts, especially on the Outer Cape.

Others believe that a model eco-tourism project would not make a significant increase in the Cape's tourism impacts and that it could demonstrate to the existing tourism industry how to do business in a more environmentally-sensitive way.

There are sentiments that redeveloping existing sites is preferable to developing a "green field" site. There is a continuum of thought on sustainable development from the position that no net new impacts should be incurred, implying there should be no new development or existing units should be eliminated in a trade-off for the new units to the position that new units could be added as long as their environmental impact was an improvement over conventional hotel units. In any event, an environmental resort project should assess and mitigate the full environmental impacts.

One caveat is that these environmental considerations must be melded with the profit-making side of an environmental resort. It must have market viability.

A mitigating factor in developing a Cape environmental resort is that it would not have to be a full-service, stand-alone operation like such resorts in remote locales. This resort could form partnerships with existing organizations and businesses, i.e. Massachusetts Audubon Society or the Center for Coastal Studies, to provide dining opportunities, entertainment, nature tours, motor transportation, etc. The resort could also be a customer for local organic food producers and fishermen. This achieves the goal of supporting existing businesses and organizations.

Regional Context of an Environmental Resort on the Outer Cape

An environmental resort must be solidly rooted in its natural environment. Although the projects discussed here could be situated anywhere on Cape Cod, they have been planned with the Outer Cape in mind. The Outer Cape is a special natural and social environment that most typifies Cape Cod, primarily because the Cape Cod National Seashore has conserved much of the most valued natural resources in the six Seashore towns.

The Draft General Management Plan of the Cape Cod National Seashore (August, 1996) indicates that the National Seashore is seeking to "use sustainable practices as a model for conserving resources, thereby encouraging seashore visitors and residents to use similar practices in their daily lives." The Draft National Seashore Plan goes on to explain that "visitors would be encouraged to leave their cars at home, share rides, take shuttles, walk, bike, conserve water, and minimize disturbance to natural and cultural resources."

The holistic vision of the Cape Cod National Seashore fits exactly with that of the proposed Cape Cod environmental resort. Since potential environmental resort sites are located adjacent to the National Seashore, the environmental resort can have an ideal partner in the Cape Cod National Seashore, as both entities seek to promote sustainable tourism. In fact, visitors to the environmental resort would spend much time in the Cape Cod National Seashore.

The Experience at a Cape Cod Environmental Resort

The visitor experience must be distinct from existing hotels, motels, or inns. It should include two elements: 1) a sustainable living experience in which a minimal impact is made by the visitor upon the environment; 2) the visitor spends his or her time exploring and being educated about the Cape Cod natural environment.

The environmental resort should be an educational tool demonstrating the role of the environment in sustaining human life. The resort's nature and recreational programs would include walks, bike rides, talks, nature cruises, and classes, so that a visitor could enjoy activities every day for visits ranging from a weekend to a full week. This is the main reason why it is important to be sited near bike trails, walking trails, and/or conservation areas. The eco-resort should focus on learning about the Cape's fisheries, including the crisis of depleted stocks and the promise of aquaculture. The resort could develop programs with local fishermen to teach visitors about the changing fisheries.

The eco-resort should have a space that can be used for meetings, slide presentations, classes, etc. Because of the appeal of Cape Cod's shoreline, the environmental resort should offer transportation access to beaches and boating.

In order to identify environmental education and recreational opportunities, the Cape Cod Commission has developed an extensive inventory of such activities for its Heritage Discovery Network, which is available over the World Wide Web at the following address:
<http://www.vsa.cape.com/~ccom>

Critical to providing an environmental tourism experience on Cape Cod is working with existing organizations that are already offering certain services, i.e. nature walks, talks, and cruises of the Massachusetts Audubon Society Wildlife Sanctuary at Wellfleet Bay, Cape Cod National Seashore, Cape Cod Museum of Natural History, Center for Coastal Studies whale watches, sea kayak trips, bike rentals. This supports existing organizations while helping the environmental resort avoid having to develop a visitor program from scratch. Packaging and cooperative endeavors can create the positive economic synergy that this project seeks.

Cape Cod Fishing Industry

One of the major environmental issues facing Cape Cod is the decline of the commercial fisheries. The Community Foundation of Cape Cod was able to provide funding through Collaboration of Community Foundations for the Gulf of Maine for the environmental resort project to develop economic alternatives for the declining fishing industry. The intention has been to create an environmental resort model that could be adapted across the Gulf of Maine, which this project does.

The Cape Cod environmental resort could have a focus of interest on the region's fisheries. Working with local institutions like the Center for Coastal Studies and the Cape Cod Museum of Natural History, the environmental resort

could develop programs that enable visitors to learn about the Cape's fisheries, the marine ecosystems, aquaculture developments, and the traditional fishing way of life. In support of the Cape Cod Sea Foods campaign, of the Lower Cape Cod Community Development Corporation, the environmental resort could serve local seafoods to guests.

Transportation

One of the goals of an environmental resort is to reduce automobile traffic, both to lessen traffic and reduce air pollution and to enable visitors to experience Cape Cod's natural environment at closer hand. This fits with the Draft Cape Cod National Seashore Plan, which seeks to encourage visitors to "leave their cars at home, share rides, take shuttles, walk, bike." Since visitors should be encouraged to use bicycles and walk, the resort will offer extensive guided programs using these modes. That is a reason why the resort should be located near trails and conservation areas.

It also is important to offer public transportation to various nature and cultural sites, restaurants, and shops. The Environmental Resort Design Workshop suggested developing a "Natural History" shuttle bus serving the Cape Cod National Seashore, Massachusetts Audubon Wellfleet Wildlife Sanctuary, Cape Cod Museum of Natural History, and Nickerson State Park. The Design Workshop also recommended working with Plymouth & Brockton Bus Lines for Outer Cape and Cape wide transportation, existing Cape Cod trolley services, and the institutions on the "Natural History" shuttle. The resort should also consider utilizing its own vans to transport visitors to various sites. The resort might find using electric or solar-powered vehicles feasible, especially since distances driven from the resort would not be that great.

Potential Sites for an Environmental Resort

The Center has examined some potential sites that could accommodate an environmental resort, though these are not exhaustive. The Cape Cod Center received referrals of 24 sites. An initial survey of these sites has found that some might not be available or appropriate for developing as an environmental resort, though a number could be. The types of sites include: several undeveloped parcels in Mashpee in or near the proposed 5,871-acre Mashpee National Wildlife Refuge; 150-acre vacant area near Cape Cod Canal; and a 1960's motel in North Truro adjacent to the Cape Cod National Seashore.

There are two sorts of projects that could be pursued--renovation of an existing building or new development on a vacant parcel.

Existing Hotels/Motels/Cottage Colonies/Inns

There are over 20,000 hotel/inn rooms at over 700 properties on Cape Cod. Finding a way to make at least some of these properties more environmentally-attuned is important. It makes sense to convert or add on to existing accommodations. Renovation is sustainable and a model for other motels and inns. Certain non-hotel properties might also be appropriate for environmental resorts because of their location or ease of redevelopment. This could also evolve into a specialized environmental section of an existing resort.

A candidate for renovation is the Outer Reach Motel, Rt. 6, N. Truro. The Outer Reach is a 70-room motel (with 8 different buildings) from the 1950s, which has hardly been renovated. It is closed six months of the year because it is not winterized. It is owned by the Evans Family, owners of the Provincetown Inn. They are interested in upgrading the property. The site is adjacent to the Cape Cod National Seashore, a 10-minute walk to the beach, and a four-mile bike ride to Provincetown. In spring, the Outer Reach hosts dozens of school groups who spend several days on environmental education. The motel has electric heat, propane gas for hot water, and its own septic system and water supply wells.

Lower Cape real estate brokers have mentioned that there are often several older motels or cottage colonies available for sale, especially on the Lower Cape. Various older properties could be ideal rehab candidates because they need upgrading. These properties have lost market share because of being outmoded and could carve out a new market by providing the amenities of environmental tourism. It might be more economical to demolish older structures that cannot be easily converted to a sustainable design than try to renovate them.

Sites for New Construction

Undeveloped land would allow a free hand in creating an environmental resort. Some towns own undeveloped land that might be used for an eco resort. Nevertheless, Cape Cod has limited affordable developable land near interesting environmental areas like the shoreline and saltwater marshes. It would be critical not to disturb natural ecosystems. If the site is undeveloped, it might range in size from 10-20 acres, depending upon its location. Proximity to a bicycle trail or a conservation area would be important. Conceivably an environmental inn could be located in a village area, a Provincetown or Chatham, as long as guests could reach natural areas easily without having to use a car.

