

Technical Proposal for a Renewable Energy/ Energy Efficiency Project in a New Certified Facility

Technical proposal pertaining to the Loan Request Pertaining to:

[ECOBKERZAY] [Baakline-Chouf, LEBANON]

Version 2.0 | 21 November 2013

[v12 of 24Mars 2017]

The "Technical Support Unit to the BDL" at
LCEC is funded by the European Union (EU)



Submitted under the NEEREA National
Financing Mechanism developed by the
Central Bank of Lebanon (BDL)



Submitted as Part of the Loan Request under the Central Bank of
Lebanon (BDL) National Financing Mechanism NEEREA

Submitted for Review by the Technical Support Unit to the Central Bank
of Lebanon at the Lebanese Center for Energy Conservation (LCEC)

Proposal Prepared by: Lara Moutin
Project Owner: Ramzi Salman
Date: 23rd March 2017

Project Owner's Statement:

I, the undersigned, Mr. Ramzi Salman hereby declare that I have read and accepted this project proposal prepared by Lara Moutin with input from the different subject matter experts listed in the document and affirm that all the recommendations mentioned in this report meet all my technical and financial terms and criteria and they are up to my satisfaction.

Signature and stamp (if applicable) of the client and date

[Name and stamp (if applicable)]

Important Notes:

1. *All sentences written in italic format in this template are for instructions purposes only. These sentences should be removed from the project proposal.*
2. *This project proposal template is for instructional purposes. It is designed to help potential beneficiaries, consultants, and contractors in preparing comprehensive technical reports and proposals about energy efficiency and renewable energy projects implementation in a New Certified Facility.*
3. *This project proposal template is a mandatory requirement towards facilitating the green loan application process through the national financing mechanism NEEREA.*
4. *This project proposal template is prepared by the Lebanese Center for Energy Conservation-Technical Support Unit to the Central Bank of Lebanon, and is available for public use.*
5. *The Technical Support Unit to the Central Bank of Lebanon at the Lebanese Center for Energy Conservation (LCEC) is supported by the European Union (EU).*
6. *For questions, clarifications, or suggestions, please contact the LCEC: 01-569101 or by email: energy@lcecp.org.lb*

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2. Contact Details of Involved Parties

2.1 Project Owner Details

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2.3 Bank Details

Name of the Bank:	To fill
Branch:	[insert branch name]
Name of the Bank Representative:	[insert full name]
Full Address:	[insert street/ number/ town or city/ country]
Telephone/Fax numbers:	[insert telephone/fax numbers, including country and city codes]
Mobile Number:	[insert mobile number, including country and city codes]
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2.4 Main Contractor Details

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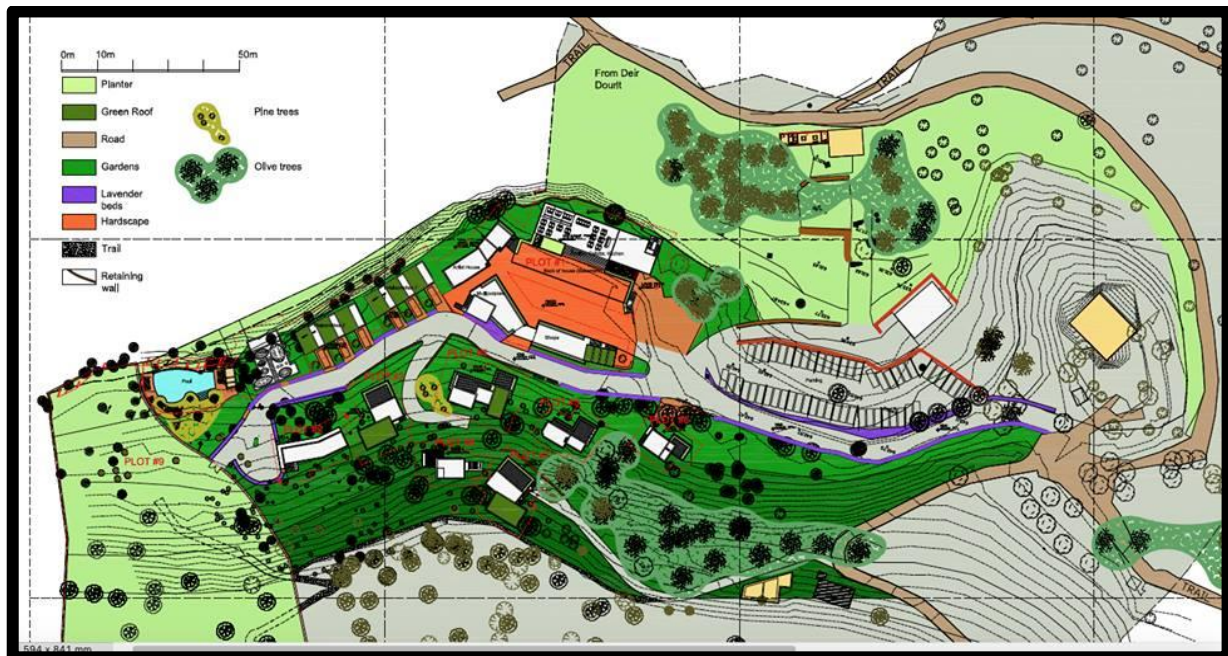
3. General Description of the New Facility

Location of the new facility

The Bkerzay village is located in the Chouf, between Deir Dourit and Baakline, 45 Km from Beirut city center.



Site map



Photos





The Bkerzay Village design reflects the local natural and cultural environment, using the principles of vernacular architecture, sustainable design and endemic design styles. The materials are a dual type of concrete and stone.

Although the overall land is 200,000 sqm with low ecological value, we specifically chose to concentrate the construction area to a plateau of 20,000 sqm to be able to minimize its environmental impact. A broad mapping of natural habitat has been done and integrated to the design in order to protect key natural features such as vegetation, natural habitat and wildlife. For instance, during the whole construction, we did not cut one single tree. We deliberately built our dwellings around the trees

Within the 20,000 sqm, we are building on plot areas that are less than 8000 sqm.

Plot Nb	Plot area	Building Type	Total BUA without double walls	Total BUA with walls
1	4722	Atelier cafeteria	418	418
1		Back of House	300	300
1		Shops/Multipurpose	317	414
1		Artist House	181	236
1		Maisonettes 1	115	135
1		Maisonettes 2	115	135
1		Hamman	98	143
1		Pool House	22	26
2	745	Cells	138	174
2		House 5	116	148
3	560	House 1	146	196
4	492	House 2	106	137
5	422	House 6	89	127
6	820	House 4	133	166
6		House 3	96	128
Total	7761		2390	2883

The conditions of the premises at the time of the contract

- Construction started summer 2015
- Planned: 31st of August 2017

The village is composed of the following :

Lodging	F&B	Outdoor/Common Spaces
Six main houses on two floors each;	A main kitchen	One public piazza
Six 'Maisonettes' built in the traditional full stone vault construction	The main Restaurant	Three shops: <ul style="list-style-type: none"> • Two Craft Shops built of stone cross vaults • One regular shop
Ten 'Chambrettes' on two levels offering small and compact rooms,	Le Café de la Place	One multi-purpose hall
Two artist residences	The Café de la Poterie (Terrace)	The pottery workshop
One Manager house		Four workshops
35 WCs (for 34 keys plus manager house)	2 WC to cover the Café de la Poterie and the main Restaurant.	The pottery showroom
	3 WC in the multipurpose hall	The traditional Spa Hammam
		The Spa Sauna
		The outdoor swimming pool
		The Spa massage room
		The pool house
		One reception hall
		One maintenance / security room
		One bulk storage room
		One staff sleeping quarters split male/female
		One MEP room to monitor electro-mechanical
		One electrical plant
		Two water plants
		1 WC in the store
		1 WC in the maintenance room
		2 WCs for on site sleeping staff

4. Narrative Description of the Proposed Project

4.1 Rationale and Objective

[This section of the proposal is dedicated to present the main objective of the targeted certification as energy efficiency or energy conservation project in the context of climate change and sustainable development]

[This section should be also used to present the rationale behind the project through understanding its importance to the client and the environmental impact of the materials used]

[This section should also include the specific objectives of the project proposal]

Rationale of the proposed project

Although agricultural lands represent more than 60% of Lebanon and forest 13%, Rural Development has been totally neglected due to conflicting priorities with other economical sectors: all governments' priority has been to focus its efforts on the tertiary sector in order to maintain banking and tourism in acceptable shape. Over time, rural regions such as the Chouf started getting depleted from the local and ancestral know-how due to different factors: lack of opportunities and capabilities enabling decent incomes; lack of intergenerational transmission of existing know-how; a low number of social development initiatives that are youth-specific and/or gender-sensitive. In summary, the rural regions are missing a holistic sustainable development model allowing the simultaneous combination of economic growth, social development and environmental friendly initiatives.

We, Bkerzay project team, had the strong belief that by creating an enabling environment for rural populations to demonstrate their capabilities and thus increase their income, we will anchor them to their land and environment while allowing them to improve their immediate livelihoods.

