

---

## ***SECTION FOUR***

### ***DEVELOPMENT ALTERNATIVES***

---

#### **4.1 Introduction**

In analyzing the environmental impacts, there are usually two or more development alternatives to consider for each issue. The alternatives may encompass a wide range of consideration and can represent a choice between the construction and operation of a development and the non-development option.

With this in mind, the general principle involved in identifying the option(s) of the proposed development is to ensure that the option chosen, which may be the 'non development option', would result in optimal social, economic and environmental returns. In effect the option chosen should corroborate well not only for the developer, but also for the environment and stakeholders in the area.

#### **4.2 The 'No Action Alternative'**

The analyses of alternatives compared results in the selection of the preferred alternative for development based on environmental, technical and economic grounds i.e., the option with the highest cost benefit factor, the most technically feasible and with least residual impact is identified as the preferred option.

The "No-action" alternative or non development option is usually discussed as an option in the EIA process. However, this alternative is difficult to consider as a viable option due to the pre-existing investments which have been incurred by the developers. One of the most costly investments that are normally incurred prior to project approval is land purchase.

In some instances, certain companies make arrangements for land purchase after project approval, after the EIA process. However, there are circumstances when land purchases have been conducted prior to the EIA preparation, thus the application of the EIA discussion of alternatives cannot include the options for alternative project location, as is the case of the proposed project.

The initial investments already incurred were the primary reason for the no action alternative not to be found economically feasible. This option would result in the loss of investment capital, and the loss of economic opportunities such as employment generation, revenue and foreign exchange generation etc. However, the EIA as a planning tool is considered critical for the determination of potential negative impacts, mitigation measures and as an important part of the process of identification of best technology for the project.

However, beneficial results of non-development options cannot be ignored. These benefits include ecological and environmental preservation, and the reduction of stress to existing flora

and faunal assemblages. One of the primary habitats that continue to be degraded and lose its ecological characteristics is the mangrove forests, which is an important vegetation type of the coastal plains of Belize. Mitigation measures addressed elsewhere, call for the clearing of this vegetation by selectively identifying important plants within the zone of impact and ensuring their preservation.

The government is under pressure to improve the standard of living of the people. To this end tourism development has been earmarked as one of the most promising avenues to growth. As always the more relevant issue is how to steer this growth in a sustainable direction so that it will do the most good for all the local and national stakeholders. The question then becomes whether the approach to the project is sustainable socially, economically and environmentally and if not how could it fulfill these higher principles.

### **4.3 Technical and Economic Analysis**

For a project to be viable it must ensure that the development is technically, economically and financially feasible. Cost Benefit Analysis (CBA) of projects of this nature often compares the economic feasibility of all options. CBA is concerned with an analysis of cost and benefits for the economy as a whole. The objective is to know the difference between social benefits and social costs.

During the analysis, financiers also looked at the need to develop the site using the most practical technology bearing in mind the objective of maintaining as much as possible, the ecological integrity of the area and the habitats it supports.

Technical and economic feasibility is then weighted against environmental /ecological degradation. Consideration of technical and economic analysis included consideration for population density, suitability of site, accessibility, and protection against natural disasters, construction costs, recreational benefits, job creation and revenue generation.

### **4.4 Conceptual Strategy for Alternative Analysis**

The alternatives to development for the proposed project are outlined in the rationale and the strategy approached of the particular alternative. This new approach is delineated by the different options that are available for discussion and the magnitude and scope of the related impact. The following sections summarize the different development alternatives and their related impacts to the receiving environment.

#### **4.4.1 Potable Water Alternatives**

Considering the different options for potable water sourcing, the proposed project has opted to consider three development alternatives. These three options will be looked at from all angles including their related impacts on the receiving environment. Table 4.1 summarizes the options evaluated for the proposed South Beach Belize development. Incorporated into the options are also the associated components that will be required to be installed. In addition, the several

treatment methods that will be implemented by each option will be explored. These alternatives are in response to the sourcing of potable water as defined in Section 3.2.3 and Table 3.4.

### *Source Alternatives*

The required volume of 296,850 gallons/day (See Table 3.2) will be primarily met by water desalinization as described previously. Since the island has limited resources in terms of water supply, various other potential sources were investigated to supply or supplement the primary source. Therefore in considering the existing developmental constraints, the following alternatives were examined.