Environmental Resort Design

Sustainable design recognizes the unique nature of the problem and responds with designs that are discoveries, not reiterations of something else. It is site specific. The sustainable designer must be prepared to experiment.

New Construction--16-Room Resort

This project has developed plans for building a new 16-room resort and renovating an existing 70-room motel. For the sake of this study, architect Gerard Ives has designed an environmental resort with sixteen units and a common building that could be well suited to a ten-acre parcel. Since the project is designed in modules of four-bedroom units, modules could be added or subtracted, depending upon site constraints. The major site, technology, and building design issues are discussed below:

Site Layout

The site for a Cape Cod environmental resort would be different from that of a resort in a remote locale like the Amazon or the Rocky Mountains. Most of Cape Cod is developed, and the sites proposed for an environmental resort are mostly already developed or fairly close to developed areas and not in the middle of conservation lands. For instance, the prototypical sites are located on existing roads and would require no special access.

The environmental resort should be sited to harmonize with Cape Cod's natural environment and surrounding properties. The impact on the site should be minimized, especially in regard to disturbing vegetation and earth grading. The project team should carefully consider how to treat on-site trees and plant material. In a site layout, parking should be at one side, under cover and not near any prime view. Siting should take into account solar access, which could be affected by the shady trees on the site, and wind protection, which is a considerable issue on Cape Cod. The site design should incorporate walkways and bike trail connections into the site plan.

The site configuration could greatly reduce land area (and cost) needed for perimeter roads and parking and maintenance associated with plowing and repairs. A central spine path could double as fire access, construction road, and pedestrian pathway.

Landscaping

The project should try to maintain existing natural and historical man-made features, protecting views and avoiding fragmentation of open space. Landscaping should protect local plant and animal species and use indigenous plant materials. The environmental resort should avoid the need for irrigation and fertilizer if planting grass. A naturalist should work on the project to identify sustainable landscaping solutions.

Since food-raising is an important aspect of sustainable development, the project should consider including a vegetable and/or herb garden and fruit trees.

Common House

The 3000-square-foot common house can expand the social experience of visitors. It can provide breakfast and meeting facilities for resort guests and accommodate hikers, bikers, and those arriving for special programs. It is subdividable into two rooms for about 40 each or one room for 80-100. The solar electric roof is located here because of its exposure to the south and because of economies of scale. It is located along the main (non-auto) axis, which curves around it to encourage human contact. Dining may occur inside or outside under attractive grape vine arbors irrigated by grey water from the facility. The concession may or may not be staffed. Guests might have key access to refrigerators with refreshments. The common house would also house the check-in desk and office.

Room Clusters

Architect Gerard Ives has proposed clusters of four bedrooms, with a shared bathroom core, solar hot water, heating, and ventilation, surrounding the common house. Each of the four units has private outdoor space for living/visiting protected from neighbors, also under arbors. Clusters would allow the buildings to interpenetrate the natural environment as well as encourage greater social interaction. Clusters can be more economical for infrastructure costs than stand-alone cabins and can be added piecemeal. Some or all of the units could have lofts allowing up to four beds.

The already existing Outer Reach Motel is broken up into motel-style pavilions of up to eight rooms apiece. A renovation program would work with the existing building configuration.

Architectural Style

Since a sustainable structure should relate to the sense of place, the architectural style should take into account traditional Cape Cod styles, the surrounding natural environment, and the building's functions. The building's color scheme should harmonize with the surrounding environment. The Gerard Ives design resembles traditional Cape Cod houses.

Building Design & Construction

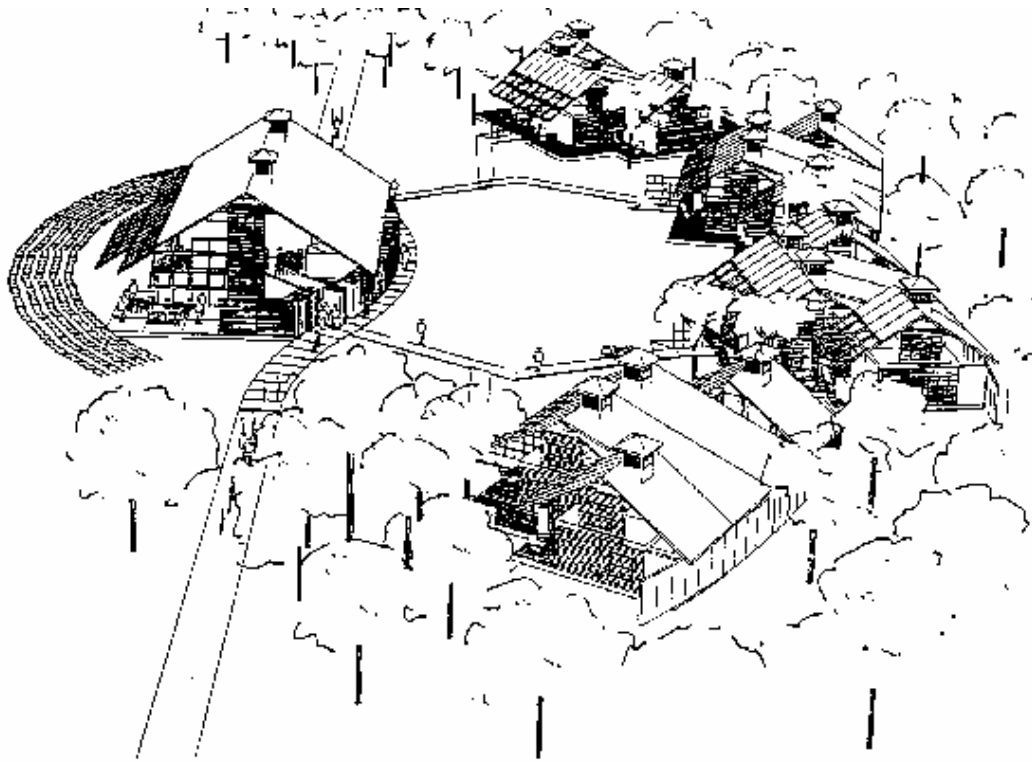
The project could be built at typical costs, spending somewhat more on construction costs for sustainable features, but spending less on energy and maintenance. By saving with simple finishes, simple baths, and shared common house facilities and outdoor space, the project could upgrade with natural wood finishes, added insulation, and design quality. The structure should be designed in a state-of-the-art fashion to comply with the Americans with Disabilities Act (ADA) to insure easy access and use by disabled persons.

Described below are specifications for building the residential clusters at the proposed 16-unit environmental resort:

- Economy/Simplicity--Cape-style modular, with prefabbed insulated walls and roofs and floors on piers; cores of stacked insulated formwork with pumped concrete minimizes impact of excavation and construction on site.
- Modulars--All prefabricated; 8' x 8' walls mounted on 8' x 8' grid; short 8' floor panels for economy; 2' or 4' x 16' roof panels or, alternately, roof trusses at 24" o.c.
- Unit Roofs--Cape Cod rhythm of repetitive roofs; green roofs and vines of wintercreeper, woodbine, and grapes; low eaves and low profile; cupola for ventilation, lighting, and core roof; could be either shed dormer or extension of present roof configuration.
- Walls--Horizontal lines and natural grain of white cedar shingles; four square divided light windows resonate with vernacular on Cape; large barn like doors open to outdoors and views.