The chosen region, the Chouf, had a unique advantage compared to other regions in Lebanon: it is its awareness level regarding sustainability matters. It is till now the only region in Lebanon where a massive forest preservation and reforestation project has been initiated and successfully implemented with the support of the local population. Through this initiative, Arz El Chouf Biosphere Reserve was created and represents 5% of the total area of Lebanon.

Bkerzay is conceived to be a sustainable development initiative with three main sustainability objectives:

1. **Economic sustainability for rural communities.** Create the conditions for rural communities to overcome poverty and generate regular income from the revival of their local craft activities; to increase demand for locally made products and organic farming, and widely from ecotourism-related activities in the Bkerzay village. In addition, Bkerzay is the demonstration hub for all remote potters in Lebanon, providing them with a platform to show case and

sell their original products and come together in its yearly Bkerzay potters fair event. The eco-lodging will facilitate the interactions between urbans and rurals as it will enable urban populations to come and stay for a few days in Bkerzay, encounter the rurals, discover and enjoy the different amenities of the Bkerzay hamlet and enable them to buy arts, local crafts and local products.

2. **Social sustainability and equity.** Social development Initiatives (e.g. enhanced stakeholder engagement, ecotourism, art crafting, sustainable agriculture and organic farming etc.) will enable stop the migration of the young rural populations to the cities, preserve and reinforce inter-generational transmission of artisan know-how; promote gender-sensitive initiatives (e.g. revival of an embroidery workshop of Baakline using the talents of old women) and create the conditions of well-being for all Bkerzay employees, customers, visitors, and suppliers.
3. **Environmental sustainability.** We have defined and implemented a set of capabilities to mitigate climate change and environmental risks, and preserve the environment. Specific actions have been taken to preserve soils from soil erosion (e.g. construction of terraces to avoid sediments and soil run-offs); preservation of the natural habitats for birds (e.g. the construction of the hamlet was done in a way to not cut a single tree on site; mitigation of noise pollution); deliberate decision to not use pesticides or chemical fertilizers in the land (e.g. use organic composts and plant local species) to preserve and/or enhance ecology; responsibly source materials from local sources, manage better construction waste (e.g. excavation materials sent to fill holes etc.; reuse materials as much as technically feasible (e.g. old electrical poles used in doors, furnishing will be done with reuse of old furniture), better manage water (e.g. wastewater is treated to be used for irrigation, use water efficient sanitary devices); and last but definitely not least, design and implement an energy efficient supply model that promotes energy supply from renewable sources (e.g. solar panels, batteries, solar thermic captors for water heating)and overcomes probably totally the use of generators.

4.2 Presentation of the Proposed Project

[This section is also dedicated to inform about the focus of the project, the adopted steps and the projected on-site actions]

[For example, to achieve the project objectives, the following approaches will be used: On-site record of energy consumption, energy production and energy fed-in to the grid; solar water heaters or LED lights will be installed etc...]

[This section should include project planning and scheduling, as well as demonstrate the protection of owner's sensitivity to quality, safety, and environmental factors]

In order to facilitate the comprehension of the assessors, we have clustered the different actions and steps in line with BREEAM categories.

1. Land Use and Ecology

1. Land use and Ecology

BREEAM Category	Objective	Description of the Action	Evidence	Status
Land use and Ecology.	<p>LE 01 Understand the ecological value of the site and</p> <p>LE02 use environmentally sensitive sustainable design to protect the site ecological features</p>	<p>Action: Select for the construction, a zone that has low ecological value; however still minimize the environmental impact of the construction to preserve surroundings vegetation, natural habitats or wildlife</p> <p>Although Bkerzay has not contracted yet a formal qualified ecologist to evaluate scientifically the ecological value and features, landowner Ramzi Salman and site architect Maha Nasrallah have engaged with a number of stakeholders and subject matter experts to assess the ecological value (e.g. the plant species richness) of the construction site. Within a land of 200,000 sqm, they selected a zone of 20,000 sqm low of ecological value, on which construction will use less than 8000 sqm.</p> <p>The broad habitat types such as coniferous woodland, (e.g. coniferous woodland etc.) that defined the landscape were assessed during the design phase in order to preserve them and keep the environmental impact of the construction at its minimum.</p>	<p>Design drawing (including existing site plan), report or site photographs confirming:</p> <ul style="list-style-type: none"> • Type, m2 and duration of previous land use • Location and footprint m2 of proposed development and temporary works • Photos confirming that the footprint has not altered from that confirmed in the design stage (not a single tree was cut off from land, on the opposite, designs were amended to build around the trees) • The ecological report on biodiversity that will be provided by the ecologist we will appoint 	Done
Land use and ecology	<p>LE 03 Enhance site ecology by preventing and offsetting soil</p>	<p>Action: Construction of terraces to mitigate the run-off and soil erosion</p> <p>Soil erosion usually occurs on a land that is sloping. Water will flow downward taking with it topsoil and organic matter content and nutrients. The consequence is that the</p>	<p>Evidence of offsetting soil erosion</p> <ul style="list-style-type: none"> • Terraces have been built to retain water and soil sediments. 	

Lara Moutin

	erosion	most nutrient-packed part of the soil is lost. One of the simplest and significant actions that have been taken to mitigate the problem of an eroding soil and slope is to break up the rate of water decent by constructing terraces. By shortening a potentially long slope into as series of more level steps, we allow heavy rains to soak in rather than run off, taking soil with it. The captured rainwater thus replenishes the underground water table	<ul style="list-style-type: none"> • Measurement of water infiltration/soil moisture.
Land use and ecology	LE 04 Enhance site ecology by preventing and offsetting soil erosion	<p>Action: Mulching to conserve soil moisture at its best</p> <p>Mulching is done end of October, before the rain season starts. Dead or dry weeds are stored on site to be used as mulch</p>	<ul style="list-style-type: none"> • Measurement of water infiltration/soil moisture.
Land use and ecology	LE 05 Long term impact on biodiversity	<p>Action: Use a Biodiversity Action Plan based on a 'Like for Like or Better' approach to preserve the existing habitats a minima and that identify measures that can reasonably be expected to result in no net loss or preferably a net gain in biodiversity.</p> <p>Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified and area's primary ecological functions and species composition. Critical habitats are defined as areas with high biodiversity value (e.g. geographically restricted species, endangered species).</p> <p>Local biodiversity expertise has been sought at, and before the design stage, all potential species of local/biodiversity importance on site were examined. It clearly appeared that Bkerzay does not have critical habitat.</p>	<ul style="list-style-type: none"> • Landscape action plan has been defined and implementation will start in April. • The landscape supplier has designed its plant irrigation system in a way to reduce irrigation duration to its minimum level. • Planting choices will exclude any alien or non-native species of flora or fauna that could not be normally found there. • A longer term Biodiversity Action Plan is under definition although we have already identified that we want favor

		<p>Throughout the project, Bkerzay’s biodiversity plan is and will be about the preservation of existing habitats a minima and potentially taking measures to implement to achieve measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.</p> <p>We briefed a planting company, namely Exotica, in July 2016 to propose us an agri-business master plan that is biodiversity friendly and that covers landscaping and planting choices. We have raised awareness across the planting company that the intentional or accidental introduction of alien or non—native species of flora and fauna into areas where they are not normally found can be a significant threat to biodiversity and is therefore not acceptable. We also briefed them to use native plants to reduce the need for irrigation and save water</p>	<p>natural habitat to increase the number of birds.</p> <ul style="list-style-type: none"> •
Land use and ecology	LE 05 Long term impact on biodiversity	<p>Action: Replace chemical/synthetic fertilizers with organic manure/compost and replace chemical/synthetic pesticides with organic and mechanical means:</p> <p>Since his acquisition of the land in 2009, the landowner has on unilateral basis, taken the decision to avoid the use of chemical/ synthetic pesticides and fungicides that are currently used in conventional agriculture. Thus, Bkerzay site is chemical/synthetic pesticides free since 2009 and therefore, suitable for growing organic food. Soil fertility improvement will be achieved through compost and organic manure.</p>	<p>Design phase</p> <ul style="list-style-type: none"> • Our waste collection and management system is designed to be holistic and actionable. We will have multi compartment garbage bins to separate in each individual location on the site, organic from Plastic, Plastic from paper, glass and metal • Composting (i.e. transformation of the organic material into a stable end-product by microbial organisms) is clearly our

			<p>priority because it is an environmentally friendly and an economically viable technique. We currently are looking the type of composting to choose: windrow composting, aerated static piles (ASP) or in-vessel composting. Factors we are considering before choosing the optimum option is the available space, the project use of the compost / end product, the speed of composting, the odor and what it requires in terms of implementation</p> <ul style="list-style-type: none">• Lab analysis of Bkerzay soil is to be planned either at design phase either post construction phase. The site has banned the use of pesticides and chemicals since 2009 and that will be reflected in the results of the analysis.
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2. Water

Overall principle: Water will be managed consciously and efficiently. Measures will be taken to avoid contamination and depletion of water sources.

