

## ***Chapter 6: Cadamstown Village Project***

The first phase of the Cadamstown project covers the 40 acres site owned by project partner Martin Langton. The plans for this first phase take into account and facilitate the further development in the village in phases 2 and 3. Cadamstown, although listed as a potential Sráid village, is way down the waiting list for a Village Plan to establish the boundaries for new development. However, the council indicated that it welcomed ideas and suggestions for a plan and that it would consider the project planning application in the overall village development context. Time and resources available to ENLIVEN did not allow for the full participative process for a properly prepared Framework Plan to which the people of Cadamstown and Ballyboy are entitled and which ENLIVEN sees as the optimum planning mechanism to guide sustainable development.

However, two meetings were held to exchange information and collect responses from the local community about the proposals for local energy systems and new planning and development structures. The first meeting on the 20<sup>th</sup> May was held in IRL headquarters in Moate, Co. Westmeath. It included representatives from Cadamstown and Ballyboy and invited input from local development organisations with experience of local renewable energy initiatives. The second meeting on the 26<sup>th</sup> May in Cadamstown was attended by a small group of local people active in the community. They discussed Martin Langton's scheme on the project site and the initial ideas for a framework plan for Cadamstown. This plan illustrated potential further development outside the project site that could benefit from the infrastructure provided by the project and that could also contribute community facilities and give shape and add value to the village. Both meetings were generally very positive with considerable support for the project and the renewable energy initiatives. A number of landowners subsequently indicated their willingness to develop their lands as roughly outlined in the draft. An indicative framework plan was prepared, taking on board as much landownership information and feedback as was available in order to provide a reasonably realistic context on which to base calculations for second and third phase development. This is not a substitute for a proper framework plan prepared by Offaly Co. Co. and/or objective consultants appointed by them.

It was not possible to collect ground levels and landownership information for Ballyboy within the feasibility study period or to arrange a meeting with the community. Duffy, Mitchell O'Donohue, architects for the Ballyboy project site owners, prepared a tentative layout for the Ballyboy site and a wider village plan in order to facilitate engineering and financial calculations for ENLIVEN— *see Appendix*. Again this is not in any way a substitute for a proper independently prepared framework plan for the village.

### **Village Analysis**

Cadamstown has suffered severe population loss over the last century and now consists of a handful of houses, a Catholic church, a pub and a café. The post office has just been closed and the national primary school was lost years ago. It has some important assets; a fine old mill building and stone bridge over the deep gorge of the Silver River and some interesting archeological remains. Community effort secured the provision of a parking

area overlooking the river and stone walls along the main village road. A *Fás* scheme helps local man Paddy Heaney maintain a delightful park at the old mill by the river's edge. As outlined before, the village has developed as a centre for walking tourism with thousands of students and visitors using the trails and climbing the cliff faces every year.



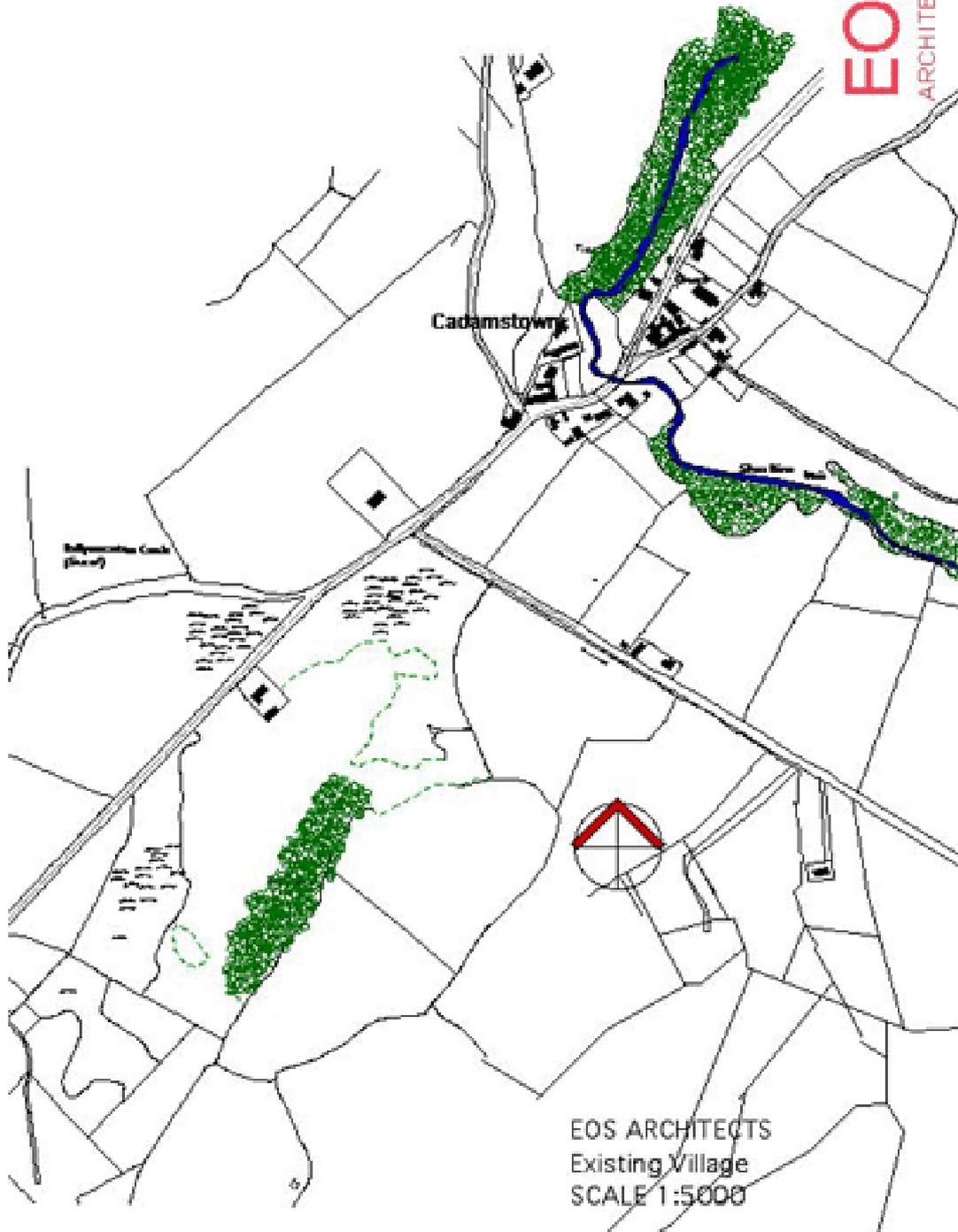
**Figure 0-1 Pub and Parking at Crossroads Figure 0-2 Informal Housing**