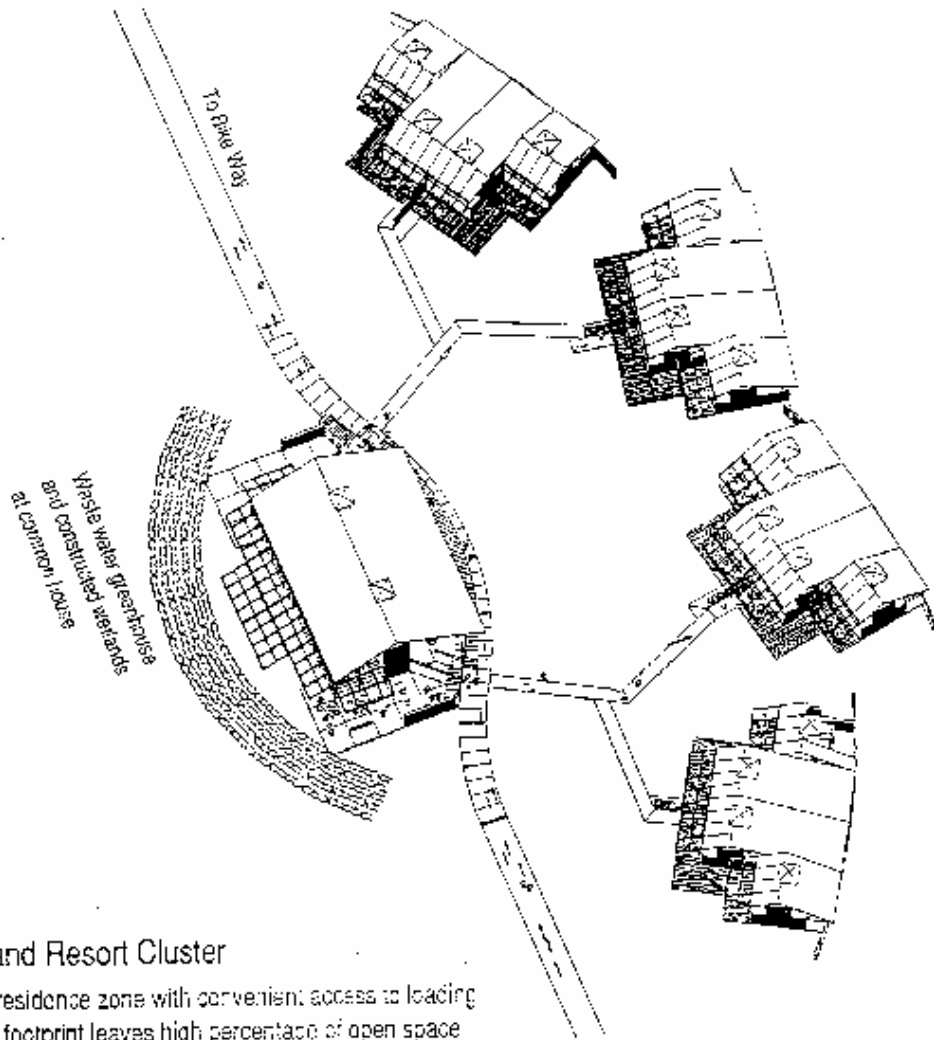
• Units--Includes sleeping area with two double beds, living area with chairs and table, bathroom, and upstairs loft housing two persons; living areas could have insulated floor panels over piers for economy; each unit has a large window on south for contact with site and passive solar; each unit has a window on an adjacent corner for a bay window effect and for pleasantly balanced daylight; outdoor lattice walls screen one deck from another's window; units and deck surrounded by half-height fences.

• Mechanical Core--For economy and noise control, baths are located in a central core; core could have insulated walls down to frost footings to protect piping; plumbing is back-to-back for economy; additional access to the wet walls from the dedicated mechanical space which would house the solar hot water storage; back-up hot water provided by instantaneous LP gas heaters for economy of operation; natural stack effect ventilates air from baths and indirectly from living spaces.



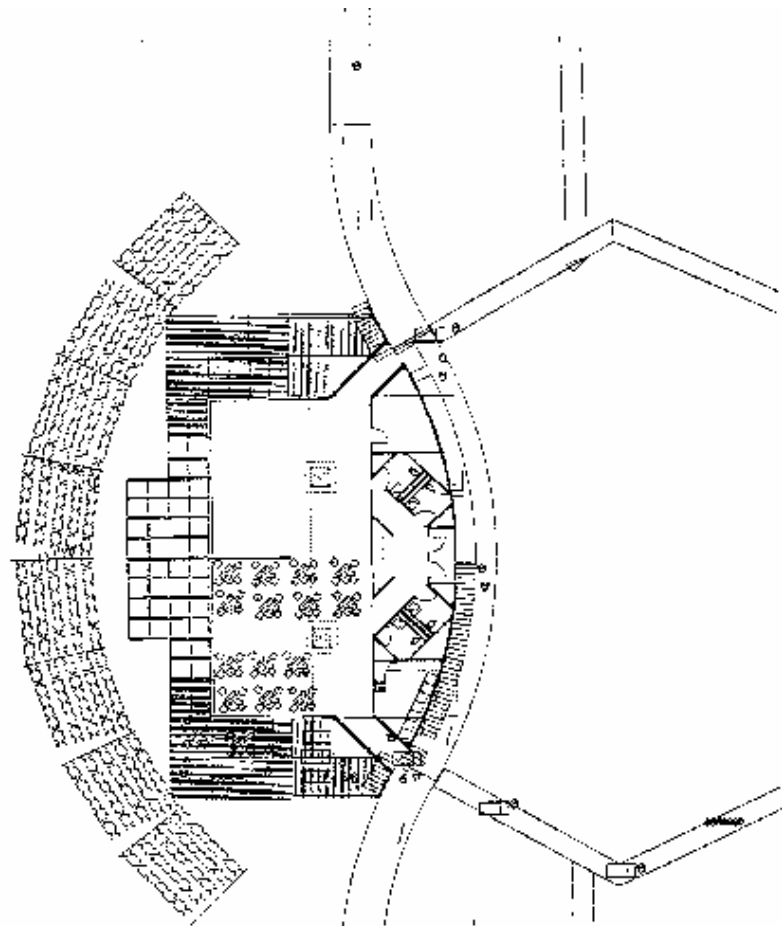
Woodland Resort Cluster from the East

- Access to Common House and registration first
- Pick up carts at parking to transfer gear to residence
- Pedestrian spine doubles as fire access
- Radial layout allows efficient distribution of utilities
- Radial layout for central crane for construction
- Solar orientation south, buffered wildlife zone to north
- Trees to the east, west, and north of buildings for summer shade
- Common House is central focus for shared experience, programs.
- Loose, informal, and friendly layout, adaptable to slopes



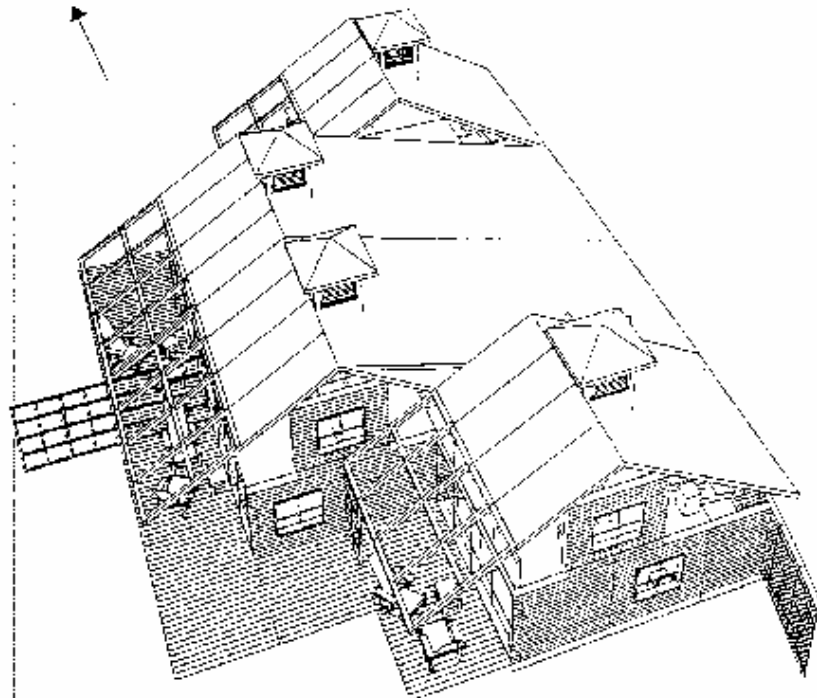
Woodland Resort Cluster

- Car free residence zone with convenient access to loading
- Compact footprint leaves high percentage of open space
- Minimum road area saves first and maintenance costs
- Pedestrian spine for access to common house and fire trucks
- Solar orientation
- Native plantings except tick free central lawn court for recreation
- Waste water treatment in greenhouse and constructed wetlands
- Short walk to common house services from residence clusters
- Radial waste water collection
- Four clusters of four units for 16 units total - each up to four pers
- Half the Common House serves 64 on site, remainder is community