BREEAM Category	Objective	Description of the Action	Evidence	Status
Water	Wat 01 Water consumption	<p>Action: Reduce the consumption of potable water for sanitary use from all sources through the use of water efficient components and water recycling systems</p> <p>Reduce water consumption means reducing the extraction of fresh water by consuming less and recycling as much as possible wastewater whenever appropriate.</p> <p>List of sub-actions:</p> <ul style="list-style-type: none"> • Install a pulsed output water meter on the main water supply to each unit to ensure that water consumption is monitored and managed. • Design stage: Provide specification/design drawings confirming technical details of water consuming components and rainwater and grey water collection systems. The technical details should provide also the water consumption figures from manufacturers' product information to determine the consumption of each type. Measures should provide the following info: <ul style="list-style-type: none"> ○ WCs - Actual maximum or, where dual flush, effective flush volume in litre/use ○ Taps - For each tap, measure the full flow rate per minute at a dynamic pressure of 3 +/- 0.2 bar for high pressure taps (Type1) and at a dynamic pressure of 0.1 	<p>At design and post- construction stages:</p> <p>The site has sub-meters at each plot and have pulsed output water meters.</p> <p>At design stage:</p> <ul style="list-style-type: none"> • Data collection from manufacturers' product information on water consuming components to determine the consumption of each type of water consuming components • Estimates matrix on average flow rate and average water consumption in High & Low Seasons to identify potential savings if improvements of 25 to 50% are implemented • We have ordered the sanitary appliances as per specification. In the meantime, the water closets are all installed and fixtures will be 	<p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p>

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>+/- 0.2 bar for low pressure taps (Type2)</p> <ul style="list-style-type: none"> ○ Showers – Flow rate of each shower at the outlet using cold water (T 30C) in litres /minute measured at a dynamic pressure of 3+/- 0.2 bar for high pressure (Type 1) and 0.1 +/- 0.05 bar for low pressure (Type 2) ○ Kitchen taps – Measure the maximum flow rate in litres/min ○ Dishwasher – Measures of litres per cycle for commercial application ○ Washing machine – Measures of litres per use for domestic use. All site laundry will be outsourced to a laundry facility in Baakline Village. ○ Waste disposal unit: flow rates in litres /minute ● Hammam – we have privileged a solution that reduces water and energy consumptions: instead of creating steam, we are heating the walls and the floors using solar panels and creating inside the hammam an atmosphere of steam with a steam generator. The steam generator works with electricity and that electricity comes from the site electrical supply that use solar energy: In terms of savings: a) 15L of water instead of 100L per hour ! b) 12kW per hour instead of 84 kW per hour <p>Water saving</p> <ul style="list-style-type: none"> ○ Week end saving on water (100L X 8h x 3 days) – (15L x 8h x 3 days) = 2040 L of water saved each week-end ○ Week days saving on water (100L x3h x 4 days) – (15L x 3h x 4 days) = 1020L saved during the 4 days of the 	<p>ready to install after tiling is done.</p> <ul style="list-style-type: none"> ● ● ● Hammam design – instead of generating steam which will be high energy and water consuming, we have decided to heat the walls and the floor of the hammam with the solar generated electricity and create ● and an ‘atmosphere of steam’ rather than steam in the Hammam. This solution enables to use SIX to SEVEN TIMES LESS LITRES OF WATER per hour and SIX to SEVEN TIMES LESS KWH for ENERGY per hour. 	<p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p>

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>week prior to we</p> <ul style="list-style-type: none"> ○ Total water saved during week = 2040L + 1020L= 3060L ○ On a yearly basis, 52 x 3060L = 160,000 L water saved. <p>Energy saving</p> <ul style="list-style-type: none"> ○ Week end saving: (84 kW x 8h x 3 days) – (12 kW x 8h x 3 days) = 1728 kW ○ Week day saving: (84kW x 3h X 4 days) – (12 kW x 3h x 4 days) = 864 kW ○ Total energy saving in kW = 2592 kW <ul style="list-style-type: none"> • We have the selection process of water consuming components should favor the ones that demonstrate efficiency expressed in % of improvement of 25%-50% versus baseline) at comparable price. For instance, the baselines for WC is 6L/min, hand wash tap or kitchen rap 12 L/min, Shower is 14L/min etc. 	<p>Post construction stage:</p> <ul style="list-style-type: none"> • Get confirmation from the supplier that the water consuming appliances have been installed as specified for the Design stage 	
Water	Wat 01 Water consumption	<p>Action: Implement systems to collect grey water and rainwater</p> <p>Collect the following information for rain water and for grey water systems:</p> <p>For rainwater, the following data should be collected:</p> <ul style="list-style-type: none"> • Collection area expressed in m2 • Hydraulic filter efficiency expressed in % • Rainfall expressed in average mm/year • Yield coefficient expressed in % <p>For grey water</p> <ul style="list-style-type: none"> • The manufacturer or system designer details • The percentage volume of waste water collected and re-used 	<p>Post-construction:</p> <p>When the grey water / rainwater system specified is installed, the water disposal system must achieve the defined percentage reduction in water consumption (over the baseline specification)</p>	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		from the following (where relevant) hand wash basins, showers, kitchen basins, dishwashers, baths, washing machine, and sources of waste water.		
Water	Wat 01 Water Consumption	Action: Use rain harvested water and treated wastewater for irrigation Adequate system has been installed to enable irrigation of agro-related activities	Post construction: <ul style="list-style-type: none"> • Demonstrate that the irrigation system uses treated grey wastewater and rain harvested water • The irrigation system has been designed to reduce the irrigation duration to its minimum, thus also the amount of water used. 	Ongoing
Water	Wat 01 Water consumption	Action: Estimate the fixed water use for F&B The F&B activity has been subcontracted to a third party. We will make an estimate of the water consumption for vessel filling, food preparation and catering and cleaning the kitchens and other related amenities. We will make an estimate on what is the baseline and during the life course of the project, how we could improve this fixed waster use amount dedicated to F&B	Design stage <ul style="list-style-type: none"> • All major facilities will be metered. That includes the F&B • Estimate for the fixed water use for F&B based on the number of guests / dining service, preparation and cleaning. 	Ongoing
Water	Wat 01 Water consumption	Action: Installing leak detection systems on the mains water supply within the houses and on the water distribution network	Design stage Leak detection system has been taken into account in the BMS. It will be an inbuilt automated diagnostic procedure for detecting leaks. Post construction <ul style="list-style-type: none"> • The water sub-meters and logbooks track water consumption 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
			<p>over time.</p> <ul style="list-style-type: none"> Once the site is operational, we will be able have water consumptions measures in low season and in high season. We will monitor these and establish what are the baseline numbers and monitor leaks afterwards as a substantial increase versus these numbers. 	
Water	Wat 02 Water monitoring	<p>Action: Install a leak detection system able to detect a major water leak on the main water supply within the constructed site and between the individual houses and the utilities water meter</p>	<p>At design and post- construction stages:</p> <ul style="list-style-type: none"> Each house, each facility on site will have its pulsed output water meters BMS is designed and set to manage leaks and isolate leaks except for the walk in shower where the toilet tap with play that role. The leak detection system should be commissioned and well understood by the site maintenance team. The action plan when water leak is detected is available and actionable by maintenance team and it is included in the site Maintenance Plan 	<p>Ongoing</p> <p>Ongoing</p> <p>Ongoing</p>

3. Energy

BREEAM Category	Objective	Description of the Action	Evidence	Status
Energy	Ene01 Reduction of Emissions	Action: Decision to not install TV nor DVD players in rooms. Better than reduce emissions, we have decided to disable one of the sources of generation of it by not installing TV or DVD players in rooms. We will be saving energy that would have been generated in use as well as in stand by mode.	<ul style="list-style-type: none"> Design demonstrates the absence of specific electrical appliances such as TV and DVD players. The only TV type devices will be the ones of the site monitoring room. 	Done
Energy	Ene 01 Reduction of Emissions	Action: Paint rooms light colors to aid reflection of available light and enhance the natural light Clear paintings (free of VOC) will be used.	Post construction stage <ul style="list-style-type: none"> Rooms' walls painted in white and /or light yellow. 	Ongoing
Energy	Ene 02 Energy Monitoring	Action: Education and mobilization of all to reduce energy consumption. <ul style="list-style-type: none"> Turn off lights in areas not being used. Clean lamps and fittings – over time, dirt build up reduces light output. Suggestions to guests to switch off their computers and unplug their recharges from walls when leaving their rooms. 	During life cycle /operations <ul style="list-style-type: none"> Housekeeping training manuals Guests booklets in rooms 	Ongoing
Energy	Ene 03 External Lighting	Action: Brief the lighting company to ensure that their proposal for external lighting fittings, within the construction zone, meet the lighting requirements of green buildings, as much as technically and commercially feasible. As indicated, we have shared with Firefly the lighting company the Bream requirements and decision has been taken to use Light	Design stage <ul style="list-style-type: none"> Design finalized Implementation <ul style="list-style-type: none"> Ordering of lighting materials 	Done