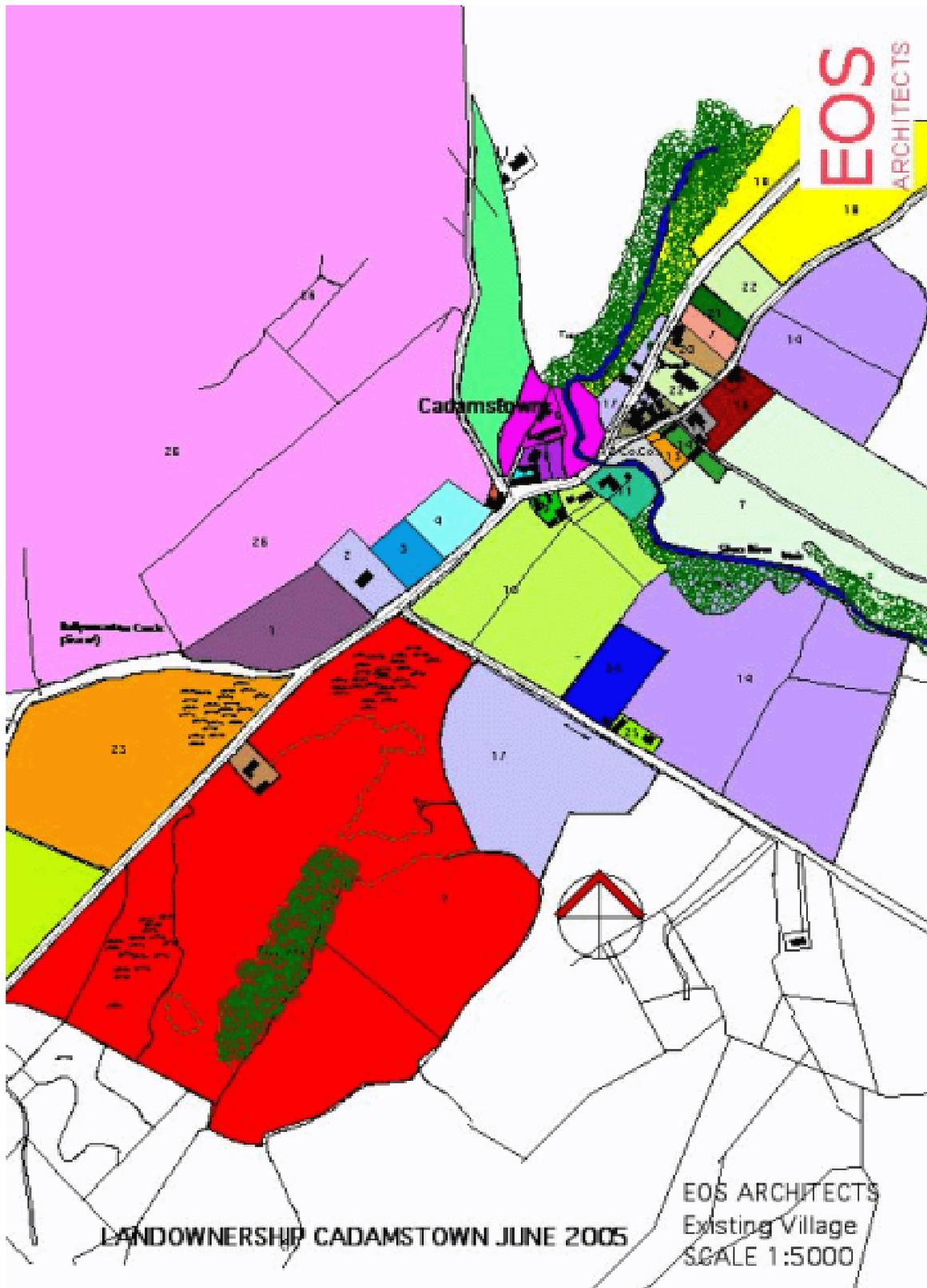
The structure of the village is not strongly defined as it would be in a market village; most buildings are arranged in an informal manner reflecting their farmyard beginnings and in some cases, continuing use. The pub, recently extended, is situated on a hill at the corner of two roads. Sloping tarmac for patrons' parking dominates the view to the upper roads; similarly the extensive tarmac of road junction mars the potentially pretty aspect of the cottage café. Cadamstown is a village molded by the demands of the private car and the goods lorries that travel through it from early morning to late evening.