- *Belize Water Services(BWS)*

Belize Water Services Limited is presently the island's supplier of potable water and to the country on a whole. This company presently purchases potable water from Consolidated Water; a Cayman based company that runs the caye's water desalinization plant. BWS is presently servicing the surrounding areas with potable water. The distribution lines are presently 1.25 miles north of the proposed project, along the existing coastal road. As development progresses, it is anticipated that this distribution line will be extended to the project site with cost either be borne by BWS or the developer.

According to the BWS manager at San Pedro, they will have no problem meeting this new demand as presently the water suppliers are increasing their capacity for R.O. water production for BWS.

- *Rainwater Harvesting/Wastewater Recycling*

Rainwater harvesting is the most inexpensive and environmentally safe method of obtaining potable water for the project site. Once stored, either in cisterns or in tanks constructed as an integral part of a building or resident, the water can be made potable by disinfecting it with an approved disinfection method. This method may include ultraviolet radiation along with ozonation and chemical treatment, specifically chlorine. Once harvested, the water can be distributed to either a building or to a central tank for pressurization and redistribution. This would ensure that the residents would be able to have access to 'running water'.

Approximately 207,975 gallons (70 %) of good quality treated and post chlorinated effluent will be produced by the treatment plants. This recycled water will be pumped on a demand basis into dedicated distribution lines for flushing of toilets only. Some 75,500 gallons per day will be required for this purpose. The remaining volume will be use for the irrigation of the relatively extensive lawn of the residential lots.

It is anticipated that the harvested rainwater along with wastewater recycling would be able to partially suffice the project if properly collected and its usage monitored and regulated. The sources will have little impact to the receiving environment, and is considered a prime candidate for the proposed project.

- *Importation*

Importation of water would only occur as a last resort if the desalinization plants were to malfunction. Imported water would be pumped into the reservoir system that will serve as catchment for the rainwater. This method would be restricted and limited to important areas of the development only.

**Table 4.1** Summary of Alternative Potable Water Sources

<b>Option</b>	<b>Source</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
1.0 BWSL –Water Desalinization Plant	BWSL	Supplement the potable water demand for the proposed project, or be sourced as the primary option.	Install the necessary distribution line to project site and eventually hooking up to the development’s own distribution system.	Installation of pipeline may be too costly. Demand required by project may limit the production rates and hamper other areas of the caye.
2.0 Rainwater Harvesting/Wastewater Recycling (Treated Post Chlorinated wastewater).	Rainwater Harvesting and Wastewater Treatment Plant (BESST System)	Harvest rain water from the seasonal rains thereby reducing the dependency on the proposed method and reducing the overall energy cost. Recycling of treated wastewater for flushing of toilets only will reduce the overall water demand on the primary source.	Construct cisterns as an integral component of the construction of buildings or placement of cisterns near the residential houses. Dedicated color coded line will be used for flushing of toilets.	Water may not suffice proposed project, cross contamination of potable water sources due to its wide distribution network. Contamination of land due to leaks, and plant malfunction. Venture may be perfect for individual residents who wish to complement their primary source.

Option	Source	Rationale	Strategy	Impacts
3.0 Barging water to the project site from Belize City and neighboring communities.	BWS, Belize City	Importing almost 100,000 gallons of water on a daily basis requires a dedicated service barge or tank system for this purpose.	Barging of water from a dock to dock location, employing pumping mechanism for loading and unloading along with storage tanks on project site.	Barging to project is too far and would be expensive considering fuel and transportation costs. This method is prone to accidents at sea.

#### 4.4.2 Wastewater Treatment Alternatives

It is anticipated that the proposed development will take into consideration the possible wastewater treatment alternatives described in Table 4.2. As mentioned previously, the project chose a package system with secondary treatment capacity (See Section 3.3.5) such as the BESST or its equivalent for its phase one development. Based on this, various alternatives were sought and therefore the project will consider the different criteria that will be influencing the proposed alternatives. The various options considered made the following assumptions:

**Option # 1 “Individual Treatment Systems”.** This system assumed that each separate infrastructure unit would consider installing individual units with the same secondary and tertiary treatment capacities. However, these systems would be individually owned instead of owned collectively.

**Option # 2 “Household Systems”.** This option considered using Individual Septic Tank Systems, with appropriate leach fields.