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>Emitting Diode (LED) wherever we have lighting, with a few exceptions such as maintenance room and food inspecting area. We have finalized our decision regarding external lighting options and fixtures and chosen the ones that provide the most advantages both environmentally and financially.</p> <p>All the chosen lumaires contain built-in lamps and the lamps cannot be changed in the luminaires.</p> <p>The External Lighting company Firefly and the Electro-mechanical company Akkary Group have been extensively been briefed that we are applying for Breeam certification and they have to comply as much as technically feasible to the Breeam requirements.</p>	<ul style="list-style-type: none"> See appendix for Lighting data 	Done
Energy	Ene 04 Low and Zero Carbon Technologies	<p>Action: Generate energy from renewable sources (solar panel)</p> <p>The Energy Operating model has been improved further in March 2017 and is still under final tuning for further improvements:</p> <p>The power supply decision matrix has been designed in a way to avoid totally using generators and thus, getting away from fossil fuels.</p> <p>The available sources of energy are in order of priority: Solar, EDL and Generators.</p> <p>The solar system (and EDL) can charge the batteries, however, EDL is only used to supplement any missing energy from the sun.</p> <p>The sequence of energy supply is as follows</p> <ol style="list-style-type: none"> The solar system simultaneously provides power supply through the batteries and charges them. It takes 6 hours to fully charge the batteries from zero to one hundred percent. In the case of solar energy not being sufficient, the system 	<p>Design phase</p> <ul style="list-style-type: none"> Yellow template available. It will be provided simultaneously with this document. 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>will compensate for this gap via EDL power (e.g. if the batteries are less than 50% full and there is no sun, we will take the difference from EDL)</p> <p>3. If EDL and Solar energy are both unavailable, the batteries can last for six to seven hours, which by that time, EDL will most likely be available again.</p> <p>4. If after this 7 hours slot, EDL is still not available, generators will be used</p> <p>Solar thermic captors will be</p> <ul style="list-style-type: none"> • Heat water in the individual lodges, Chambrettes and the Hammam. • In summer, heating being not necessary, the amount of available energy produced by the sun will be used to heat the swimming pool and the Hammam. <p>Currently, we are working on optimizing the use of solar energy by focusing our efforts on solution providers offering new generation batteries that have an increased storage capacity.</p>		
Energy	Ene 04 Low and Zero Carbon Technologies	<p>Action: Heat the rooms with wood stoves (except the Chambrettes that will be heated with solar energy)</p> <p>We will ordered a model Olymberyl (EU norm) wood stoves delivering a heat output to room of 4.6-6 kw, an overall efficiency of 70-75% and with a maximum CO2 emission of 0.25 – 0.3%. All the wood pruning of trees will be dried and used for heating in the lodges. Design wise, the wood stoves are high efficiency cast iron with the option of heating a towel holder in the bathroom.</p>	<p>Post construction stage:</p> <ul style="list-style-type: none"> • Wood stoves installed, operational and enabling us to heat the room without using fossil fuels 	Ongoing
Energy	Ene 05 Energy	<p>Action: Install energy efficient refrigeration system in the site kitchen</p>	<p>Design</p> <ul style="list-style-type: none"> • Kitchen design not yet fully 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
	efficient cold storage	We are in the process of designing the kitchen layout. We will ask from the kitchen appliances suppliers, in addition to competitive pricing, all information regarding the cold storage in order to chose the most energy efficient appliances (e.g. Refrigerated display cabinets, Refrigerated compressors, Refrigerated system controls, Cellar cooling equipment, Air cooled condensing units, Commercial services cabinet (i.e. cold food storage),	<p>finalized</p> <p>Post construction stage</p> <ul style="list-style-type: none"> Chosen appliances are compliant with the agreed specifications. 	
Energy	Ene 08 Energy efficient equipment	<p>Action: Conduct regular equipment maintenance to avoid energy losses</p> <p>Energy losses can be caused by dirt or pipe/duct leakage. We will develop a routine maintenance procedure and checklist to insure peak efficiency</p>	<p>Post-construction:</p> <ul style="list-style-type: none"> A documented process and checklist for routine maintenance plus allocation of this task to the on site maintenance team 	Ongoing

4. Waste

Waste should be reduced, reused, recycled and composted in an appropriate manner.

BREEAM Category	Objective	Description of the Action	Evidence	Status
Waste	Wst 01 Construction Waste	<p>Action: Implement measure to effectively manage and reduce construction waste.</p> <p>We have proceeded to excavation activities during the construction and used the waste generated in two ways:</p> <ul style="list-style-type: none"> We are reusing the material on site (in situ for new applications) to fill land gaps We are diverting these materials from basic landfill by transporting the excavation output to a specific spot, in 	<p>During construction and post construction</p> <ul style="list-style-type: none"> We are currently implementing the practices described for excavation outputs 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		a crater nearby, where the landowner wishes to fill its land holes with this material		
Waste	Wst 03 Operational waste	<p>Action : Dedicate space to cater for the segregation and storage of operational recyclable waste volumes generated by the assessed lodges, its occupant and activities</p> <p>This will include the consumption of cleaning chemicals, soaps, newspapers, paper toilet, napkins, packaging waste, cooking oils, aluminium foils, vegetable and fruit peelings, used coffee grounds and bags, trimmings from food preparation, raw fish and meat bones, corks, unused breads, pastries, salads, plastics, etc.</p> <p>Green hotel studies indicate that for a middle size hotel, the total weight of waste in kilograms per year is 18.637 Kgs</p>	Design phase	Ongoing

5. Health and Well Being

BREEAM Category	Objective	Description of the Action	Evidence	Status
Health & Well-being	Hea 01 Visual Comfort	<p>Action: Fit all fluorescent and compact fluorescents lamps with frequency ballasts (Fluorescent lamps are currently used only in pottery for now. We haven't made the choice yet to have fluorescent lamps elsewhere, but if the case, we will implement these recommendations)</p> <p>We understand that this is a pre-requisite. Ballast starts the lamp and control lamp operations.</p>	<p>Post construction stage:</p> <ul style="list-style-type: none"> Ballasts are installed and operational 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>Rapid-start ballasts heat the electrodes of fluorescent lamps before applying the voltage necessary to start the lamps, causing a brief delay in starting. Electrode heating, which usually continues even after starting, results in a power loss of 3-4 watts.</p> <p>Instant-start ballasts do not heat the lamp electrodes during either starting or operation and so usually operate at lower power than comparable rapid-start ballast. Instant-start ballasts provide high initial starting voltage, which will reduce the lamp life relative to rapid-start operation. This reduction in lamp life is greatest when lamps are turned on and off frequently, which sometimes occurs in applications where occupancy sensors are used. Once lighting fully defined, we will make a conscious choice on the types of ballasts to install.</p>		
Health & Well-being	Hea 01 Visual Comfort	<p>Action: Brief the lighting company to ensure that its proposal of lighting is aligned with CIBSE Code of lighting the luminance (lux) levels in all internal building relevant areas and apply zoning and occupant controls for internal lighting.</p> <p>We have pre-defined the following specifications for internal lighting that we will discuss with lighting suppliers</p> <ul style="list-style-type: none"> • Reception desk 300 lux • Corridors and stairs 100 lux • Bedrooms 50-100 lux • Bar, Restaurant, Cafés: 50-200 lux • Retail store 150 lux • Food storage area 150 lux • Food product inspection (Kitchen) 1180-1400 lux • Bulk ingredients storage 320-430 lux • Maintenance 750-860 lux 	<p>Post construction:</p> <ul style="list-style-type: none"> • Independent verifier to check that specified lighting recommendations are implemented 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<ul style="list-style-type: none"> Entrances and Exit 200 lux Car park in rural area 10 lux Roadway village 15 lux High risk areas 15 lux 		
Health & Well-being	Hea 01 Visual Comfort	<p>Action: Achieve the required daylight levels</p> <p>We have promoted in the design of amenities the use of natural light. For instance, we have designed large picture windows, door-ways and regular windows to enable maximum natural light penetration and cross ventilation.</p>	<p>Post construction stage:</p> <ul style="list-style-type: none"> Check compliance of construction versus initial design 	Ongoing
Health & Well-being	Hea 01 Visual Comfort	<p>Action: Control glare and provide adequate view out</p> <p>Most windows are conveniently oriented to the view which is North allowing for a nature glare control while providing pleasant day lighting</p>	<p>Post construction stage:</p> <ul style="list-style-type: none"> Check the glare control and day lighting 	Ongoing
Health & Well-being	Hea 01 Visual Comfort	<p>Action: External lighting</p> <p>We have sent the BREEAM certification requirements in terms of Lighting to the External Lighting suppliers to include in their proposal as many requirements as possible. The mandatory requirements will be included by all means</p>	<p>Post construction stage:</p> <ul style="list-style-type: none"> Check that installation has been done as per final agreed specification 	Ongoing
Health & Well-being	Hea 02 Indoor Air Quality	<p>Action: Prohibit the use of materials containing asbestos on the site</p>	<p>Design phase</p> <ul style="list-style-type: none"> Included in the specifications <p>Post-construction phase:</p> <ul style="list-style-type: none"> Site open for verification by independent auditors 	Ongoing
Health & Well-being	Hea 02 Indoor Air Quality	<p>Action: Define an indoor quality plan where ventilation design takes into account the sources of pollution</p> <p>We have specified our site paints, products and finishes in accordance with relevant standards for emission low levels for Volatile Organic</p>	<ul style="list-style-type: none"> Post-construction: The contaminant concentration in air will not exceed the tolerated concentration limits of carbon dioxide, carbon monoxide, total 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<p>Compounds (VOC).</p> <p>We have designed our occupied spaces within the site (e.g. bedrooms, spa, etc.) with the capability to provide fresh air entirely via a natural (cross) ventilation strategy by having at least two windows on two different walls in each room. Our design uses natural outside air movement and pressure differences to passively cool and ventilate the constructed entities. We believe that this design feature along with ceiling fans will help meet the building comfort zone for cooling without using air conditioning systems. We believe this saves a large fraction of the total energy use of the construction.</p>	<p>VOC</p> <ul style="list-style-type: none"> • Post construction: saving in total energy use. 	
Health & Well-being	Hea 03 Thermal Comfort	<p>Action: Subcontract thermal modeling</p> <p>Modeling will be done to demonstrate that the building design and services strategy can deliver thermal comfort levels in occupied spaces in accordance with the criteria set out in ISO 7730. We will use thermal modeling analysis to feed the temperature control strategy for the building and its users.</p>	<p>Design phase:</p> <ul style="list-style-type: none"> • Decision has been taken to appoint Eco-certification company for thermal modeling. 	Done
Health & Well-being	Hea 04 Water Quality	<p>Action: Design all water systems in the building in compliance with the measures outlined in H&S executive and legionella disease.</p> <p>The water network is composed of two main tanks of water (First one located at 65m height above the second one) and a distribution network to the different facilities. Between the two water units, we have three main high- pressure pipes. Two of them send the water down to the lower level tank and distribute to the whole network and one of the pipes. Two main pipes of high pressure send the water down to the lower level tank and across the distribution network. There are no stagnant water areas within the water network where</p>	<p>Post-construction stage:</p> <ul style="list-style-type: none"> • Samples of water will be picked at different nodes of the water system network and send for bacteriological analysis in a laboratory 	Done