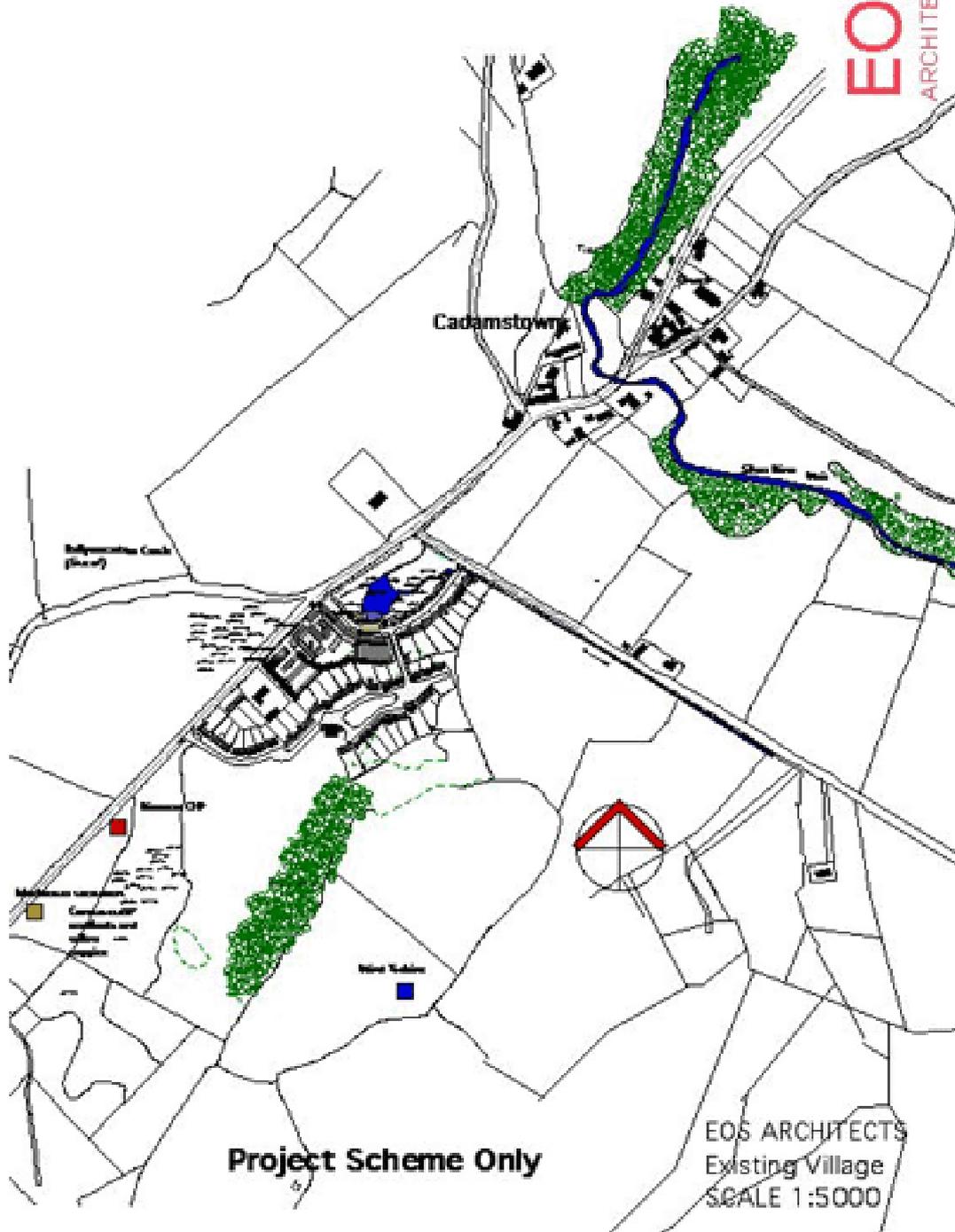
## **Project Site**

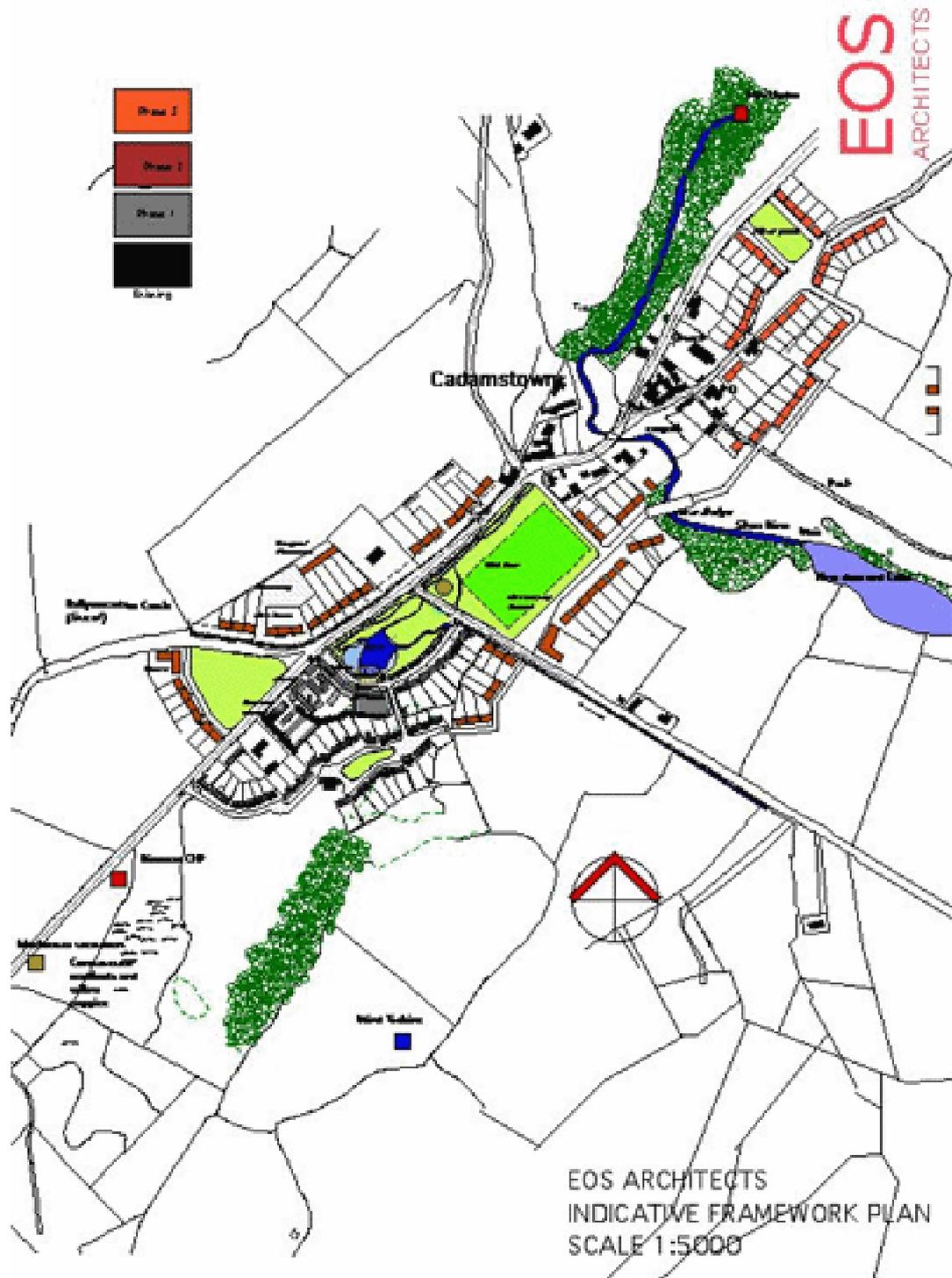
The first phase site lies 175 metres from the centre of the village and the first objective of the village plan was to make a link to the old centre. The second objective which follows the first, was to make that link pedestrian friendly and to provide for new houses and service buildings which were shielded from the through traffic on a separate access road. The importance of a walkable village has been emphasized in a number of important reports. Although, it was long suspected that community life is stronger in older settlements with mixed uses, a recent study of Galway, contrasting suburban car dependant districts with denser older districts proved that *“Respondents living in walkable neighborhoods (sic) were more likely to know their neighbors, participate politically, trust others and be socially engaged”*<sup>i</sup>