**Table 4.2** Generic Evaluation of Wastewater Treatment Alternatives

Option	Rationale	Strategy	Impacts
1.0 ‘Individual Treatment Systems’	Individual treatment units in the buildings would treat waste more effectively and efficiently, lower impacts to receiving environment by means of secondary and tertiary treatment. This option may be applied for the first phase of development	Individual connections with mechanized pressure systems. Individual reservoir for treated wastewater and subsequent disposal	Medium environmental impact due to volume of projected wastewater and nature of the receiving environment. Installation of excessive force mains making it vulnerable to leaks and system malfunction, installation of numerous systems to

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
			cope with projected wastewater generation and too many sampling points. Effluent might not meet DOE requirements.
2.0 Household Systems	Individually operated system can collect building's waste water and offer moderate treatment – Dimensions would vary according to number of wastewater generating sources	Gravity feed system involving leach or tile field disposal. Plumbing and gradient considerations.	Not acceptable since area is in contact with the marine environment which influences the functionality of 'soak away' to reduce nutrients and fecal pathogens...Possible leaching of effluents into sea which threatens both human health as well as threat to the environment from eutrophic or nutrient enrichment influences.

#### 4.4.2.1 Disposal of Treated Wastewater

It is inevitable that wastewater will be generated as a result of the operation of the proposed development and for any development for that matter. In considering the magnitude and scope of the proposed project, several disposal alternatives were discussed with the consultancy team and a few viable options were examined. The various options considered are summarized in the following:

**Table 4.2A** Evaluation of Treated Wastewater Disposal

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
1.0 Diffusion into the mangrove reserve of Zone 7 of the proposed development.	The mangrove of the reserve would 'further' polish the treated wastewater before entering either the Grand Canal network or the lagoon area.	Collection and subsequent discharge of the treated and post chlorinated effluent into the reserve. Discharge pipes would convey the effluent from the package plant's to a diffuser that will disperse the effluent in the reserve	The effluent waste stream may have elevated levels of chlorine that is toxic to most aquatic organisms. The quality of the effluent will vary according to the package plant's operation. Furthermore erosion may take place

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
2.0 Diffusion into the Grand Canal Network for dissolution	Rapid dispersal of the treated wastewater into the proposed waterways.	Collection and subsequent diffusion of the treated and post chlorinated effluent into the canal system.	Chlorine concentration in wastewater may vary from time to time thereby affecting the aquatic organisms. Moreover, potential eutrophication problems if monitoring of wastewater quality is not followed.
3.0 Irrigation purposes only	Rapid recycling of treated wastewater and subsequent dispersal of wastewater volumes	Install irrigation mechanisms in most areas of the development	Treated wastewater volume is too high for intend use. Additional usage must be employed (especially during the rainy seasons)

#### 4.4.3 Solid Waste Disposal Alternatives

In discussing the alternative analysis for the project’s solid waste disposal methods, the development considered and evaluated two feasible disposal options. This approach is important in considering that this action would eliminate the dependency of having a single disposal method, especially considering the nature of the operation, location of the project and nature of the receiving environment. In any event, the alternative options are always important in analyzing the true ‘benefits’ of employing the primary or chosen option.

##### *Disposal Alternatives*

Due to the pre-existing conditions at the local and designated solid waste disposal sites, the alternatives for solid waste disposal were limited to two as listed in the following. It is important to mention that these disposal alternatives are not limited in scope.

- ▶ **Option # 1**, Use of existing dumpsite with some classification
- ▶ **Option # 2**, disposal of all waste to project’s dumpsite

Table 4.3 summarizes the disposal alternatives for the proposed residential subdivision project considering the following elements:

- The first option was to consider garbage separation (organic and inorganic) with the carting out of the inorganic (combustible/non combustible) waste to the San Pedro dumpsite after relevant approval.
- The second option considered the disposal of the solid waste with some classification (organic and inorganic) at a site within the project area.