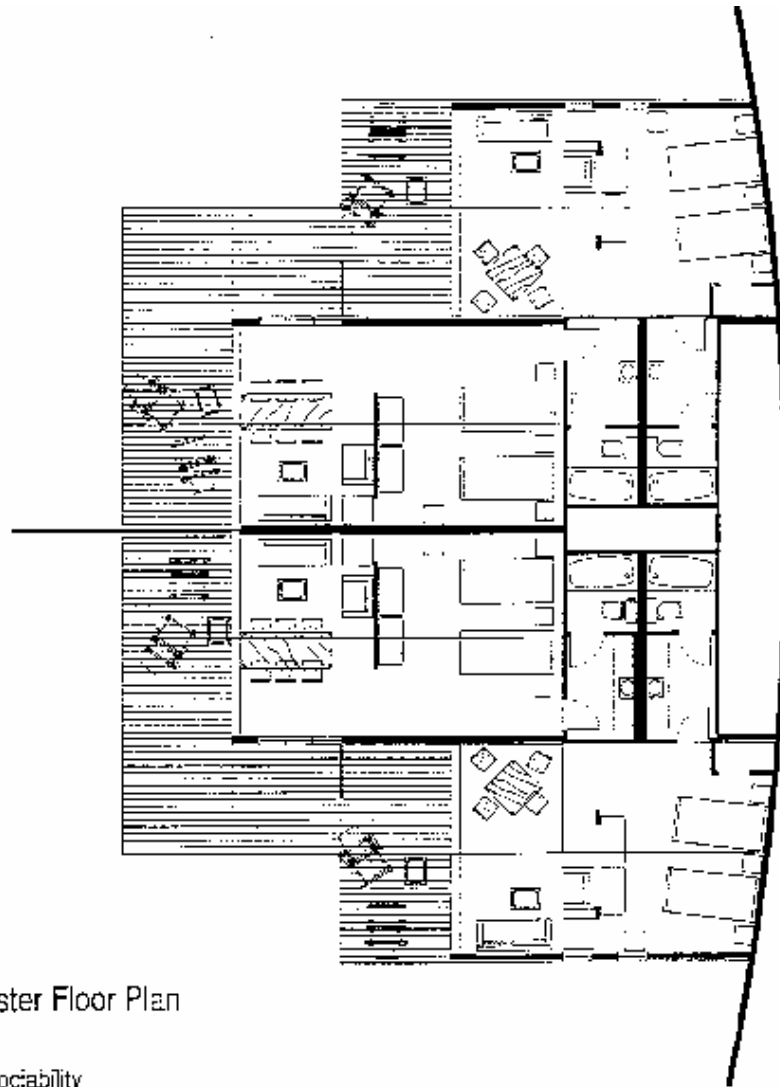
COMMON HOUSE PLAN

- Common House provides sociability, contact
- Half the Common House serves 64 on site for dining, programs.
- Half the Common House serves the broader community for programs, events.
- Operable partition in middle provides flexibility of space use.
- Efficient food service (concession, unit refrigerators) in Commons
- Self serve dining inside or out. Self service kitchen
- 16 refrigerators for 16 units - optional solar electric operation.
- Design for minimum staff operation.
- Support for outside catering, dishwasher.
- Provision for staff office.



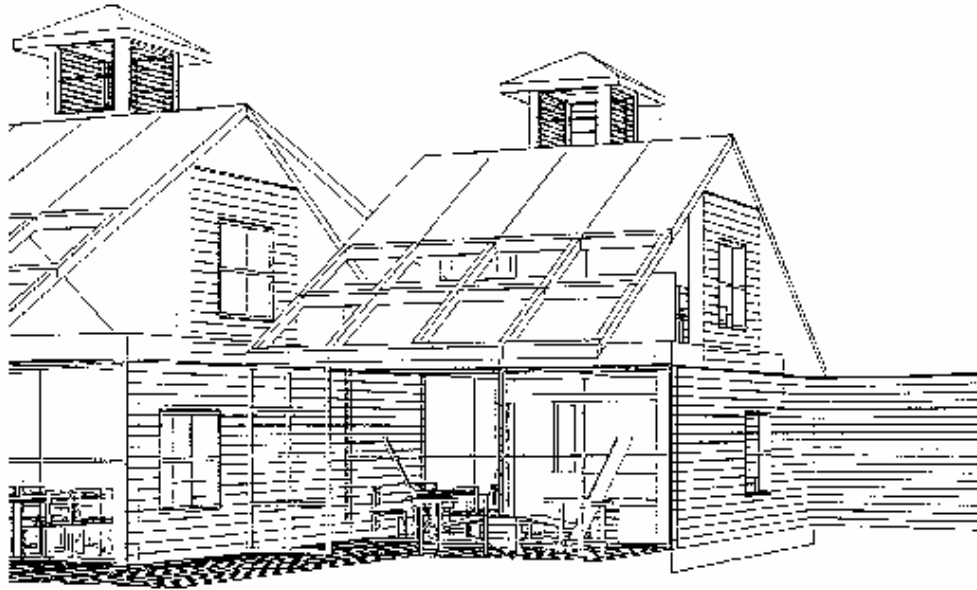
Residential Cluster from East

- Solar orientation
- Outdoor living and views
- Screens for privacy and shade
- Cupola ventilation/cooling
- "Cape" style roofs
- Atlantic white cedar siding
- Solar thermal panels for water, central water storage
- Excellent insulation
- High performance windows
- Louvered ventilation
- Short walk to common house services



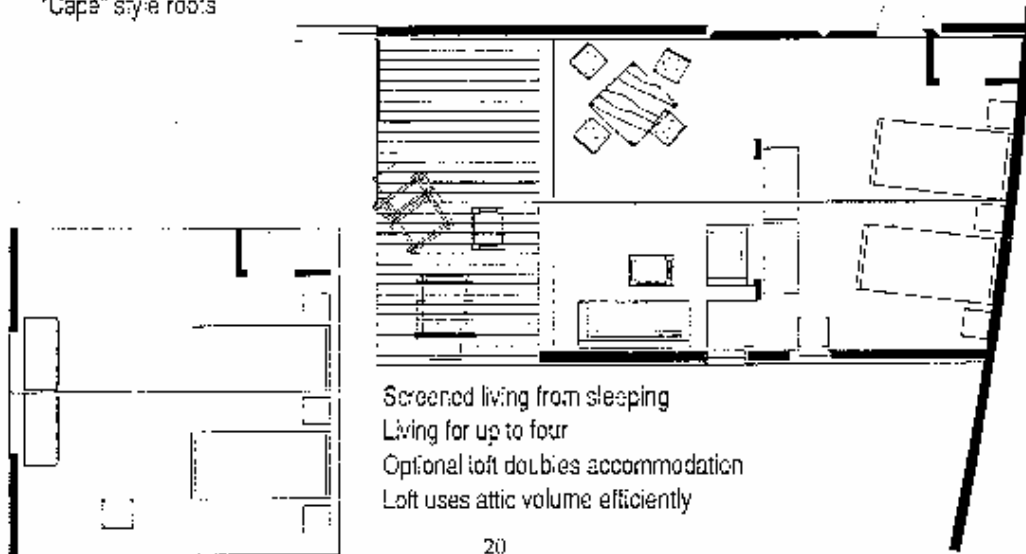
Residential Cluster Floor Plan

- South window wall
- Outdoor decks for sociability
- Sound separation inside
- Central services core - non freeze mechanical/wet space
- Controlled fresh air for excellent indoor air quality
- Shared services, heating
- Composting toilets and/or gravity to shared treatment sys.
- Wall, floor modular units
- Recycled construction materials in modules



Residential Unit from Southeast

- Solar orientation
- Outdoor living and views
- Screens for privacy and shade
- Cupola ventilation/cooling
- "Cape" style roofs



- Screened living from sleeping
- Living for up to four
- Optional loft doubles accommodation
- Loft uses attic volume efficiently

Green Conversion of an Existing Motel

The proposed plans for the green conversion of an existing motel were based upon renovating the existing 70-room Outer Reach Motel, North Truro. These concepts could be applied at other motels/hotels on Cape Cod.

By adopting a sustainable design, a motel could reduce operating costs for heating, air conditioning, and maintenance of paved areas, increase design appeal, and develop a new market.