It was important the plan should maintain and expand the rural quality of the village so it was decided to provide for generous plots for houses with long and wide back gardens. This also accords with Offaly Co Co's 'Sráid' designation requirement. A view to the open countryside or to a green space for most houses was seen as very important to differentiate the village spatial quality from that of the suburban or town urban design. In this way a set of principles evolved which shaped the project site and the village itself. *See Appendix 4.*









## Project Scheme

The Project Scheme is given a focal identity and economic foundation by the tourism, health and cultural uses proposed for the corner site fronting a new wetlands park and natural swimming pool. A hostel is situated on the less favoured roadside and a café to

catch the passing trade of travelers and road hauliers. The pub element of the hotel Complex takes the corner site where it can be seen from all directions. The hotel entrance and bedroom wing make up most of the façade of buildings and have immediate views to the wetland park and long views to the west river valley. This triangular wetland area is on a low point of the site with poor drainage and it was decided to make a virtue of it and deflect the drainage stream to make a reflecting pond and natural swimming pool for the hotel guests and village families. A sports and fitness centre completes the hotel complex, adding to the already established recreational activities of its location.

When the sun shines, the bathers in the natural swimming pool can use the changing rooms of the Health and Fitness Centre. It also can serve a proposed GAA playing field (under the village plan) on the only level large field in the village. A new housing access road is created to overlook the playing field that provides a safer pedestrians and cycle route to the village than the heavily trafficked main road. This layout pays homage to Frank Gibney's Bord Na Mona housing which worked so well to inspire young sportsmen in Kilcormac. A new school is located there too, to further benefit from the playing field and the safe access road.

The Business Centre is a flexible barn-like space beside the café and visitor car-park. It can become a shop, laundry, workshop, call-centre or suite of offices and meeting rooms for small businesses as demand indicates. A small wood pellet production factory is also planned for the later stages of the first phase. This will take advantage of the cheap heat from the biomass CHP and electricity from a single wind turbine planned for on the upper field. It is expected that other enterprises will wish to locate nearby for the same advantages and the village plan shows potential sites both on the first phase site and on other village lands.

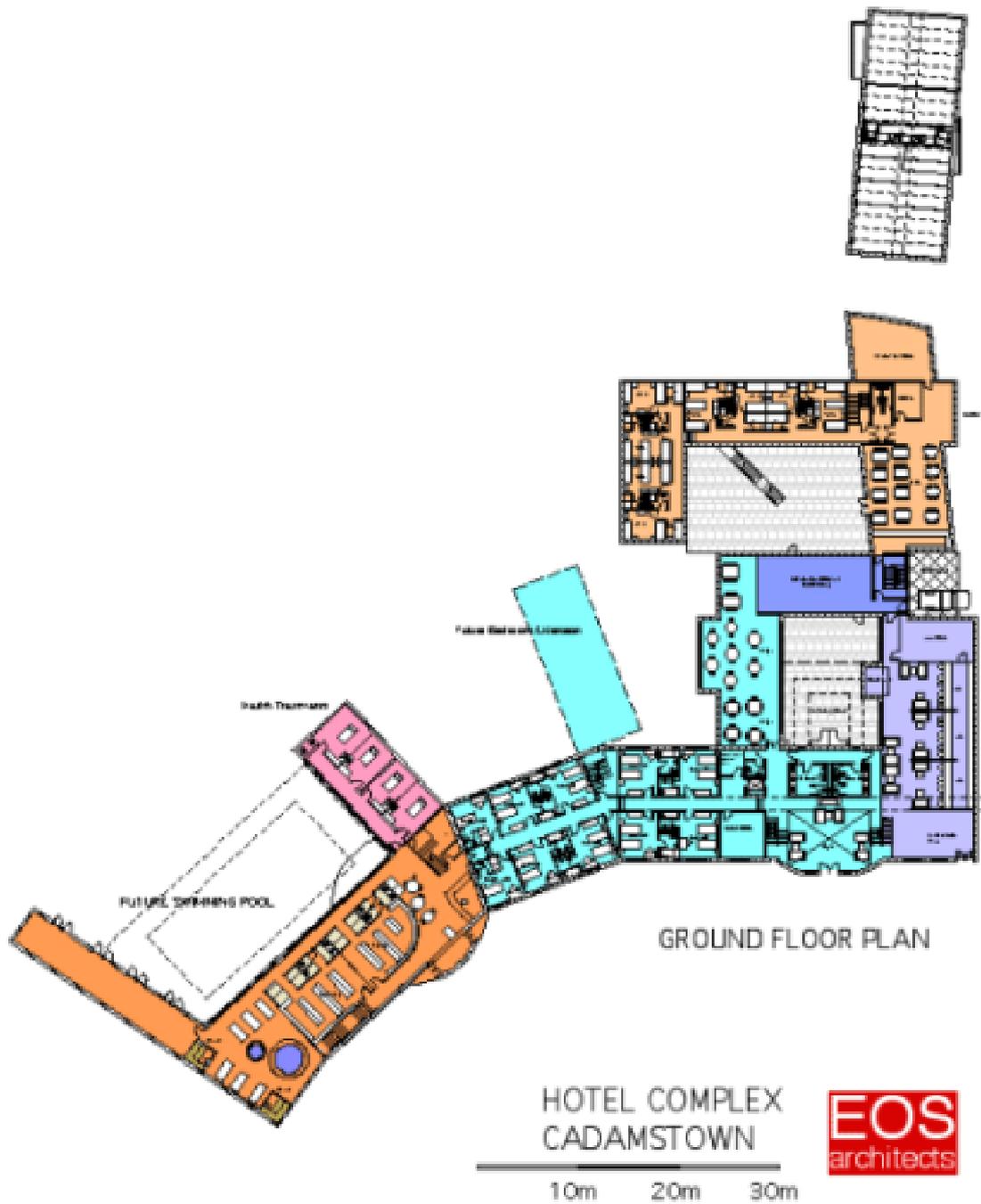
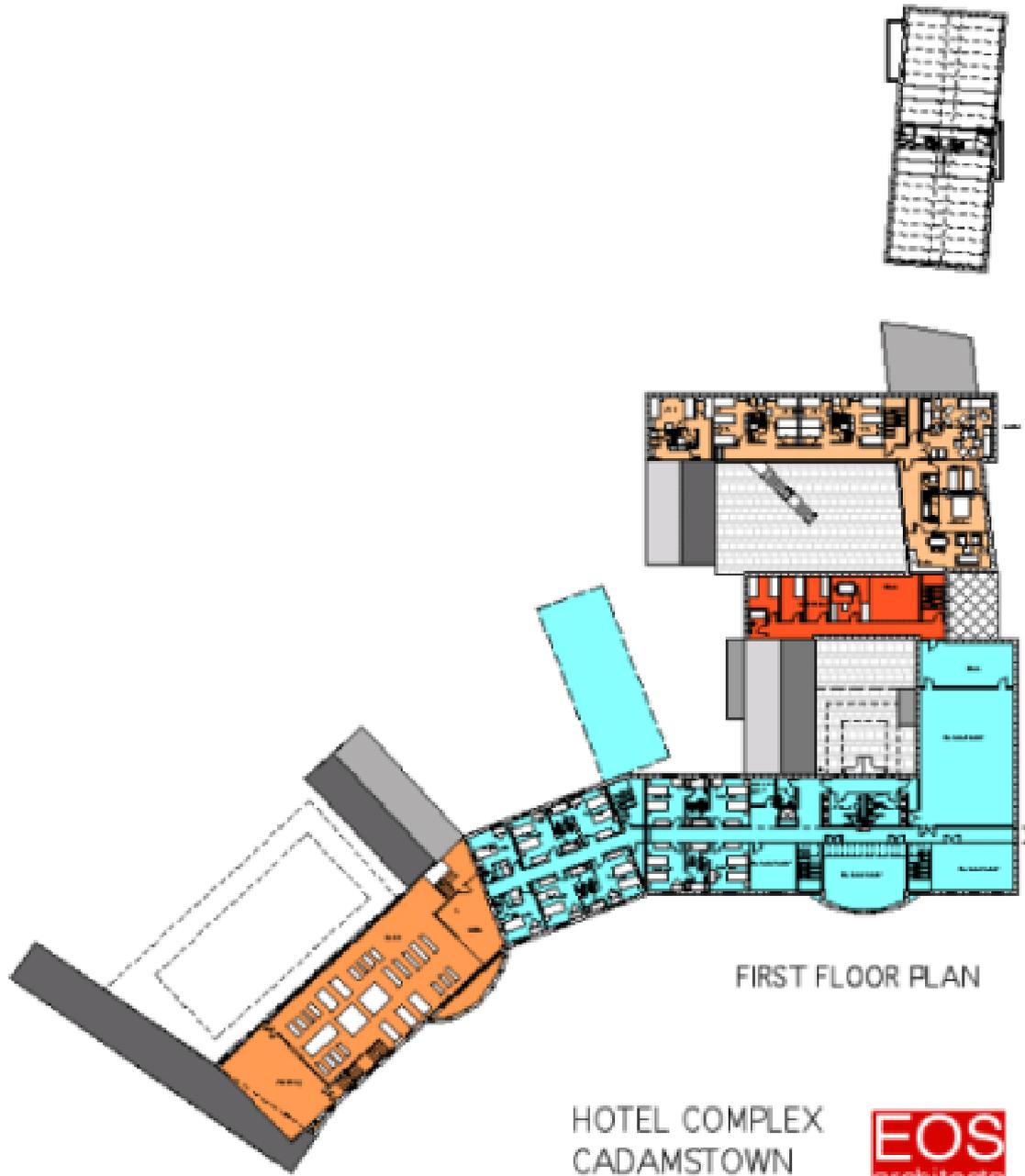