**Table 4.3 Domestic Waste Disposal Option**

<b>Option</b>	<b>Source</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
1.0 Use of the existing dumpsite with some classification	Construction and operation of proposed project at 25 -100 %	Utilize compost for project's benefit and discard inorganic waste at nearby dumpsite.	Judicious classification of waste into organic and inorganic along with appropriate daily collection and disposal.	Organic waste can be used on site for composting. Usage of the dumpsite would pose additional environmental impacts and hazards to the existing pressure.
2.0 Create internal facilities for the collection and disposal of generated solid waste.	Construction and operation of proposed project.	Separation of 100 % generated waste from project site.. Utilization of waste to fill low lying area of the project site	Daily collection and disposal of waste. Provisions for adequate containers for waste collection and transportation to minimize leachate spills and/or leaks.	Significantly impact the receiving environment A disposal site on the project site would contaminate the site with pests and diseases as well as the need for adequate land.
				Water contamination can also occur given the nature of the project location. Moreover, impacting a new site on the property would threaten the receiving environment.

**4.4.4 Energy Generation Alternatives**

Development alternatives are an important concept in any environmental impact assessment. As part of the alternative analysis for energy generation, the proposed project will explore its only available alternate source of energy that will suffice or supplement the energy demand. This approach is essential considering that this would simply eliminate the dependency of having a single source of energy. In addition, this assessment would promote the usage of new and developing technologies. The following section summarizes the source description along with their respective impacts.

**Table 4.4** Alternative Analysis for Energy Generation

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
1.0 Diesel Generators	In view of a continuous energy supply over an extended period of time, South Beach Belize is considering the use of diesel generators as its single or supplementary source of producing electrical energy for the proposed development. This option was chosen due to the spate of recent power outages and the need to satisfy the residents and customers.	The developer will therefore utilize diesel generators to produce and supplement the energy demand. The sizing of the generators will be an important economic investment particularly considering the project investment return. Generators will be purchased according to the project's energy demand.	Generators tend to create excessive noise pollution as a result of their operational process. Pollution risk due to accidental spill from fuel and oil storage tanks can also occur. In addition, air pollution and combustion fumes can pose serious health risk to the humans and contaminate the air over prolonged operation.
2.0 Combination of Generators with Alternative Energy Sources	Reduce the overall dependence of the primary option. It is anticipated that this option can be applied at whatever point along the development to reduce the project's consumption.	The proposed project plans to install wind turbines and solar panels where appropriate to compensate and supplement the energy demand which can either be from BEL or mechanical generated.	The potential impacts would be primarily from the operation of the diesel generators. Alternative energy impacts are limited and restricted to the life span of the solar panels and storage batteries as well as the dimensions of the wind turbine blades, its impact on the migratory bird population

**4.4.5 Dredging and Land Reclamation**

The proposed development will require dredging and excavation activities for land reclamation process that will alleviate some portions of the project site presently inundated by the tides. In considering the development alternatives for the dredge fill, the following table summarizes the siting and placement of the coastal burrow pits that will be utilized for land reclamation processes, road construction and infrastructure development such as parks and playgrounds.

**Table 4.5** Dredging Activities

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
<p>1.0 Locate main burrow pits closer to project site or nearer to the shoreline to increase shore area depth for the anchoring of boats and other marine vessels visiting the area.</p>	<p>To obtain fill material and transport it to the project site as quickly as possible without the setbacks and additional mitigational measures</p>	<p>Use of suction dredging machine along with a ‘cutter head’ to remove sediments from the sea floor. Use of pontoons to support pipeline network, construction of spoils containment areas.</p>	<p>Primary need for the dredging is to source material for reclamation purposes. Anticipated impacts would require successful mitigation measures to be in place as described in Section 6.3.1. In addition, this option would not yield the required volume necessary for reclamation.</p>
<p>2.0 Locate Access Channel burrow pit near the Laguna de Boca Ciega.</p>	<p>To obtain fill material for land reclamation purposes, especially Zone 1 of the proposed development.</p>	<p>Use of suction dredging machine along with a ‘cutter head’ to remove sediments from the sea floor. Use of pontoons to support pipeline network, construction of spoils containment areas.</p>	<p>Dredging activity would ‘interfere’ with the tourism activities. The activity would also compete for material with the present dredging companies commissioned to dredge the area. In addition, the Grand Canal network would not have any access to the sea from that location. Furthermore the entrance would be blocked and limit water circulation within the canal system.</p>
<p>3.0 Transportation of fill material from neighboring areas inland sources if possible.</p>	<p>Reduce overall dredge related activity impacts on receiving environment</p>	<p>Selection of inland source with transportation of material by trucks and barge respectively.</p>	<p>Minimal impact, however the venture would be extremely expensive and would not be of native materials that are required for project.</p>

#### 4.4.6 Canal Design Alternatives

As discussed previously, the Grand Canal network will form an integral part of the proposed residential subdivision development. The proposed canal network has several other alternatives that can be used but would not offer the same flushing effect as the proposed design. Moreover, the design covers areas on the project site that consist of lagoons and swamp lands. The following section discusses several other canal design alternatives to comply with the project's TOR.