BREEAM Category	Objective	Description of the Action	Evidence	Status
		bacteria is able to proliferate.		
Health & Well-being	Hea 04	<p>Action: Design the water network in a way that water contamination risks in the building services are minimized and clean sources of water are provided to the users.</p> <p>The water tanks are supplied in fresh water</p> <p>a. Upper tank supplied from the municipality</p> <p>b. Lower tank supplied from the well and the municipality.</p> <p>The grey water network is totally separated from the main water distribution network.</p>	<p>Design</p> <ul style="list-style-type: none"> We have deliberately removed one of the boilers to reduce risks and optimize the use of water and energy in the heating process of the hammam and spa. <p>Post-construction stage:</p> <ul style="list-style-type: none"> Samples of water will be picked at different nodes of the water system network and send for bacteriological analysis in a laboratory Separated streams for fresh water and grey water. 	Ongoing
Health and Well Being	Hea 05 Acoustic performance	<p>Action: Appoint a suitably qualified acoustician at the right stage of the procurement process to ensure that the buildings acoustic performance including sound insulation meet the appropriate standards and; internal environment and specialist areas achieve optimum performance.</p>	<p>Design stage</p> <ul style="list-style-type: none"> Appointed Pierre Geara to be the acoustician <p>Post construction</p> <ul style="list-style-type: none"> Provide acoustic performance report 	Done Ongoing
Health and Well Being	Hea 06 Safe Access	<p>Action: Take measures to provide safe access.</p> <p>All measures promoting low risk, safe and secure access to and use of the building have been included to the design and will be implemented.</p> <p>Access to private outdoor spaces (terrace, balcony) is carried by a line whose height does not exceed 2 cm</p>	<p>Post construction:</p> <ul style="list-style-type: none"> The entry gate has an automatic opening and closing device is accessible so as to not to have to leave the car. Obstacles halfway or at head 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
			<p>height have been eliminated; Sharp edges are removed to reduce the impact in case of accident.</p> <ul style="list-style-type: none"> • Furniture heights are suitable for children and short people • Wherever possible, steps and disruption levels are restricted to facilitate travel for all. • Stairs constructed with safety requirements • Some of the units designed to be wheel-chair friendly: the free passage of doors is sufficiently large (above 80 cm) for the passage of a wheelchair and, above all, simplify moving in all cases of disabled • All glass doors show signs of contrast (the lines are installed at 1.10 m and 1.60 m high). • The entry gate will be installed with an automatic opening and closing device to operate it without leaving the car. • Difference in level between 	

BREEAM Category	Objective	Description of the Action	Evidence	Status
		<ul style="list-style-type: none"> • Fire resistant materials are being used (e.g. stone walls) • Alarm systems will be installed and will be audible throughout the site. The alarm will have a distinct sound that is different from any other noise notification system. • The site will be equipped with fire detectors and fire-fighting equipment to ensure at least containment of the fire until the arrival of the firemen. Provision of manual firefighting equipment that is easily accessible and simple to use will be made and the equipment will be maintained in good working order. It will be adequate for the dimensions of the premises • The whole site staff will be trained on fire safety measures, earthquake safety measures and first aid. 		

6. Management

BREEAM Category	Objective	Description of the Action	Evidence	Status
Management	Man 01 Sustainable	Action: Include in project brief and design of the whole team (Design team, contractor,	Design stage <ul style="list-style-type: none"> • Highly integrated team reporting to one head 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
	Procurement	<p>suppliers, representatives of the future customers, consultants) to ensure that the site is designed and built in accordance with functional and sustainable performance expectations</p> <p>Holistic approach to include end-users requirements, architectural design requirements functional, technical and aesthetics, particular installation and equipment, usability and management of the premises during its life have all been taken into account and each fed by specific subject matter experts.</p>	<p>with clear accountabilities</p> <ul style="list-style-type: none"> Holistic approach to requirements is reflected in design strategy <p>Commissioning and handover</p> <ul style="list-style-type: none"> Thermographic survey to be provided to confirm conformance of construction to design 	
Management	Man 02 Responsible Construction Practices	Action: Manage the construction site in an environmentally and socially considerate, responsible and accountable manner.	<p>Post construction:</p> <ul style="list-style-type: none"> Contractor's performance assessment in being compliant to the specifications 	Ongoing
Management	Man 03 Construction Site Impact	Action: Require from the principal contractor to monitor and report on site activities (e.g. energy, water use and material sourcing)	<p>Construction stage:</p> <p>The contractor (A.R. Hourie) has been monitoring and reporting the following</p> <ul style="list-style-type: none"> Water use- We have 100.000L are used per week on the construction site. This is calculated by filling a 10.000L tanker, twice a day, based on 5 days/week. Energy use – There are two generators installed on the site. One of 60 KVA able to operate 5 days/week and 150 KVA able to 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
			<p>operate 7 days/week. The 60 KVA generator 5 x 500 watts consumes 2500 watts; the 150 KVA generator 7 x 200 watts consumes 1400 watts, thus a total of 3900 watts.</p> <ul style="list-style-type: none"> • Material is sourced from close locations in order to minimize transport and GHG use. 	
Management	Man 04 Stakeholder Participation	<p>Action: Stakeholder engagement: Consultation</p> <p>Although not formalized in writing, the Bkerzay project team led by the land owner Ramzi Salman, invested time to identify and prioritize the stakeholders; assess their interests and concerns; and consult them inclusively early enough to get their input in the decisions. There isn't yet a formalized grievance management process however, the team has established regular interactions, in an open, accessible and responsive manner e.g. regular visits between Ramzi Salman, his team and the local stakeholders to raise concerns and grievances about the project and take preventive and corrective measures wherever necessary. Interaction with local communities is occurring on regular, almost daily basis and information is disclosed without any censorship. We are conscious that certification schemes require more formalized approach, minute stakeholder</p>	<p>Design and construction phases</p> <ul style="list-style-type: none"> • Stakeholders properly engaged and well managed • Information disclosure is occurring without any censorship • Absence of grievance 	Done