Site Transformation

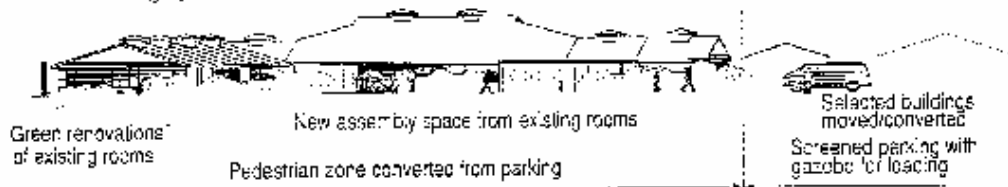
- Enhance the "sense of place" by reinforcing the "Moorland" image of North Truro; low building profiles; screened and protected from the wind with low "heath" type native plantings.
- Reduce the negative impact of automobiles (not unattractive asphalt and exhaust fumes) by consolidating parking in buffered and screened areas adjacent to residential units.
- Reduce storm water run-off with consolidated parking and porous paving.
- Provide pedestrian zones by converting old paved areas. Provide convenient transition between parking and rooms with loading/unloading gazebo for inclement weather and push carts for luggage.
- Provide links at residential clusters to walking and bike trails.
- Increase native plantings; they avoid the need for irrigation and thus conserve water.
- Selectively remove some rooms/buildings to optimize views, openness, maintenance costs, and to accommodate new site plan.

Residential Units

- Reuse of buildings is a form of recycling.
- Provide assembly/classroom space by expanding the volume of a few of the existing rooms.
- Adapt existing rooms to cooler seasons with envelope upgrades and integrated heating/hot water systems.
- Adapt envelopes to climate with shade plantings and arbors, wind capture, and appropriate ventilation inlets and exhausts.
- Provide some residential features (kitchenette, refrigerator, garnet, etc.) in assembly space to enhance contact and sociability.
- Minimal change to structural frame; costs targeted at exterior envelope for thermal performance and visual appeal.

Design Specifications

- **Unit Roofs**—Low roofs/low profile to blend into "Moorland" landscape; green roofs & vines: wintercreeper, woodbine, and grapes
- **Walls**—Natural grain of Atlantic white cedar siding; four square divided light windows resonate with vernacular of Cape; large doors open to outdoors and views.
- **Units**—Clusters/courtyards with shrub plantings for screening and windbreaks; lower paths (split levels) for privacy in sloped areas; lattice walls, screen decks.
- **Systems**—For economy the heating and running hot water is integrated into one system; plumbing is back-to-back, where possible, for economy; additional access to the mechanical space from below; existing plumbing systems can be adapted to "green technologies" as appropriate
- **Cupolas**—For natural stack effect, ventilate air from baths and indirectly from living spaces.



"Green Transformation" of Moorland Resort

- Pedestrian zone converted from parking
- Buildings and berms form protected areas
- Car free courtyards with convenient access to loading area
- Orientation away from cold winds
- Low native plantings avoid wind damage
- Existing structure insulated and sealed
- New efficient heating and water fixtures
- Non-toxic materials and improved indoor air quality
- Reduced road area reduces first and operating costs
- Pedestrian zone converted from parking

Green Conversion of Existing Outer Cape Motel

Sustainable Technologies Applicable to New Construction and Conversion

Building Materials

In designing the structure, the architect should evaluate the complete life-cycle energy, environmental, and waste implications of each building material and product in order to build in the most environmentally-sensitive way. Building materials should be prioritized by origin: 1) primary--materials found in nature, like wood, stone, earth; 2) secondary--materials made from recycled products like wood, plastics, cellulose, and aluminum; 3) tertiary--man-made, artificial, and nonrenewable materials, like plastics and plywood. The sustainability rule is to use the simplest building technology appropriate to the functional need. Avoid using energy intensive, environmentally-damaging, waste-producing, and/or hazardous materials. This also is important for indoor air quality, as materials, especially paints and finishes, that exhaust particulates and volatile organic compounds (VOC) can be toxic and unhealthy.

Some environmentally-sound materials may save costs, while others may raise them somewhat. For instance, metal roofing can be more expensive than asphalt. The project should consider indigenous and recycled materials, particularly ceramics made from recycled materials. Other desirable materials may include wet cellulose (newspaper) insulation, copper or cast iron piping instead of PVC piping, solid lumber floor and decking (avoiding formaldehyde).

An excellent source for identifying particular materials and products is Andrew St. John, editor, The Sourcebook for Sustainable Design: A Guide to Environmentally Responsible Building Materials and Processes. This Sourcebook describes and identifies vendors for such materials as concrete, masonry, metals, wood and plastics, thermal and moisture protection, doors and windows, finishes, mechanicals, electric systems, and solar electric and hot water systems. As the project is developed, it should keep track of the resource impacts of the various materials and technologies as a demonstration test and be prepared to explain the demonstration to interested parties.

The Rocky Mountain Institute's Primer on Sustainable Building emphasizes the importance of paying close attention to the construction process to make sure that the work is done to specification and the objectives of sustainability are reached. Material substitutions proposed during the construction period, for instance, must not compromise the original standards. Careless work and inattention to detail can subvert the goals of energy efficiency.

Energy, Lighting, and Ventilation

The environmental resort should be designed for year-round use because one of the objectives of this project is to encourage off-season nature tourism. Matt Patrick, of Self Reliance Inc., has explained how energy conservation and passive solar gain is more economical than producing new energy. He has recommended setting the roof line on an east-west orientation for optimal passive solar gain. Bedrooms should be located toward the southeast corner of the building for solar gain. A kitchen should be situated in the core or on the north because it generates heat of its own. In siting, one must be aware of potential tradeoffs between not disturbing the site and maintaining shade and optimizing solar gain. Lighting can also be enhanced through solar gain. In addition to windows, daylight can be provided by lightshelves, clerestories, and atriums. The building might use fabric awnings for shading which could come down in winter.

This proposal recommends photovoltaic electric panels on the common house. Although not yet cost-competitive with conventional electric production, photovoltaics is becoming less expensive and can perform an educational function, thus justifying the small subsidy that would be required. Relating to windpower, the Outer Reach Motel site, in Truro, has some of the highest wind speeds on Cape Cod. These wind speeds combined with the site's remoteness from other buildings might make it a worthwhile site for windpower.

Matt Patrick recommended constructing super-insulated buildings with a sun space which could be closed off from the living space at night with shades, a door, or a fan. This sort of design would minimize the need for a full-scale heating system so that electric resistance heating or a wood stove could serve as backup. Although construction costs might be increased by the superinsulation (can add 5% to building costs) and a sun space, energy costs and the costs of installing a gas (preferred) or oil heating system would be reduced or eliminated. The highest R-rated windows are R-8, so unless they are closed off with shades at night to avoid heat loss, they can end up losing energy.

Computer programs are available to figure necessary insulation and ventilation levels. Healthy air quality and ventilation is critical, especially as buildings become tighter to conserve energy. Air-to-air heat exchangers can be most effective in ventilation. Louvers, screens, and stacks can provide natural ventilation, preserving the structure and avoiding moisture and allergies.

The environmental resort should be sure to use energy-efficient appliances and lighting. The Cape Cod environmental resort might borrow from

the example of Stanley Selengut's Maho Bay Camps, where he has installed energy meters for guests to keep track of their energy use.

Wastewater Treatment

The project could choose from at least two major innovative treatment systems: 1) Clivus Multrum composting toilet, with grey water being used to irrigate plants; 2) black water and grey water being treated biologically in a greenhouse system like the Ocean Arks solar aquatics system. Potential combinations could be used, depending upon which toilet fixtures might be more appealing to the public.

The Clivus Multrum composting toilets, such as those used at the Massachusetts Audubon Wellfleet Bay Wildlife Sanctuary, would be less expensive and would be more easily maintained (though composting toilets do require regular maintenance). Such a wastewater system would produce greywater, which could be used to irrigate flowers and plants (though not plants used for food).

Beth Josephson, of Ocean Arks International, has estimated that a 16-room facility would generate 1760 (Gallons Per Day) of wastewater (110 GPD per room not including wastewater from a restaurant), and a 40-room facility would generate 4400 GPD. Ms. Josephson estimated that a 1,760 GPD facility, with a greenhouse and a standard-sized septic tank, would cost approximately \$25,000. A 4,000 GPD facility would cost \$50,000-60,000. This system could be built in a modular system by simply adding treatment tanks.

The key to any sustainable wastewater treatment system is reusing the nutrients. In developing such a treatment system for an environmental resort, the developers might pursue grants for innovative treatment systems.