Figure 0-3 Ground Floor

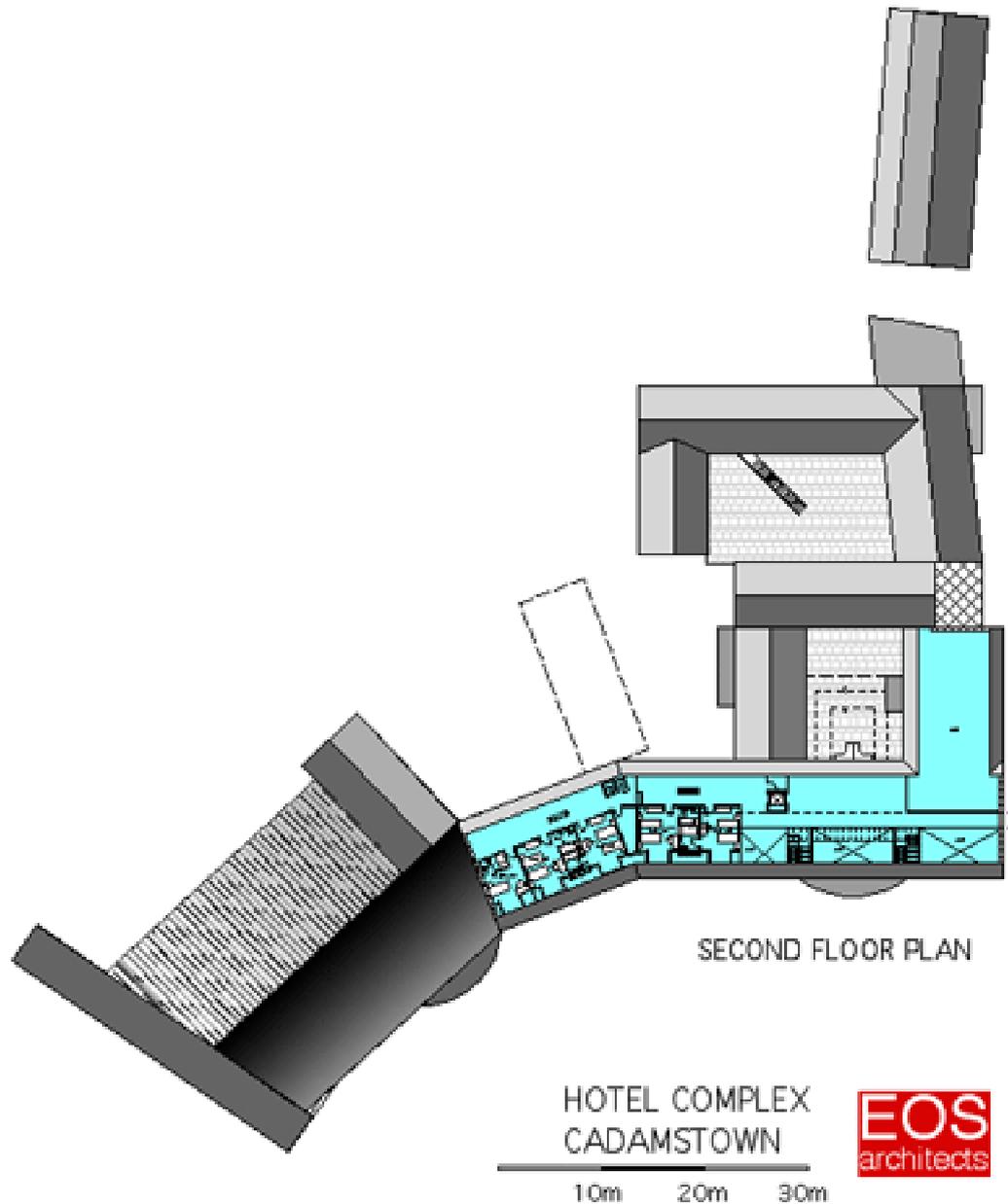


FIRST FLOOR PLAN

HOTEL COMPLEX  
CADAMSTOWN



10m 20m 30m



### Orientation and Relationship to Place

Luckily the site allowed for most buildings have a southerly orientation which is best to collect and store heat from the sun. But where orienting buildings to the east and west gave a better quality public space it overrode the energy advantages of a southerly aspect. Better standards of insulation, proper sealing of the envelope and efficient heat recovery systems have made optimum solar gain less important in the overall energy equation. But the same factors have raised the importance of good daylighting. Half the energy use in a well-insulated house can be accounted for by artificial lighting. Accordingly, all buildings are relatively shallow in depth and ceilings are higher than average so that daylight can penetrate to light the back of most rooms. This form echoes that of vernacular buildings which followed the same set of rules in pre cheap-energy days.

Roofs are generally pitched at 42 degrees, the best slope for solar hot water in this latitude as it is at right angles to the average noon day sun – again, a fact intuited by the old builders. The exceptions are the large-span spaces; - the Business Centre and health and fitness buildings whose curved roof echoes the familiar corrugated roofed barn.

The hotel complex has an unusual roof with a long hip of 4 degrees which reflects the average slope for the site. This device resolves the competing requirements to keep overall height of the hotel low while providing a strong terminal block at the site edge. The roof is dramatically high pitched over the public room block; pub on ground floor, function rooms on first with the residents' library / sitting room enjoying the best views on the top floor. The gable treatment subtly recalls the tower house form. Large dormers clad in zinc cover the second floor bedrooms to the front and rear.

The houses generally follow the arcing natural contours of the site to eliminate the need for excavation of rock very near the surface. The second access road into the rear of the site has houses facing the open countryside and forms the physical boundary of the village. As this access road climbs the hill it splits to make a small sheltered park. The houses fronting this park are smaller and lower on the northwest side; to permit views over their roofs from the higher southeast houses.

### **Facades and Fenestration**

The buildings have very different expressions to their sunny and shady sides. On the shady side, they are solid and substantial with punched openings recalling the proportions of the local classically inspired midland vernacular. Walls are curved into bows to indicate the entrance – a very familiar device seen in domestic houses and public buildings alike in the midlands of Ireland. The northern aspect hotel bedrooms have timber side panels that are closed over side windows in the winter to conserve heat and are left open to let in more light and view in summer. Similarly, the large southern aspect hotel windows have shade screens in summer that can be folded back in winter when excessive heat gain is not a problem. Narrow clear glass windows illuminate bathrooms with privacy assured by the tight junction to the internal walls. The sunny facades are more modern and orthogonal in expression reflecting the rigidity of the glass and timber sheeting employed. The curved theme is carried through but becomes semi-transparent transformed into vertical slatted screens, which provide visual screening from passers-by and shade on the hottest days. The window plane varies in depth from the front to the rear of the thick walls. This celebrates the wall's substance and provides interesting opportunities to play with light and shadow on the facades. A matrix of window types based on a 450mm module in height and width have been employed throughout the scheme to link the very varied building types.



**Figure 0-4 Elevations to Main Roads**



**Figure 0-5 Sectional Elevations**

**A Family of Village House Types**

The houses are designed on a 600mm module to minimize cutting and waste. All have the same internal spans with optional varied extensions for families who need more space. The kitchens, utility and bathrooms are all located on the colder northern side with most large rooms having a sunny orientation. The entrance may be from either side, north or south depending on its siting which gives variety to the facades on either side of the street. A consistent front entrance facing front entrance (and back garden to back garden) relationship is maintained. This is a departure from many ecological housing layouts that sacrifice cultural differentiation of public and private space for identical plan form related to orientation.

There are six major house types reflecting both entrance orientation and the different building heights - from one storey cottage, through one and-a-half to one-and three-quarter storey houses. The roof rafters are sprung at an eaves height of 2.1 m in the larger houses - this lends character to the room inside and reflects the local vernacular proportions of a higher ground floor relative to upper floor. All floor plans are kept as simple as possible with regular and generous main rooms. Many of the larger houses have a second living room on the ground floor that can be easily used as a bedroom for a mobility-impaired family member.

The final mix of house sizes and elevational treatment will depend on the buyer's needs and preferences within a matrix of choices – all different but with a strong family resemblance. In this way the anonymity of contemporary self-identical urban and suburban estate houses is avoided and a distinctive rural quirkiness fostered. This strategy also prevents the 'dog's dinner' effect of a collection of chaotically different and exhibitionistic one-off houses becoming distressingly prevalent in the outskirts of many towns.