BREEAM Category	Objective	Description of the Action	Evidence	Status
		consultation and participation meetings and most likely, over the course of the project life, we will do it, but we want to keep the verbal interaction ongoing.		
Management	Man 04 Stakeholder Participation	Action: Inclusive and accessible design We have defined design solutions, which remove obstacles for disabled people's mobility on site. We also have taken into account the diversity of its potential visitors (e.g. elderly people, women with heels, kids)	Design stage <ul style="list-style-type: none"> Disabled users requirements have been taken into account and embedded in the design (e.g. see Hammam) Site takes into account the people of different, gender and fitness levels 	Ongoing
Management	Man 04 Stakeholder Participation	Action: Building user information User guides will be provided to staff and all potential residents / visitors. The purpose is to make sure that all potential users will be able to use the facilities in an effective manner	Post construction stage <ul style="list-style-type: none"> User guides prepared per audience and disseminated across the site 	Ongoing
Management	Man 04 Stakeholder Participation	Action: Post Occupancy evaluation (POE) and Information dissemination Bkerzay Ecotourism will have it own brand, website, publicly available literature, communication plan, marketing and market appropriation.	Design stage <ul style="list-style-type: none"> Bkerzay has its own website currently focused on the Pottery activity. Different press releases are available on Bkerzay's potter's fair Post occupancy evaluation stage <ul style="list-style-type: none"> The strength of Bkerzay brand equity Trip advisor comments Occupancy levels in high and low season Reputational index 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
Management	Man 05 Life cycle cost and service life planning	<p>Action: Monitor and improve cost and service throughout the project life.</p> <p>The Bkerzay village has to be maintained in impeccable state. Facilities have to be maintained in optimal level of cleaning, functionality and maintenance (e.g. windows, cladding, finishes, external spaces and services)</p> <p>The maintenance strategy and systems will be designed to demonstrate how to maintain the systems and operational features in a safe, efficient and cost effective manner.</p>	<p>Post construction and occupancy</p> <ul style="list-style-type: none"> • Site personnel will be trained on continuous improvement (e.g. facility, costs and services) • All induction programs to include the continuous improvement approach. • A maintenance strategy will be developed before the end of the construction phase and available at handover stage. It will describe how the removal or replacement of major equipment should occur (e.g. layout / access) • A management plan for landscaping will be available and handed over to site management team 	Ongoing

7.Materials

BREEAM Category	Objective	Description of the Action	Evidence	Status
Materials	Mat 01 Life Cycle Impacts	<p>Action: Specify construction materials with a low environmental impact.</p>	<ul style="list-style-type: none"> • All materials used for the construction are environmentally friendly materials (e.g. stone, wood from renewable sources, iron, gravel). I • Gravel replaces asphalt, considered as non environmentally friendly 	Done

BREEAM Category	Objective	Description of the Action	Evidence	Status
Materials	Mat 03 Responsible sourcing of materials	<p>Action: Responsibly source all key building elements</p> <p>We have defined guidelines to have the following elements responsibly sourced (traceable and from renewable sources):</p> <ul style="list-style-type: none"> • Structural frame, Ground floor and Upper floors • Tiling • Roof (planted green roofs at more than 50%) • External walls (minimum 40 cm thick double walls half CMU, half natural stone, for optimal thermal insulation) • Internal walls (CMU with plaster and low VOC paint) • Foundation / substructure (CMU) • Fittings (Low energy consumption and low water consumption) • Hard landscaping 	<p>Construction stage:</p> <ul style="list-style-type: none"> • Ready mix concrete 30m³ supplied from Sebaa Chouefat (25km distant) • Polyethylene pipes for water supplied from Roumieh (60km distant) • Excavation materials sent with the trucks arriving to Bkerzay to a specific area where the land owner wants to fill its holes and make the soil even (7 km distant) • Stones – 3000 pieces / month supplied from Botmé from a crater near Moukhtara (10km distant) • Gravel and sable – 100m³ per month supplied Dahr el Beydar (35 km distant) • Internal walls/Cement supplied from Baakline (3km distant) • Tiles are locally produced 	Ongoing
Materials	Material 04 Insulation	<p>Action: Specify responsibly sourced thermal insulation that delivers low embodied environmental impact</p> <p>Our ambition is to have at least 80% of the thermal insulation used in the building be responsibly sourced.</p> <p>The insulation products that are considered</p> <ul style="list-style-type: none"> • Products using > 50% recycled content except those using timber (double membranes SBS) • Other renewable-based insulation materials using agricultural by-products (e.g. straw) <p>External walls (minimum 40 cm thick double walls half</p>	<p>Design and post construction stages</p> <ul style="list-style-type: none"> • Insulation through inclusion of Double SBS membrane + geotextile fabric; straws. 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
		CMU, half natural stone, for optimal thermal insulation		
Materials	Material 05 Design for Robustness	Action: Identify all potentially vulnerable areas of the building (both internal and external) where vehicular, trolley and pedestrian movement occurs and incorporate in the design suitable design features/solutions to prevent damage of vulnerable areas.	Design stage <ul style="list-style-type: none"> Takes into account all vulnerable areas and soft mobility of population (e.g. disabled, kids) 	Done

8.Pollution

BREEAM Category	Objective	Description of the Action	Evidence	Status
Pollution	Pol 01 Impact of refrigerants	Action: Reduce the level of green house gases emissions arising from air conditioning systems and F&B systems using refrigerants <ul style="list-style-type: none"> CFC free refrigerant Choose kitchen appliances and cold storage that have the adequate Global Warming Potential Choose AC devices that are environmentally friendly 	Design phase <ul style="list-style-type: none"> Copy of specifications indicating absence of CFC in refrigerants AC systems have a specification of Global Warming Potential ≤ 10 AC is triggered when outside temperature is (24°C) 	Ongoing
Pollution	Pol 02 NOx emissions	Action: Supply heat from systems that minimizes NO_x emissions	Design stage <ul style="list-style-type: none"> Heating is designed to be provided through renewable energy of solar panels and from wood stoves 	Ongoing

BREEAM Category	Objective	Description of the Action	Evidence	Status
Pollution	PO 3 Surface water run off	Action: Check the efficiency of terraces in case of floods. As described in Land use and ecology section, terraces have been built to stop surface water run offs and prevent soil erosion. This is already operational. However, this needs further testing in case of floods.	Post construction stage <ul style="list-style-type: none"> An assessment of potential floods have to be made to check the efficiency of the terraces 	Ongoing
Pollution	PO4 Reduction of night time pollution	Action: Concentrate external lighting in the appropriate areas and minimize upward lighting The external lighting strategy is under development but already includes the following guidelines: <ul style="list-style-type: none"> Reduce visual pollution from external lighting Essential lighting is provided between 23:00 and 6:00 am. These lights will be operating at lower levels. There are no illuminated advertisements Areas where external lighting is sensor based. 	Post construction stage <ul style="list-style-type: none"> The external lighting should be compliant with the specifications of the designers in terms of density, orientation of the lights 	Ongoing
Pollution	PO5 Noise attenuation	Action: Control and reduce the noise in and around the buildings, reduce the likelihood of noise arising from fixed installation	Design stage <ul style="list-style-type: none"> The maintenance room where generators are placed are noise insulated. Post construction stage <ul style="list-style-type: none"> Acoustician report should measure noise attenuation 	Ongoing

9. Transport

BREEAM Category	Objective	Description of the Action	Evidence	Status
Transport	Tra 01 Public transport accessibility	No action. Not applicable Public transport accessibility to the site does not exist. Bkerzay Village is located 1 km from the road	Not applicable	
Transport	Tra 02 Proximity to Collective Amenities	Action: Provide proximity for F&B (e.g. restaurant, café de la piazza, café de la poterie, grocery and food shop), Leisure (swimming pool, hammam and hiking road	Design stage <ul style="list-style-type: none"> All collective and/or food amenities are on site and less than 50 meters away from the most remote house in the Village Hiking road is less than 100 meters from Bkerzay village center 	Ongoing
Transport	Tra 03 Alternative modes of transport	No action has been decided regarding the cyclist facilities or alternative mode of transport	Not applicable	Ongoing
Transport	Tra 04 Maximum Car Parking Capacity	The current car capacity is 53 cars. No car capacity strategy has been yet thought of that will encourage the use of alternative means of transport. To de defined.	Once the car strategy is defined, implementation should reflect the strategy	Ongoing
Transport	Tra 05 Travel Plan	Action: Develop a travel plan A travel plan has been developed since the opening of the site pottery workshop. The current travel plan to do not include the second access to the site (through Baakline) The travel plan will be amended accordingly.	Design stage <ul style="list-style-type: none"> Travel plan already exists as part of the site (Pottery workshop and cafeteria) is operational since 3 years 	Done

4.3 Design Features

[This sub-section should include details about the project's character and identity]

[The sustainable development features targeted by all considered resource management schemes of the project in terms of building/planning/design and in terms of social schemes must be mentioned here.]

[Architectural Features must be presented as well as sufficient information about operational and project management]

The Bkerzay Village design reflects the local natural and cultural environment, using the principles of vernacular architecture, sustainable design and endemic design styles.

Although the overall land is 200,000 sqm with low ecological value, we specifically chose to concentrate the construction area to a plateau of 20,000 sqm to be able to minimize its environmental impact. A broad mapping of natural habitat has been done and integrated to the design in order to protect key natural features such as vegetation, natural habitat and wildlife.

The construction area is on a slope. Therefore, to preserve the environment, it is essential to prevent and offset soil erosion and construct terraces that enable to slow down the surface run-offs, facilitate the infiltration of rainwater into the soil of the property through a set of technical choices, appropriate landscaping and/or plants depending on the direction of surface run-off.

Before starting the design, in order to preserve the existing trees and maintain and enhance the quality of landscapes, a precise mapping of all the vegetation was made and the structures were carefully inserted between the trees and crafted around them. We did our best to preserve a harmonious relationship of the construction with its environment, preserve heritage and visual identity.