Water Supply & Water Conservation

Much of the Outer Cape, including Truro's Outer Reach Motel, relies upon on-site wells for water supply. In order to protect on-site water supplies, the resort should avoid using toxic materials and minimize nitrogen-loading. The project should avoid using chemicals on the grass or grounds that could affect the water supply and should limit water run-off from any parking lot. In order to conserve water, the resort should install efficient low-flow water fixtures, particularly on toilets and showers.

Waste Prevention & Recycling

One of the fundamental principles of sustainable development is to avoid generating wastes through reducing, reusing, and recycling materials. The environmental resort should use non-toxic products, especially cleaning materials, that minimize waste. It should compost or anaerobically digest biodegradable wastes, an important practice as 60-75% of solid waste is organic. As much as feasible, materials should be reused onsite or collected for offsite recycling. In the first place, products should be purchased that can be reused or recycled. One of the key elements for implementing this program is training the staff and making guests active participants in the entire waste prevention process.

INFORM, a New York non-profit organization specializing in educational programs reducing pollution, has published several publications detailing suitable materials and practices for minimizing waste. The two most relevant publications are John P. Winter & Shereen L. Azimi, Less Garbage Overnight: A Waste Prevention Guide for the Lodging Industry (1996) and Source Reduction Planning Checklist (1992) should be consulted in operating an environmental resort.

The Economics of Developing and Operating an Environmental Resort

Economic Viability

Economic success for an environmental resort requires making it a magnet attraction with a standout design and programs. A facility of approximately 20 units or less would resemble an inn/bed & breakfast and could be managed by a single individual or family. Some proposals might simply retrofit or add a handful of units to an existing inn. A facility of between 20 and 40 units might still be operated by a family, but would require more of an outside staff, resembling the staffing and overhead for a motel. During the shoulder seasons, it might not be viable to operate an environmental facility as large as 40 units.

The ultimate profitability of the eco-resort would be determined by the construction and operating costs of the project as well as the rate structure for accommodations.

Rehabilitation of an existing hotel/motel/inn would achieve its economic benefits by adopting more efficient and cost-saving energy, water conservation, and wastewater technologies and building materials and by developing a new, possibly more profitable market niche. The number of rooms would not necessarily be significant because certain operating economies would have already been developed by the facility.

Land Cost

In order to make an environmental resort project feasible, the land acquisition costs should be kept low. The Conservation Lodge Foundation, for instance, is avoiding land purchase by seeking to develop on land owned by non-profit organizations who see a conservation lodge as an amenity which they wish to subsidize.

Room Rates

In speaking with various developers and tourism professionals on Cape Cod, this project would be a moderate priced environmental resort with rooms going for \$75-125 per room, depending upon the season. A higher priced facility would probably require an extraordinary site and amenities, and it probably would not be able to charge deluxe prices during any time but the summer. Moderate prices are projected because environmental tourism should be within the price range of a large audience.

Seasonality

The intention of this project is to operate during much of the off-season, to enhance the economy and because that is the best time to enjoy natural aspects of Cape Cod like winter seal cruises and bird-watching. January through March might be financially untenable unless some parts of the eco-resort were closed off or groups were booked in for blocks of time. The estimated pro forma budget below assumes that an eco-resort would operate on weekends, three nights a week during the four winter months. Although year-round operation would be preferable, the facility could probably succeed by operating eight or nine months of the year.

Ownership & Management

The environmental resort would probably be owned by a private business, although some percentage of the ownership might be allocated to the Cape Cod Center for the Environment & a Sustainable Economy, a private non-profit organization, because of its role in the development process. The environmental resort would be most effectively managed by an experienced and enthusiastic owner-operator who is knowledgeable about eco-tourism and sustainable technologies. The owner should be committed to conservation of the surrounding natural areas. Profits from the project might be allocated to further research and development on sustainable development.

Food Service

The expense of providing three meals a day could be prohibitive, but an environmental inn could provide breakfast and snack/box lunch. With many local restaurants available, this project would not need a self-contained, full-service restaurant. In fact, one of the reasons for this project is to support local enterprises. The principal reason for having a kitchen would be to accommodate groups, which would be more difficult to accommodate at outside restaurants. The kitchen could minimize its overhead by only serving meals to groups and not serving to the general public. Individual rooms might have kitchens if one objective is to keep guests on-site and discourage car travel to restaurants.

Food and Handicrafts Production

The resort could be involved in model organic vegetable, fruit, and herb raising, including operating a greenhouse. These foods could supply the resort's kitchen and could sell to other Cape businesses. If this food production activity did not work at the resort site, the resort could buy food from local producers practicing sustainable agriculture. Local food production is especially important since most food consumed on-Cape is produced off-Cape and opportunities for local food production and economic development are being missed. The resort should make a particular effort to use local fish and shellfish products to support area fishermen.

The environmental resort also might promote locally-based crafts and products, including furniture, draperies, bed coverings, wall paintings and decoration, dishes, etc. This would support other Cape Cod businesses and undergird the strategy of small business development being pursued by the Lower Cape Community Development Corporation. The resort would also promote an appreciation of authentic Cape Cod handicrafts and arts.

Eco-Resort Development Scenario

There is no single scenario for developing or determining the financial feasibility for an environmental resort on Cape Cod. Economic feasibility depends upon the assumptions underlying the project. As with any development, high construction, property acquisition, financing, and operating costs can make a project unprofitable. If this project had to purchase commercial land at market rates, build the structure at conventional industry costs, and maintain a year-round, fully-staffed operation, it would be difficult to be profitable.

A scenario for rehabilitating an existing motel/hotel/inn is not included here because the pro forma would vary with each property, depending upon its existing physical and economic conditions.

This report draws a scenario for a new, relatively small environmental resort or inn--first, because a size of 16-40 rooms would be the limit of what could conceivably be considered sustainable in its visitor impacts; second, because the Cape Cod market in general and the eco-tourism niche in particular are, at best, moderately-priced markets, generally \$75-125 per night for a room and breakfast.

The following development scenario could prove profitable for a Cape Cod environmental resort. These are general and conservative estimates. It should be noted that the per unit operating costs (assumptions from Davies, Hardy, Bell & Brown, So-You Want to Be an Innkeeper, San Francisco: Chronicle Books, 1996) include savings from energy and water conservation and using materials with longer life-cycles than average. Construction and development costs have been developed by architect Gerard Ives and the Conservation Lodge Foundation. This scenario is based on a 16-room inn, which is about the largest property that can be operated mainly by a family with ancillary help and which has a fairly low visitor impact.

16-Room Environmental Inn Scenario

Development Costs

Construction (\$40,000 per unit x 16)	\$640,000
Common House	\$300,000
Site Preparation	\$75,000
Landscaping	\$75,000
*Land Cost (\$30,000 x 10 acres)	\$300,000
Soft Costs (20% of construction)	\$188,000
Furnishings/Equipment (20% const.)	\$188,000
Total Development	\$1,766,000

Projected Income (16 rooms accommodating up to 4/room)

Summer (12 wks. @85% occupancy) x \$125/room	\$143,000
Shoulder (24 wks. @60%) x \$100/room	\$161,000
Winter (16 3-day/weekends @60%) x \$80/room	\$ 77,000
Common Room Rental/Concessions/Catering (3233 more nights x \$10/room)	\$ 32,000
Total Income	\$373,000

Operating Budget

Operating Expenses (\$8,500 per unit x 16, inc. gen. mgt.)	\$736,000
Debt Service (on \$1,413,000, assuming 80% financing; 10% x 20yrs.)	\$164,000
Owner Income, before Taxes	\$ 73,000
Total Budget	\$373,000

This scenario could change under different assumptions. Lower land costs could increase profitability. Greater net revenues could be produced by a larger facility ranging from 20 to 40 rooms, although costs may rise with the size of the facility. Using the above assumptions, a 24-room facility could produce approximately \$145,000 in income. This scenario projects opening on weekends during the winter months. It could be closed for part or all of the winter and thereby reduce operating costs. The common room, concessions, & catering figure includes selling box lunches and snacks; this figure could be boosted by selling more products and services to visitors and conference attendees.

Role of the Cape Cod Center in the Development Process

The Cape Cod Center, a private non-profit organization dedicated to pursuing economic development strategies that are environmentally-friendly, has spearheaded this research and design of a Cape Cod environmental resort since the inception of the project with Stanley Selengut's visit to Cape Cod in the spring of 1995. The Cape Cod Center obtained two grants from the Community Foundation of Cape Cod to hire an architect to develop plans. A Project Committee, co-chaired by James O'Connell, Economic Development Officer, Cape Cod Commission, and Jim Tobin, of the Cape Cod Center board and Ballymeade Realty Corporation, has developed this feasibility study.