CADAMSTOWN

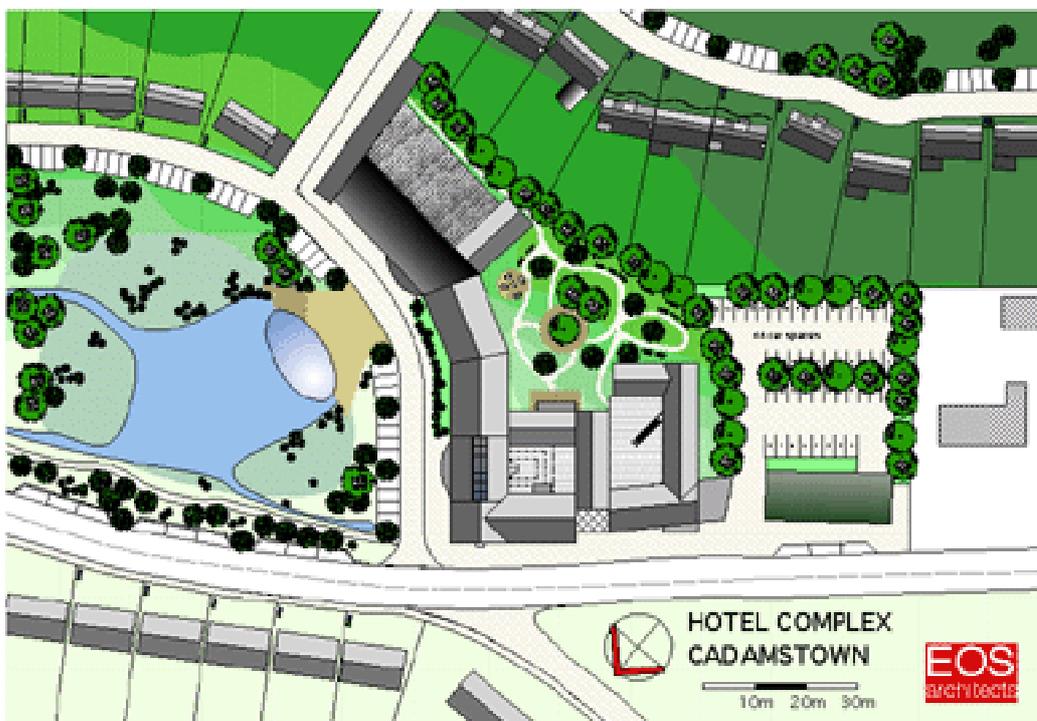


**Figure 0-6 3D View to Pond, Park and Project Scheme**

## Rainwater, Greywater and Blackwater Treatment

Water is a precious resource and clean potable water is even more so. The many uses and qualities of water are recognized in the drainage and water treatment systems employed in the Phase 1 scheme. Rainwater, mostly very clean, is collected from the gutters and downpipes and piped to the pond where it will slowly seep into the ground to replenish the groundwater. The pond water is available for garden irrigation in the summer months. The possibility of pumping it to cisterns for use in washing and WC.s will be explored. Greywater, water from sinks and baths, is piped to constructed wetland areas where its nutrients are utilized by the plants and aquatic life to provide a valuable bio-habitat while purifying the water before it recharges the groundwater in the same way as the rainwater run off. Only blackwater, human waste from WCs, is piped to the waste treatment system on the south end of the site. All WCs will be low flush to minimise the water volumes needing cleaning.

Investigation will be made into installing urine-separating toilets in the hotel and hostel. It was thought that house-buyers might be resistance to their strange design but that visitors would not, as it would form part of the total ecological and healthy-living experience offered by the hotel and hostel. Reducing urine input into the sewage treatment system significantly simplifies treatment while the urine can be collected and applied safely as a fertilizer to fruit trees. The sewage treatment system will employ biological methods as far as possible, finishing the process with both vertical and horizontal reedbeds. The remaining sewage sludge will spread on short rotation willow coppice or sent to the Ballyboy anaerobic digester. However carefully designed, no other sewage treatment system can beat anaerobic digestion for all-round ecological benefits including energy capture to nutrient capture. But as we have seen, the economics of Anaerobic Digestion requires access to nearby farm or factory organic waste that



Cadamstown does not have. The ENLIVEN Ballyboy development will, however, provide an excellent opportunity to showcase Anaerobic Digestion for human and farm waste treatment.

### **Roads and Parking**

All roads lead somewhere in the village plan layout; there are no cul-de-sacs. This strategy provides a network of routes and options for pedestrians that improves 'permeability' and fosters random meetings, thus contributing to community wellbeing. A firm decision was made not to separate pedestrian and car routes but to make access roads 'pedestrian priority' with cars kept strictly subservient to the public space function of the roadways. Within this concept, separate paths are unnecessary; the road is the path. Cars move slowly and respectfully – the pedestrian rules OK. Separation of people and cars leads to confusion of the public and private realms and a breakdown of the passive surveillance of pedestrian pathways in particular. Parking provision is set at two on-curtillage spaces per house in the Offaly Development Plan but ENLIVEN aspires to one car per house with most of these on the roadside or in small parking courts. Some visitor parking will be provided to augment private provision. It is hoped that Offaly Co Co can make an exception to their parking requirements in view of the experimental nature of the project and the planned electric vehicles.

As most houses front open green spaces, parking is provided on the opposite side of the road to the house. Forty car park spaces for the hotel and hostel are provided behind the business centre. Further visitor parking is provided along the busy through roads and the village plan will provide further parking courts behind village service buildings. Parking areas will have permeable surfaces specially constructed to collect and filter rainwater runoff to recharge groundwater. Swales along the internal roads, dished naturally planted areas, will also serve this function to meet the Sustainable Urban Drainage (SUDS) guidelines.

### **Energy Conservation and Heating Systems**

A very high level of energy conservation and efficiency will be the target for all the buildings in the first phase scheme. Insulation levels will be higher than the new Part L of the Irish Building Regulations. In addition, the houses will be fully sealed against draughts and air leakage, with airlock entrances for use in the colder months. The hygroscopic materials will moderate the air moisture internally by acting as 'breathing walls' - absorbing moisture when the humidity is high and releasing it when the air is dry. A high efficiency and healthy heat recovery system will and remove moisture and heat fresh incoming air with the heat from the stale outgoing air without mixing air streams. When fully occupied the houses will have little need for additional heat but if desired, the district hot water will feed an 'in wall' heating panel for the very coldest days or when the house is empty for a long period. Some residents may also opt for a wood pellet stove - more for visual effect on frosty days. Constant hot water will be available from the individually-metered hot water mini-grid but all houses can be easily refitted for conventional boilers/immersion heaters should the need arise. A solar panel array will be mounted on the roof of the hotel to augment the CHP in the sunnier months. A centralised solar system gives a 50% bonus due to the 'diversity factor' in relation to the

amount of hot water generated to that of the demand required. Typically, this halves the solar panel requirement to 1.5 square metres per household.