The project owner engaged with the local stakeholders to ensure that they were included in decision making from day one and enable them to provide inputs.

Youssef Haidar, a Lebanese architect, developed the project master plan. Later, the architectural design of the different components was assigned to Maha Nasrallah Architect, with regular input from the project owner Ramzi Salman, CEO of the Hourie contracting company, and also himself architect.

All materials used in the outdoor spaces are natural, and if not directly taken from the land itself, they were brought in from the nearby villages and locations such as reuse of stones for both construction and retaining walls ((terraces, paths, retaining walls, curbs, flower boxes) and reuse of wooden telephone posts for door and window lintels

The design of the internal spaces is climate responsive taking into consideration local temperatures in winter and summer; wind direction for cross ventilation, solar exposure and orientation for shading and natural day lighting. The design enables to optimize energy requirements and thermal comfort. For instance, the wall thickness allows for cooler spaces in the summer heat and warmer in winter.

The materialization of the property lines is consistent with the identity of the place. The property is not fenced; on the contrary, an agreement was made with the adjacent Horch Baakline (i.e. Forest of Baakline) municipality to protect natural habitat and to allow wildlife animals and people (e.g. trekkers) to move freely between the two forests.

Within the site, soft mobility solutions are privileged (footpaths, pedestrian access, bike paths) rather than only motorized roads

Waste collection sorting bins including composting and recyclable materials are planned to be harmoniously designed with the site and in compliance with regional specificities.

In order to respect social equity, the ergonomics and accessibility of all places to be taken into account. For instance, in the project design, we have embedded responses for at least two types of disabilities among the four impairments: visual, auditory, mental and motor.

If during implementation, we experience significant technical difficulties in meeting the criteria of motor impairment in its wide magnitude, we will deliver what can be delivered and we will comply with the requirements for visual and hearing impairments. In other words, our design is made to make all areas accessible to customers;

- Obstacles halfway or at head height have been eliminated; Sharp edges are removed to reduce the impact in case of accident.
- Furniture heights are suitable for children and short people
- Wherever possible, steps and disruption levels are restricted to facilitate travel for all.
- Stairs are constructed with safety requirements
- In some of the units are designed to be wheel-chair friendly: the free passage of doors is sufficiently large (above 80 cm) for the passage of a wheelchair and, above all, simplify moving in all cases of disabled

- All glass doors show signs of contrast (the lines are installed at 1.10 m and 1.60 m high).
- The entry gate will be installed with an automatic opening and closing device to operate it without leaving the car.
- The difference in level between indoor and outdoor spaces (terrace, balcony) never exceeds 2 cm

Engaging with local stakeholders

Although not formalized in writing because Lebanon and its mountains remain informal verbal communication land, we invested time to identify and prioritize the stakeholders; assess their interests and concerns; and consult them inclusively early enough to get their input in our decision-making process.

We do not have yet a formalized grievance management process however, we have established accessible and responsive means, such as regular visits between the project owner Ramzi Salman, his team and the local stakeholders to raise concerns and grievances about the project and take preventive and corrective measures wherever necessary. Interaction with local communities is occurring on regular, almost daily basis and information is disclosed without any censorship.

We are conscious that certification schemes require more formalized approach, minuting stakeholder consultation and participation meetings and most likely, over the course of the project life, we will do it, but we want to keep the verbal interaction ongoing.

5. Loan Request Summary Sheet

[The provisional cost estimate of the project must be clearly presented. A detailed bill of quantities (BOQ) of the proposed project is to be provided in this section]

[The total amount of loan request as per the percentage corresponding to the certification rating must be clearly presented in this section]

[Energy savings solutions and environmental benefits solutions should be presented separately as per the table shown below]

BILL NO. 2
ARCHITECTURAL & MEP WORKS
BKERZAY VILLAGE

SUMMARY

	<u>Total USD</u>
Division 1 General Requirements	180,000.00
Division 2 Site Works	1,283,386.67
Division 3 Concrete Works	641,650.00
Division 4 Masonry	657,255.88
Division 5 Metal Works	120,000.00
Division 6 Woods and Plastics	81,100.00
Division 7 Thermal and Moisture Protection	57,592.22
Division 8 Doors and Windows	254,820.60
Division 9 Finishes	556,597.00
Division 10 Specialities & Equipment	1,430,000.00
Division 15 Mechanical	159,205.64
Division 16 Electrical	1,596,038.10
Provisional Contingency 5%	350,882.30

BILL NO. 2
ARCHITECTURAL & MEP WORKS

General Summary

USD 7,368,528

[Name of the Project]

[Client's Signature]

The detailed budget breakdown is available in Appendix Hodema enclosed to this document

This part of the document will be extensively filled in the Yellow Template of LCEC

Ref. No.	Brief Description of the Energy Solution	Cost Estimate (USD)
1		
2		
3		
4		
5		
	TOTAL AMOUNT OF THE ENERGY SOLUTIONS (USD)	

Ref. No.	Brief Description of the Environmental Solution	Cost Estimate (USD)
1	Energy	tbd
2	Reduction of GHG/ Transport	tbd
3	Water*	6.500.000L/year
4	Waste	tbd
	TOTAL AMOUNT OF THE ENVIRONMENTAL SOLUTIONS (USD)	

(*) This saving number on water does not include the estimated saving on water used in kitchen, hammam and pool.

Our estimates indicate that the PV will generate 131.000 kWh/year from solar. Within this short time frame, we were not able to calculate the estimate saving on energy. We know that currently EDL delivers 60 A and we have on site 2 generators (one of 55 KVA and one of 27 KVA)

Waste – to be determined

Reduction of GHG will come from different sources (e.g. absence of CFC in the refrigerant systems. Etc.) Currently, we have already reducing our GHG emissions by getting our materials from close locations (60km maximum distance)

6. Registration Confirmation Letter (LEED/BREEAM)

[This section should include the proof of project registration for certification from the BREEAM or LEED registration team]

Action : Eco certification

7. LEED/BREEAM Score Cards

[This section should include the information sheet filled by the general information, the project information, the needed documents, and comments. The project checklist must be provided presenting the targeted and non-targeted points or credits, the certification level being indicated]

The table below shows the results of the current appraisal of the proposed “Name of the Project” project:

<i>Technical Area</i>	<i>Points achieved</i>
<i>Management</i>	
<i>Energy</i>	
.	
.	
.	
Total	

[Add additional rows for additional technical area as needed]

Action: Eco-certification

8. Technical Report

[This section should include the detailed technical sustainability report including the technical details of the proposed measures, the different development specifications and actions required and projected for the whole project. This report must be describing the strategy to achieve the expected rating]

[Several sections describing the technical aspects of the project will present the most important information as presented below]

In 4.2, we have deliberately presented all the actions that are undertaken to achieve BREEAM certification and their status (Done/Ongoing)

We will enclose:

- The Yellow template developing the energy study details even if it is not the final version
- The technical drawings
- The drip irrigation system drawing indicating how grey water is treated and reused for irrigation purposes.

8.1 Envelope

[Brief description of the building's envelope must be presented in this section according to a well known mentioned baseline. An example of the efficient building envelope is the higher thermal and acoustic isolating properties]

- We have appointed an acoustician (Pierre Geara) to study the acoustic performance of the construction.
- We intend to mandate Eco-certification to conduct a thermo-modelling analysis
- Both reports will be available post-audit.

8.2 Technical

[All tips that will be taken into account during the development of the project in order to reduce the energy consumption and increasing the energy efficiency of the facility must be presented clearly in this sub-section. Some technical solutions are high efficiency boilers, renewable energy, energy efficient lifts, high efficient lighting, low water consuming sanitary fittings, wastewater treatment plan, etc...]

A. Energy from renewable sources - Solar Photo Voltaic

Rationale

Bkerzay's ambition is to be an environmentally friendly site. Photovoltaic solar panels have appealing characteristics in the process of converting light into electricity.

The advantages we identified before making our choice are:

- A relatively high conversion efficiency giving the highest overall conversion efficiency from sunlight to electricity yet measured.
- No pollution while producing electricity, no fuel consumption to operate
- Ability to operate at moderate temperatures
- No risks of leakage as they don't contain fluids or gases

- Have a high power to weight ratio making them suitable for roof application, amenable to on-site installation i.e. decentralized if needed;
- Modularity permitting a wide range of solar-electric applications and wide-power handling capabilities from micro watts to megawatts.
- Have rapid response, achieving full output instantly.
- Require little maintenance if properly manufactured and installed.

Description of the system

The PV modules will be used to convert sunlight into electrical energy. A battery storage will be installed to enable power storage and a solar charge controller will be installed to maintain the batteries in proper charge level and protect them from overcharging. Auxiliary energy sources will be EDL and two other diesel generators.

The power supply decision matrix has been designed in a way to avoid totally using generators and thus, getting away from fossil fuels.

The available sources of energy are in order of priority: Solar, EDL and Generators.

The solar system (and EDL) can charge the batteries, however, EDL is only used to supplement any missing energy from the sun.