The Cape Cod Center intends to continue facilitating the development process for a Cape Cod environmental resort, working with potential developers, architects, and other interested parties to bring a project to fruition. Depending upon its involvement in the project, the Cape Cod Center might take a small financial stake in the project. Over the long term, the Cape Cod Center hopes to encourage the adoption of a more environmentally-friendly type of tourism on Cape Cod.

Background on Environmental Resorts

The Cape Cod environmental resort would build on the experiences of Maho Bay, U.S. Virgin Islands, eco-resort developer Stanley Selengut, the Massachusetts Audubon Society Wellfleet Bay Wildlife Sanctuary, and the Conservation Lodge Foundation.

One of the pioneers of eco-tourism is Stanley Selengut, who visited Cape Cod during this study and consulted with the Cape Cod Center for the Environment & a Sustainable Economy. In 1976, Selengut opened Maho Bay Camps, simple tent-cottages on St. John, U.S. Virgin Islands. In 1993, he opened Harmony, the first eight units of 32 that make up an eco-resort. Selengut also has opened Estate Concordia, a collection of loft duplexes. The entire visitor experience at Maho Bay harmonizes with the natural environment. Visitors live simply, but comfortably and tend to spend their time pursuing recreation and education connected to the local environment. Selengut's business has attracted international attention.

The most important lesson to be learned from Stanley Selengut's Virgin Islands resort is to experiment--with new materials, new processes, new products. There is no ultimate formula for sustainability, only constant concern about waste and efficiency. Although the Virgin Islands eco-resort is in a tropical environment and Cape Cod is in a four-season temperate climate, many principles Selengut followed in the Caribbean could be applied on the Cape.

On Cape Cod, the Massachusetts Audubon Society Wellfleet Bay Wildlife Sanctuary, under Director Bob Prescott, has developed a comprehensive year-round program of classes, nature walks, and cruises, which has established it as the leader of environmental tourism on Cape Cod. Its new visitors center incorporates many sustainable elements, including passive solar heat, wastewater recycling, and a greenhouse growing a wide array of plants. This project has adapted energy conservation and waste recycling technologies to the Cape Cod environment.

The Conservation Lodge Foundation, operating from the San Francisco-Bay Area, has obtained funding from The Pew Charitable Trust to develop four conservation lodges in North America over the next couple years. The Director of the Conservation Lodge Foundation has visited Cape Cod and has met with key Center members on the sustainable resort. The Foundation is planning conservation lodges with 25-40 rooms. Following are some salient points about the Conservation Lodge Foundation:

- The objective of the conservation lodge is "environmental protection and public education." The lodges will feature low-impact architecture and use local materials and traditional building designs, renewable energy sources, state-of-the-art sewage and waste disposal systems, and state-of-the-art sustainable mechanical and engineering systems.
- Conservation lodges will educate people about the functioning of marine and terrestrial systems, including social, economic, and biological values of these systems and methods of conservation. The lodges would promote local food production, handicrafts, and local recycled or "green" products.
- The aim of the foundation is "to develop an international network of lodges that are recognized for quality accommodations and excellent service, and which offer a distinct type of travel experience that sets them apart from countless other "ecotourism" destinations around the world.

Potential Markets for Environmental Tourism

Environmental tourism is a major draw on Cape Cod, especially during the off-season. Over 300,000 people take whale watches from Provincetown. The Wellfleet Audubon Sanctuary draws as many as 60,000. There are scores of Elderhostel and student education programs operating on the Cape each year. Although many of the 5,214,000 annual visits to the Cape Cod National Seashore are not directly connected to environmental tourism, a significant number are. According to the Cape Cod National Seashore's Draft General Management Plan (August, 1996), the National Seashore has a major impact on the local economy. Direct expenditures of visitors to the National Seashore is \$123 million annually, combining with indirect expenditures (multiplier of 1.95) for a total economic impact of \$240 million. This translates into 8,700 jobs. Such a market indicates a real niche opportunity for an environmental resort on the Outer Cape.

Nature tourism is one of the fastest growing tourism niches in the world, growing by 30% annually while tourism in general is growing by only 6-8%.

Potential Cape Cod environmental resort market segments include:

- **Eco/Nature-Tourists**--This is a specific niche in the market, many of whom are birdwatchers, hikers, etc., and are likely to visit in the off-season. They would respond particularly to specialized programming.

- **Groups**—Gary Knop, of Outer Reach Motel and Provincetown Inn, believes that eco-tourism on the Cape would have to rely largely on groups or pre-sold packages to fill the facilities, especially outside of July and August. Groups include school, Elderhostel, members of environmental organizations, and associations.
- **Families**—Strangest during summer, school vacations, and holiday weekends. Again specific packages must be offered. These provide a complete visitor experience at an attractive cost.
- **Couples & Individuals**—Strong shoulder season, get-away market. May not be interested in particular educational activities, but enjoy scenery and might be interested in a lightly-scheduled program which allows some free time.

Background on Environmental Tourism Market

Elderhostels have demonstrated how Cape Cod can provide a desirable environmental education experience. Currently, the Cape Cod Museum of Natural History, Marine Biological Laboratory, and Center for Coastal Studies/Provincetown Inn offer Elderhostel programs. The programs average approximately \$350 per session. Since 1994, the Cape Cod Museum of Natural History has operated Elderhostels six times each year during the shoulder seasons. The Marine Biological Laboratory (MBL) has operated four Elderhostels per year since 1989—in November, December, January, and March.

The Center for Coastal Studies/Provincetown Inn has offered Elderhostel eight weeks each year during the spring and fall since 1992. The six-day/five-night session focuses on whales and marine science. The Provincetown Inn is starting a one- or two-night seniors package for the fall which includes a whale watch, nature walk, and environmental lecture. The Outer Reach Motel also is planning to offer hiking and biking options to groups meeting at the motel.

Another strong environmental market for Cape Cod are the hundreds of school groups that spend up to a week here doing nature study each year. Though not spending a great deal of money, they demonstrate both the range of environmental education and recreational activities that the Cape offers as well as the strong appeal that they have. For instance, the Provincetown Inn/Outer Reach Motel hosts approximately 60 school groups from mainly the New York area each spring for a two-or three-day program featuring whale watches and nature hikes.

A national trend toward environmental tourism is demonstrated by several recent tourism market studies. A Massachusetts Office of Travel & Tourism study (1994) found that 55% of vacationers in Massachusetts are interested in heritage, environmental, and cultural activities:

Sands & Bands	26%
*Outdoor Enthusiast	21%
*Culture Seeker	19%
Repeater	19%
*Explorer	15%

Sands & Bands--25-34 single, childless couples, seek relaxation

*Outdoor Enthusiast--24-54, with children; outdoor activities, family, scenery, whale-watching

*Culture Seeker--46-61, no child at home; seek historic, quaint, stimulation.

Repeaters--go to places they know; visit relatives or friends

*Explorer: interest in restaurants, activities, scenery; everything is appealing

Recent Cape Cod tourism market studies by The Mellman Group, Inc., indicate a strong potential for an environmental resort for Cape Cod. A small sample survey of fall, 1995 tourists to the Cape found that 21% of those visiting came for "eco-tourism" purposes, broadly defined to include the environment, climate, and scenery.

The majority of Cape Cod visitors come from Massachusetts and the Northeast, though there are significant numbers of visitors coming in the shoulder season from Europe, Mid-Atlantic States, and Midwest. A further smattering of visitorship comes from elsewhere in the country and abroad. With all these markets, Cape Cod has the potential for developing environmental tourism further through effective niche marketing. More distant visitors can be especially important to an environmental resort because, The Mellman Group survey found, visitors from farther away tend to stay longer and spend more money. Shoulder season visitors also tend to have higher than average disposable income and higher levels of education. Since a large majority of shoulder season visitors come to the Cape for a weekend (Mellman found 59% of those surveyed were here on a 1-4 night visit), a weekend educational-recreational environmental package could be popular.