**Table 4.6** Canal Design Network

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
1.0 Proposed canal network to flow semicircular in relation to the lagoon shoreline	Locate lots along canal's edge thereby offering a few lots and expensive rates.	Offer adequate flushing of the canal with the aid of the naturally occurring cycles and the addition of paddle aerators in the canal to further aid in the flushing effect.	This design would not take advantage of the naturally occurring mangrove swampland thereby requiring more fill material for reclamation, especially since the project site is inundated by water. This volume of material required would be huge considering that the peat that will be extracted from the proposed canals would be less. Hydrologically, this design would not allow for the proper draining of the land once reclaimed.
2.0 'L or T' shape canal through the development	Locate fewer lots along the canal's edge	Conserve areas as much as possible without disrupting the natural environment	Designs would cause project to require more fill material than is presently required. Also the designs would not promote the required flushing effects water circulation of the canals. In addition, the development would suffer huge investment loss as these canal lots will be the selling point of the proposed project

<b>Option</b>	<b>Rationale</b>	<b>Strategy</b>	<b>Impacts</b>
3.0 No canals	Minimize impact to the receiving environment by not excavating canals	Conserve areas as much as possible without disrupting the natural environment	Proposed project would require additional fill and would not offer a variety of economic investments. Hydrologically, the canals would necessitate the need for proper drainage, especially during storms and hurricanes.

#### 4.4.7 Siting and Placement

The proposed areas will be developed on the zones designated by the project proponent in phase 1 in order to maximize their investment returns. The eventual siting and placement of the overall development and its associated components will play an integral part in the decision making process and more so in this Section.

The general principle involved in identifying option(s) to the proposed development is to ensure that the option chosen, which indeed may be the ‘non development’ option, would result in optimal returns in social and environmental capital: In other words the option chosen should bode well not only for the developer, but also for the environment and stakeholders in the area and by extension the nation. The various options are detailed in Table 4.7 below.

**Table 4.7: Options for Development**

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Overall Development	Location of development phases is consistent with the investor’s development policy for optimum investment return. Location is also consistent geographic occurrence of primary resources.	Other areas would jeopardize investor’s development plan as outlined by the owner. In addition, possible related impacts can be augmented.	The project site in its predevelopment state has no economic impact, thus non-development option means potential loss of capital investment and revenues.

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Siting of Primary Development Infrastructure	Chosen site has advantage in that all the necessary resources can be reached to the site. This makes it ideal especially considering that fuel for the emergency generators will be required on a regular basis.	The other location would be Zone 2, but considering the residential nature of the zone this would not be appropriate.	Non-development option is not feasible given that the support services are the back bone and life blood of the overall development.
Development Zones	The size of the development zones is consistent with the overall development concept. These zones have been designed to accommodate the residential lots and amenities such as the casino, Summit, and Mall.	Placement of the casinos and mall on Zones 2 or 3 to allow for the accommodation of the residential lot.	The amenities are an important feature for the development's economic growth and overall sustenance, especially the casino and mall.
Recreational Areas	The placement of the parks and playgrounds are strategically placed for easy access and with the confines of the overall development. These recreational areas can be accessed by everyone visiting or residing on the project site. Moreover, safety is important.	The placement of these areas can be enhanced by the substitution of designated lots for recreational areas in order to better serve the residents and general visiting population	The placement of these recreational areas other than the ones mentioned would jeopardize the development concept and possibly affect the economic investment.
Siting of the Hotel and Casino	Location would maximize investment returns and would utilize 'less green areas'.	Other areas can accommodate the hotel and casino but would pose several social and economic problems.	Development is necessary for capital investment and revenue generation.
Siting of Overwater Cabañas	The proposed location is adequate considering the tranquil environment and good water quality of the Laguna de Boca Ciega. Also, the cabañas are well protected by the project.	The other location would be beside the Casino where it would complement the casino.	No- Action alternative restrict the development in exercising its developmental options. Loss of potential investment