SECTION	DESCRIPTION		
Thermal envelop	Elemental U values to high EU standard	Ground floor	.2 W/m2K (.25 current IBR Part L)
		Walls	.22 W/m2K (.27 current IBR Part L)
		Roof	.15 W/m2K (.16 current IBR Part L)
		Windows, roof lights and glazed doors	1.5 W/m2K (2.2 current IBR Part L)
		Opaque doors	.6 W/m2K
	Air leakage in a pressure test over whole thermal envelope		.5 m3/m2hr @50 Pa
Building Services	Space heating	Heat Exchange Ventilation for background heat and radiators/in wall fed by district CHP with Wood Pellet Stove for radiant heat as back up	
	Water heating	Water draw off per tap limited to 0.5 litres. Storage losses limited to 10W.	
	Ventilation	Efficient heat exchanger	
	Lighting	Dedicated fluorescent or equiv.	
Major elec. appliances	Low energy refrigerators, washing machines, freezers, TVs etc		
Small appliances	Reduced standby electricity consumption		
Cooking	Gas, LPG or high efficiency electric cooker		

**Figure 0-1 Energy Targets for Housing**

### Materials and Construction

The materials used in the construction of all the buildings can be sourced or grown locally; mainly a hemp/lime mix cast around a timber frame. The project will be the first large-scale application of this new construction method in Europe although there have been many single buildings constructed in France and Germany over a twenty-year period. The system evolved for the conservation of heritage buildings constructed of wattle and daub, cob or stone. Lime is the linking material in these older systems as lime

adheres well to any other lime based material. Hemp supplies the insulation qualities missing in older building construction. As hemp/lime usefulness became apparent, new extensions and entire new buildings came to be constructed from what some believe could be a 'wonder material'. Hemp grows well in Ireland as a new agricultural crop it could bring considerable benefits to farmers as a recent UCD research project affirms.

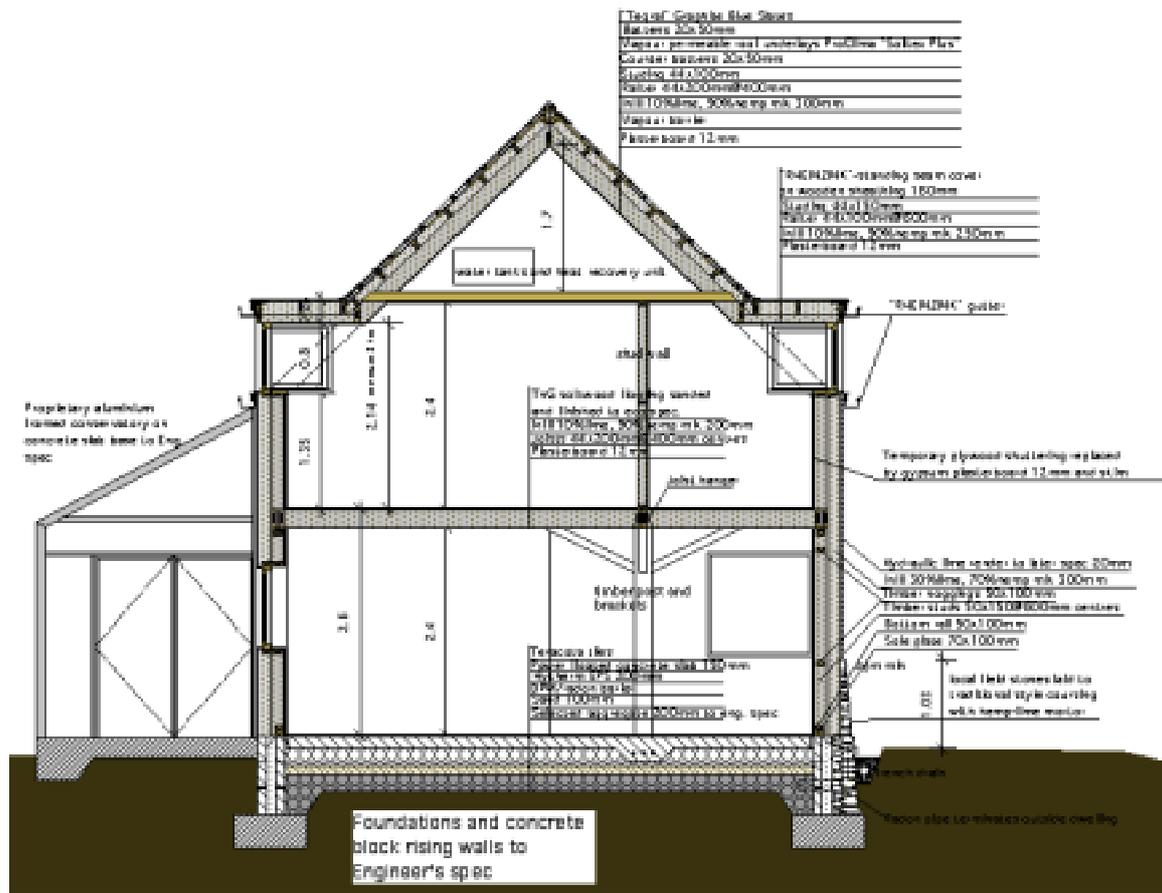
*As hemp is a plant, it is an ecologically sustainable method of producing a material. It does not require pesticides and requires little fertilizing (Rannalli 1999). A hemp crop can be grown in Ireland in roughly 100 days. One hectare of hemp produces 3.5 tons of hurds (Bertucelli, S., 2004, pers. comm., 6 October). The current decortication process of separating hemp into its separate parts of long fibres and woody hurds results in the hurds as a byproduct. The only direct energy required for processing is inspection of the material, packaging and transportation. Hurds are now available from a large hemp producer in England (Hempcore), and there are several suppliers throughout Ireland. This material has little negative impact on the environment in terms of CO<sub>2</sub> production.<sup>ii</sup>*



**Figure 0-2 Hemp/Lime Building in Co Monaghan**

Hemp's greatest advantage is its positive effect on the atmosphere during its growth process when it absorbs carbon dioxide and the almost negligible energy needed for its processing. Large-scale adoption of hemp/lime for construction could lead to a rapid drop in Ireland's green house gases at a time when climate change thresholds appear to be getting very close. In other words, just as money is worth more now than in the future and interest/discount rates reflect that fact; green house gases reduction is worth more now than in the future. Directly substituting hemp/lime for concrete or brick in external walls in conventional domestic construction could lock up carbon for the 60-year lifespan of the building. Hemp will grow in a year but it takes forty year to grow trees for the construction industry.

Of course there are caveats and uncertainties about any new material and construction system that require it to be fully researched with a critical mind and tested under real conditions in pilot projects. This issue is more fully discussed in the next chapter.



**Figure 0-3 Typical House Section**

<sup>i</sup> Leydon, Kevin M. *Social Capital and the Built Environment: The Importance of Walkable Neighborhoods*. American Journal of Public Health September 2003, Reprint Volume 93, No.9

<sup>ii</sup> O' Dowd & Quinn *An Investigation of Hemp and Lime as a Building Material* BENG Research Project. Department of Civil Engineering University College Dublin 2005