The Mellman Group, which also held focus groups to determine what appeals to visitors most during the shoulder season, found that most short-term visitors were coming from relatively close by--Massachusetts, Southern New England, and Greater New York--and were looking for a stress-free getaway and a unique experience. Cape Cod's natural beauty is its greatest and most distinct

attribute, so it could be translated into something more through environmental tourism. Shoulder season visitors are also attracted to the Cape because it is less crowded and more "natural" than during the summer season—an ideal lead in to environmental tourism. According to The Mellman Group, 69% of potential shoulder season visitors are in their working years, between 40-64 years of age and seeking a respite from the stress of work. Conversely retirees are looking for longer vacations with lots of activities.

A complementary look at the tourism market comes from the PRIZM Tourism Market Study Analysis: Visitors to Cape Cod, done by Arts Market Consulting, Inc., in 1995 for the Cape Cod Chamber of Commerce and the Cape Cod Times. Based on a profile of over 11,000 Cape Cod visitors, the study confirmed that the major market for the Cape is in Massachusetts, followed by Rhode Island and Connecticut. Outside of New England, the major markets are New York City and Long Island; Hudson River Valley; New Jersey; Philadelphia; Washington, DC and Baltimore; Upper New York State cities; and Midwestern cities. The PRIZM study, which is based on geo-demographic analysis by zip codes of potential markets, found that the following target groups made up the market in Massachusetts for Cape Cod: Executive Families 21%; Young Upscale Couples 20%; Young and Single 17.5%; Upscale Young Families 15.6%; Upscale Empty Nesters 10%; Middle Income Older Couples 6%; Middle Class Families 5%; Low Income Families 2%. This breakdown indicates that Cape Cod caters to a wide range of market clusters, many of which might have some interest in an environmental tourism experience.

One other useful piece of market data comes from a 1993 visitor survey conducted at the Cape Cod National Seashore, which found that 25.3% were involved with nature study while visiting the Seashore, 46.4% did hiking, 31.5% did biking, and 8.3% were involved in ranger-guided activities. These activities indicate further potential for environmental tourism activities.

ECO-DESIGN COMPARED TO CONVENTIONAL PRACTICE

SITE DEVELOPMENT

	CONVENTIONAL	ECO-DESIGN	REMARKS
Landscape	High initial investment for exotics. High maintenance for water, fertilizer. Ground water pollution from Title V (standard) septic system nitrogen.	Modest cost for native plantings. Built in watering/fertilizing system.	Landscape doubles as waste treatment system. Nitrogen is removed from ground water pollution.
Access & transit	Car dependent.	Car free. Bike path connections. Walking connections to nodes and natural history transit system.	Higher quality experience can focus on natural environment and not how to get from A to B.
Parking	Near units. Requires sprawled road system and high maintenance. Interferes with site drainage. Negative impact upon experience.	Consolidated a short walk from units. This allows tighter clustering of units which reduces impact upon site, reduces ground area required.	Both first and operating costs reduced.
Infrastructure /Configuration	Sprawled with road system. Large leach field destroys landscape.	Concentrated for reduced distribution costs gravity where feasible. Partially attached to buildings reduces site impact further.	
Waste Recycling	None. Pay tipping fees.	On-site human waste water recycling. Composting organics. Option burn of carbon. Provision for recycled pick-up. Materials/consumables management programs.	

COMMON HOUSE AND RESIDENTIAL UNITS

	CONVENTIONAL	ECO-DESIGN	REMARKS
COMMON HOUSE			
Common House	No common house.	Common house near residence units.	Convenient. Built-in connection.
Registration	Registration and staff near roads. Common areas near roads.	Common area closer to dense residential car-free clusters.	Improved experience at common areas.
Socializing	Minimum socializing within facility or with greater community.	Areas for informal interaction near food support. Conversion to formal presentations.	A community experience with options of broader, more in-depth programs.
Food Services	No food or concessions with small facility. Large facility restaurants have high staff costs.	Information services-food support/concession reduces car trip demand.	Avoid car trips.
Infrastructure	Grade connected. High operating costs.	Common House solar electric supports central refrigeration. Grid connected for buy back/ro battery expense.	Retrofitted operating costs offsets high initial investment. Requires long term economic analysis and cooperation of utility.
RESIDENTIAL			
Sales	Declining market, increasing first and operating costs, difficult competition with undifferentiated product.	Eco-tourist niche market trend. Easier to market/sell eco concept as group programs that produce economy of scale and predictable reservations.	For comparable costs this market produces better returns especially in shoulder seasons.
Privacy	Good visual, sound can be problem.	Visual connections, cluster socializing on decks. Units private with good sound separation.	More choice in eco design between socializing and privacy.
Occupancy	Two double/twin beds.	Two doubles with two twins in loft. Loft provides inexpensive volume and additional occupancy.	Double occupancy for group programs. Higher returns with group market.

	CONVENTIONAL	ECO-DESIGN	REMARKS
Operating	High costs for heat, hot water, air conditioning.	Efficient natural ventilation. Cluster integrated solar hot water/heating supplemented with non-electric back-up.	Reduced cost of integrated back-up system offsets higher costs of solar thermal.
Finishes	Plastics, vinyls. Carpets act as sinks for fumes, odors, etc.	Natural materials without bad fumes. No carpeting. Throw rugs removable. Good ventilation.	A high quality interior environment without expensive carpet maintenance which introduces spores and VOC's to the interior environment.
Wastes	Linear systems and disposal.	Composting toilets or on-site treatment of waste water for irrigation and fertilization of gardens.	Reduced water consumption, pollution.

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Project Committee

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Mark Aitchison, Over Look Inn, Eastham, and Over Look Jungle Lodge, Brazil
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Matt Patrick, Director, Self Reliance, Inc.
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David Willard, Cape Cod Five Cents Savings Bank
Mary Spillane, Association for the Preservation of Cape Cod
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24-Room Environmental Inn Scenario

Development Costs:

Construction	
(\$40,000 per unit x 24)	\$960,000
Common House	\$400,000
Site Preparation	\$75,000
Landscaping	\$75,000
Land Cost (\$30,000 x 10 acres)	\$300,000
Soft Costs (20% of construction)	\$172,000
Furnishings/Equipment (20% costs)	<u>\$272,000</u>
Total Development	\$1,954,000

Projected Income (24 rooms assuming occupancy up to 40 rooms)

Summer (11 wks. @85% occupancy) x \$125/room	\$214,000
Shoulder (24 wks. @60%) x \$100/room	\$242,000
Winter (16 3-day/weekends @60%) x \$80/room	\$ 75,000
Common Room Rental/Concessions/Catering (4800 room nights x \$10/room)	<u>\$ 48,000</u>
Total Income:	\$559,000

- Operating Budget:

Operating Expenses (\$8,500 per unit x 24, inc. gen. mgt.)	\$204,000
Debt Service (on \$1,883,000, assuming 50% financing, 10% x 20yrs.)	\$218,000
Owner Income, before Taxes	<u>\$137,000</u>
Total Budget	\$559,000

This scenario could change under different assumptions. Lower land costs could increase profitability. This 24-room scenario uses the same assumptions as the 10-room scenario because general development and operating costs would be similar. A larger facility would have higher cost factors.

40-Room Environmental Inn Scenario

Development Costs

Construction	
(\$40,000 per unit x 40)	\$1,600,000
Common House	600,000
Site Preparation	125,000
Landscaping	125,000
Land Cost (\$30,000 x 5 acres)	450,000
Soft Costs (20% of construction)	440,000
Furnishings/Equipment (20% const.)	440,000
Total Development	\$3,780,000

Projected Income (40 rooms accommodating up to 4/room)

Summer (12 wks. @85% occupancy) x \$725/room	\$757,000
Shoulder (24 wks. @60%) x \$100/room	\$492,000
Winter (16 3-day/weekends @60%) x \$60/room	\$ 92,000
Common Room Rental/Concessions/Catering (8000 room nights x \$10/room)	\$ 80,000
Total Income	\$852,000

Operating Budget:

Operating Expenses (\$9,000 per unit x 40, incl. gm. mgt.)	\$360,000
Debt Service (on \$3,064,000, assuming 30% financing; 10% x 20yrs.)	\$350,000
Owner Income, before Taxes	\$142,000
Total Budget	\$852,000

This scenario could change under different assumptions. Lower land costs could increase profitability. Operating costs may rise with the size of the facility. This 40-room scenario assumes that per-room operation costs will rise from \$8,500 to \$9,000. It also assumes that land needs and land costs will increase by 50%. Under these assumptions, the net income would be only somewhat higher than a 24-room facility.