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Siting of Beach	Site chosen is sandy and requires less reclamation. Beach is designed to expand the range of experiences to visitors to the caye...Thus this decreases the intensity of use and hence impact on any given facility of the proposed development.	Siting of Recreational Beach on southwest or east end of caye would require more reclamation, potentially greater cost to the environment and would be less aesthetic.	Non-development option would forego any revenue generation possibilities and would eliminate one of the primary attractions to site.
Sitting of Mall	Proposed location is adequate and centralized and would not interfere with the livelihood of the other residents who would reside on the project site.	Any other area would interfere with the residential setting of the zone that it will be located. Furthermore, this would minimize development and prolong investment return.	No –Action option would not maximize the potential investment return and would not support the intended interest.
Archaeological Site	Enhance the archaeological site to suite both the residents and the nation on a whole by excavating and reconstructing the site. In addition, the developer is implementing a buffer zone to further protect this archaeological site.	Removing of site to accommodate an amenities center. This is especially true considering that the site has never been thoroughly investigated and demarcated as a natural reserve by NICH.	By allowing the site to remain as presently conceived would be a an eye sore for the project, and would be a loss to society, especially considering that much of the site has been looted and robbed of its contents and identity on a whole.
Road Materials	Use of native dredged material for road construction purposes. This would further be compacted by heavy equipment and maintained by the intended residential subdivision management.	Other materials such as cobble stone, asphalt or white marl can be considered based on the density of the anticipated development.	Road construction materials must be native in order to promote the natural areas of the surrounding environment.

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Road Network	Proposed road network is adequate as it enables all the lot owners to access their property. Moreover, it enables both residents and visitors to access the different amenities on site as well as safe passage through these areas.	The other road network would be limited to some lots that cannot be accessed by sea. Therefore there would be two transportation means to the project site.	Roads are an important element in residential subdivision and general mode of transportation. Without these roads, the project site would not be accessible and therefore loss of potential investment.
Entrances to Project	The project will have two entrances. These will also double as exists for the proposed development. The need for two entrances is for easy access to the residential areas and amenities and to easy exist, especially during an emergency crisis.	The project site will have one main entrance that will serve as an exit area as well. This would allow for the surveillance of the traffic entering and leaving the project site.	The development requires roads to access the site. Without them the development would suffer serious losses as no supplies and potential investor would be able to enter the site.
Placement of Seawall	An interlocking concrete slab system will be used to line the canal network where appropriate. This is primarily due to the depth at which bedrock is encountered.	The placement of palmetto stakes to line the canal would be more of a natural preference, however, this system is not recommended as it would not be able to support the land mass and would be subject to rot.	It is essential that the canals be lined with some sort of protection. This is important in order to prevent erosion and losing land mass as a result of movement within the canal network.
Sidewalks/Bulkheads	Use of bulkhead as a side walk would facilitate the ease of transiting around the project site. It would also ease the pressure of the road system.	Construction of access paths through several passageways would impact the green areas and reduce aesthetic appeal.	No-Action alternative would leave the site without adequate access paths.

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Piers	Placement of the piers at the different strategic areas would facilitate the ease at which some of the residents and visiting population can access the project site.	Placement of a pier at the casino section only since this area will cater to water transportation mechanism.	Piers are an important component in the water transportation mechanism as it facilitates the docking of vessels.
Siting of the Service Station	Placement of fuel services at the Zone 4 would facilitate the servicing of marine vessels and would not influence the navigability of the canal networks. Anticipated response time to any hydrocarbon spill/leak can be quickly contained giving the ample space.	Placement of this service elsewhere would be unsuccessful considering the location of the service station and its docking services along with the depth of the canal network.	No Action on this alternative would be detrimental considering the distance between the caye and San Pedro, especially if the marina is to cater to small marine vessels
Siting of Security and Social Services	Placement of the social services (Police and Fire Stations) at proposed location. In addition this feature is an integral component of the overall development component, especially in considering today's security issues.	Placement of this service in other areas is also acceptable, barring any unforeseen or calamitous event delaying or preventing the police or fire service to respond adequately.	This service is essential and is also a vital part in the overall development. Residents and home owners ask for these types of services beforehand.
Siting of the Sports Complex	Placement of this complex is ideal given the outline and design of the anticipated project. It also complements the second entrance road to the development. In addition, the location is ideal when considering that the facility will be open to the public.	Placement of this complex within the development zones would utilize valuable land space. In addition, the complex would be seen as a 'security' issue especially since this complex will be for the residents and general public.	A sporting complex is an alternative facility to parks and playgrounds and it is focused mainly in attracting youths. Sports (basket ball, volleyball, football baseball, etc.) are essential for any youth's development as it merges the fact of team effort.