The sequence of energy supply is as follows

5. The solar system simultaneously provides power supply through the batteries and charges them. It takes 6 hours to fully charge the batteries from zero to one hundred percent.
6. In the case of solar energy not being sufficient, the system will compensate for this gap via EDL power (e.g. if the batteries are less than 50% full and there is no sun, we will take the difference from EDL)
7. If EDL and Solar energy are both unavailable, the batteries can last for six to seven hours, which by that time, EDL will most likely be available again.
8. If after this 7 hours slot, EDL is still not available, generators will be used

It is estimated that we will only use the generators for 10 minutes per year

Technical and commercial rough assumptions – work in progress

We have decided to use e24 solutions to supply the site with Solar Photo Voltaic systems

B. Domestic hot water through solar heating system

NaturEnergie will be the chosen supplier for this system

Domestic hot water will be provided through solar systems to all habitable plots.

1. The Chambrettes, Hammam et Pool circuit.

This circuit has three sub-circuits for the hot water. Only two of these sub-circuits work simultaneously. Their activation is very much dependent of the presence of users at the place of consumption. In other words, the design is done in a way to make the hot water available to the place where there are users needing it

The water storage is divided into two tanks and stored in series, ensuring that the hot water outlet is always from the hotter tank since the solar system will heat the tanks and reverse circulation of the domestic hot water.

The solar system will start heating the Chambrettes hot water tanks until a preset temperature. When the set temperature is reached, the system stops heating and starts heating the Hammam hot water tanks, also to a pre-set temperature. Once this temperature is reached, the system will go back to the first priority (i.e. Chambrettes) and then to the pool.

The back up is electrical power.

2. Hot water for Houses and Maisonnettes

Each plot has its own hot water circuit, its own solar panel and its own hot water tank. The system captures the solar energy and heats the water.

Rough Assumptions and Estimates– work in progress

Operational assumptions are:

Solar energy will be used to ensure the energy needs of Eco-Bkerzay in low season and the first five days of the week. Shall solar energy fail to fulfill the total needs in terms of water heating and chambrettes heating, we will supply the differential of energy required by generators. During summer, while heating is off in the chambrettes, we will use the available solar energy to heat the spa (Hamman and Pool)

System design – work in progress	
PV system rating (estimated array rating)	87.68 kWp
Estimated battery storage size	492.4kW
Total energy provided by the PV system (kWh/y)	131000kWh/y
Estimated costs and payback	
Estimated installed cost of PV system in USD	290000 \$
Estimated payback period expressed in years	6.87 Years
Estimated operational use	
Estimated Energy use on site (kWh/year) high season1 st May –	Not yet available

30 th Oct	
Estimated Energy use on site (kWh/year) low season (1 st Nov – 30 April)	Not yet available
Estimated Savings	
Estimated annual energy savings in kWh/y	Not yet available
Estimated annual cost savings in USD/year	Not yet available
Estimated CO ₂ avoided in kilograms	Not yet available

Important comment:

We have started filling the yellow template of LCEC describing the energy efficiency and consumption process. Our operational assumptions will be reviewed, as well as our technical assumptions. Thus, the commercial proposal will be reviewed accordingly. After a year of operations, the technical proposal will be fine-tuned.

B. Wastewater treatment system

We are treating wastewater in two ways

- **The physical treatment** of wastewater occurs through sedimentation and filtration. Basically, that will mean letting the wastewater pass through zones where the velocity of the water is so low that the heaviest particles will precipitate.
- **The biological treatment** is based on the use of various types of micro-organisms which play a major role in the purification of wastewater. The biological treatment can be separated based upon the form of contact between the wastewater and the oxygen in the air. It will be an aerobic treatment through ponds with natural aeration, maturation ponds or mechanical aeration. The aerobic ponds are widely accepted due to their simplicity and cheap construction, their simple maintenance and good treatment efficiency in warmer temperatures.


Our aim is to manage at best the wastewater in order to create the conditions for water to be potentially used for irrigation (e.g. by implementing a filter of grind and sand where contaminants get trapped further down the road)

C. Water consuming solutions

Water is a scarce resource and our approach has been to save water as much as possible.

The specifications we chose so far allow us to save litres of water versus baseline

Component	Performance						Unit
	Base	1	2	3	4	5	
WC	6	5	4.5	4	3.75	3	Effective flush volume in litres
Hand wash basin tap	12	9	7.50	4.50	3.75	3	Litres/min
Showers	14	10	8	6	4	3.50	Litres/min
Kitchen Tap	12	10	7.50	5	5	5	Litres/min
Grey water /rainwater system	0%	0%	0%	25%	50%	75%	% of WC flushing demand met using recycled non potable water
Kitchen tap for pre-rinse	10.30	9	8.30	7.30	6.30	6	Litres/min
Waste disposal unit	17	17	0	0	0	0	Litres/min
Commercial sized dishwash	8	7	6	5	4	3	Litres/rack
Commercial sized industrial sized washing machine	14	12	10	7.50	5	4.50	Litres/kg

Chosen specifications 

Assumptions on water consumption using conventional (baseline) fittings are:

On average, a hotel consumes 500 liters of water per guest night (online reports)

Based on the calculations we did during the meeting per guest night:

- 3 toilet uses (6 L each) = 18 L
- 5 hand washes (1 min each at 12 L per minute) = 60 L
- One 30 minute shower (14 L per minute) = 420 L

Which means a total of 498 Liters per guest night

As such, we can adopt an average of 500 liters per guest night

Therefore:

- At full capacity (assuming 100 guests per night), total consumption would be 50,000 liters per night
- At minimum capacity (assuming 50 guests per night), total consumption would be 25,000 liters per night

As such, we can say that the average consumption using conventional fittings is around **38,000 liters per night**

Assumptions on water consumption using chosen energy-efficient fittings:

Based on the calculations we did during the meeting per guest night:

- 3 toilet uses (3 L each) = 9 L
- 5 hand washes (1 min each at 3 L per minute) = 15 L
- One 30 minute shower (8 L per minute) = 240 L

Total of 264 Liters per guest night - let's adopt an average of 260 liters per guest night

Therefore:

- At full capacity (assuming 100 guests per night), total consumption would be 26,000 liters per night
- At minimum capacity (assuming 50 guests per night), total consumption would be 13,000 liters per night

As such, we can say that the average consumption using energy-efficient fittings is around **20,000 liters per night**

Based on the above, we can say the average water savings by using energy-efficient fittings is **18,000 liters per night, thus approximately 6,500,000 liters per year**

Our assumptions and estimates do not include the Kitchen, The Pool and the Hammam. They are based only on the lodging numbers but will be extrapolated in due course and water efficient fittings will also be chosen to equip these areas of the construction

D. Lighting system

We have taken the decision to use Light Emitting Diode (LED) wherever we have lighting, with a few exceptions such as maintenance room and food inspecting area. We are now discussing different options with the External Lighting company in order to determine which option will provide the most advantages, including the environmental friendly ones while being the most cost-effective.

We will share with the external lighting prospected suppliers the BREEAM certification requirements, in order to align ourselves, as much as technically and commercially feasible, within the construction zone, to meet the lighting requirements of green buildings.

We will brief the lighting company to ensure that the proposal they will make specifies lighting in accordance with CIBSE Code of lighting the luminance (lux) levels in all internal building relevant areas and apply zoning and occupant controls for internal lighting. We have pre-defined the following specifications for internal lighting that we will discuss with lighting suppliers

- Reception desk 300 lux
- Corridors and stairs 100 lux
- Bedrooms 50-100 lux
- Bar, Restaurant, Cafés: 50-200 lux

- Retail store 150 lux
- Food storage area 150 lux
- Food product inspection (Kitchen) 1180-1400 lux
- Bulk ingredients storage 320-430 lux
- Maintenance 750-860 lux
- Entrances and Exit 200 lux
- Car park in rural area 10 lux
- Roadway village 15 lux

External Lighting BREEAM requirements are

We are sending this appendix to the lighting company.

External lighting location	Light fittings measured in lamp lumens/circuit watt, when		LED luminaires where the lamp is integral to the fitting measured in luminaire lumens/circuit Watt	
	Color rendering index (Ra) >=60	Color rendering index (Ra) <= 60	Color rendering index (Ra) >=60	Color rendering index (Ra) <60
Dwelling access, pathways	50	60	40	50
Car parking, associated roads, Flood-lighting	70	80	55	60
	Lamp wattage >=25	Lamp wattage <25	Lamp wattage >=25	Lamp wattage <25
Signs, Uplighting	60	50	50	50

Color rendering index (Ra) is a measure between 0 and 100, of the ability of a lamp to reproduce the color of objects in comparison to their aspect under a natural or reference source of light. An incandescent source has a Ra of 100 and a low pressure sodium source of Ra of 0

8.3 Materials

[Mentioning the type of materials to be used on site is very advantageous to be mentioned in this sub-section. Environmental impact of the materials, waste management, reduction of construction site impacts and recycling must be evoked in this sub-section]

8.4 LEED/BREEAM Pre-Assessment

[This part is dedicated to the pre-assessment estimate results; the targeted credits across each category should be presented in this sub-section. The intent behind implementing each credit, the correspondent plan of action and scores must be also provided]