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non- Development)</b>
Siting of the Theme Park	Ideal location on which to put such an infrastructure. This activity is aimed at attracting the residents and general public who wish to enjoy the water sports without venturing into a boat. Location is also away from the development therefore minimizing any security risk to the subdivision.	Placement of this theme park where the sports complex will be located.	This is another recreation activity that would attract more potential lot buyers to the project site. In addition, this facility would complement the overall recreational activity.
Siting of Natural History Museum	This facility is to be located beside the proposed water theme park. This facility is designed to promote the Marco Gonzales site.	Placement of this facility near the Marco Gonzales site would complement the ruin.	Option 2 would take away any possible buffer zone assigned for this site. There is a need for a museum in order to promote the other archaeological site and the natural heritage of the greater Ambergris Caye
Siting of Nature Walk	Located in Zone 7, this nature walk further adds to the overall development of the proposed project. It is intended to conserve as much as possible the areas of concern as well as to promote the natural surroundings	No other Zone can accommodate such a facility.	The No-Action alternative would not conserve and promote the natural surroundings in which the project is situated.

#### **4.4.8 Ecological Development Alternatives**

In considering the ecological importance, mainly the conservation of the mangrove buffer zone, the proposed project will incorporate a few development alternatives that will address the issue of conservation and protection. The following table summarizes the ecological alternatives of the proposed project.

**Table 4.8** Ecological Alternatives

<b>Development Issue</b>	<b>Option #1 &amp; Justifications (Chosen Option)</b>	<b>Option #2 &amp; Justifications</b>	<b>Option #3 &amp; Justifications (Non-Development)</b>
Land Clearance	Land will be reclaimed as part of the overall development, particularly since much of the project site is underwater. A good portion will remain in its natural state as a sign of good stewardship.	Partial reclamation would reduce impact to project site and conserve the natural surroundings.	No-Action alternative would conserve the mangrove areas but would not allow for any development thus loss of about 120 million in potential investment.
Land Reclamation	Reclamation activities to be carried within scope of development plan. Carrying out reclamation activities in areas slated to be reclaimed	Partially undertaking such activity would not suffice the project needs for maximum investment returns and tidal rise influences	No-Action alternative would pose a serious risk the project site and to south Ambergris Caye, especially considering global warming and the effect of tidal rise.
Open Space	Availability of ‘open spaces’ within the confines of the project would facilitate the development with a reduced density value contained in the project areas.	Lack of the ‘open spaces’ would increase the human carrying capacity and increase the associated anticipated impacts related to domestic and tourism activities.	No-Action alternative would jeopardize the investor’s development policy for the caye in that there would be no buffer zone and no mangrove protection scheme in promoting ecotourism.
Reserve	This area is scattered in beside two Zones (5 and 8) and forms part of the zone in which it is found. The most important area is near the project boundary with Hol Chan. The other area is near Zone 8 where it will be used to limit that particular development.	Other areas could include Zone 6 and 7 where the proposed recreational activities are to be located.	No-Action development would be detrimental to the project as it would not promote conservation, preservation and good stewardship of the mangrove forest and swamp land.

## **4.5 Conclusion**

In accessing the comparative evaluation of the different development alternatives presented for the proposed project, the proponents plan to exercise these alternatives as seen fit. This of course, will fall within the scope of the overall environmental performance of the chosen 'alternative' and its associated impacts to the receiving environment.

In any event, it is necessary to layout the different options that are available in order to safe guard the environment and its interconnected elements. In considering the different development alternatives presented, the comparative process stems from both the rationale and strategy approach that was devised to discuss the alternative. Therefore, it is in the best interest of the governing body to 'compare and evaluate' the options described.