

# **Albany Project**

## **Environmental Impact Assessment Evaluation Report to the Bahamas Environment, Science and Technology Commission**

**Black & Veatch International**

**July 6, 2006**



**BLACK & VEATCH**

# **BVI ALBANY PROJECT EIA REVIEW**

## **1.0 Introduction and Overview**

Park Ridge Securities Corporation (PRSC) is proposing to develop a residential club community on the southwestern coast of New Providence called the Albany Project. An Environmental Impact Assessment (EIA) prepared by Turrell & Associates dated October 2005 was officially submitted to BEST for review. Additional information was provided in four separate supplemental submittals in response to specific questions and issues raised by BEST in its review. Black & Veatch International (BVI) was then contracted to review, provide critical comments on, and support BEST in conducting an objective and thorough evaluation of the EIA submittals.

The primary criteria of the BVI review is to (1) determine whether the EIA followed applicable EIA guidelines and standards as identified by BEST, (2) evaluate whether EIA description of project features and activities, investigations of baseline conditions, and impact analyses were sufficiently performed to reasonably determine the extent and appropriately characterize the significance of potential impacts, and (3) assess project design and proposed environmental protection and impact mitigation measures to determine whether appropriate and best available mitigation and environmental management practices will be implemented.

This report summarizes the activities undertaken and services provided by BVI in supporting BEST in this EIA review, and presents the findings and recommendations of BVI's independent evaluation of the EIA information provided for its review.

## **2.0 EIA Review Activities**

BVI received on April 6, 2006 the following materials for review:

- Preliminary Environmental Assessment dated January 2005 by Turrell & Associates
- Preliminary Environmental Assessment Data Points dated January 2005 by Turrell & Associates
- Albany EIA dated October 2005 by Turrell & Associates
- EIA Supplemental Information dated January 2006 by Turrell & Associates
- EIA – Response to Request for Additional Information Supplement #2 dated February 2006 by Turrell & Associates
- EIA – Response to Request for Additional Information Supplement #3 dated March 2006 by Turrell & Associates
- EIA – Response to Request for Additional Information Supplement #4 dated March 2006 by Turrell & Associates
- EIA Peer Review by Timothy Hall dated December 9, 2005

- Albany Marina Status Report for Groundwater Configuration (hydrogeological assessment) by HallTech dated February 2005.
- PowerPoint presentation entitled “Groundwater Analysis of the Albany House Development Site and Marina”
- Draft Heads of Agreement dated February 2, 2006

BVI reviewed these materials according to the criteria outlined at the beginning of this report, and then provided BEST with an initial summary of issues in an e-mail transmitted on May 17, 2006. A separate list of written questions and comments regarding the EIA and the proposed project was transmitted to BEST on May 19, 2007 for forwarding to PRSC and its consultants for response. PRSC provided responses to BEST which were transmitted to BVI on May 30, 2006. The BVI project manager and oceanographer/water quality specialist traveled to New Providence Island on May 31, 2006 to conduct a pedestrian site visit to observe conditions in and around the proposed project area.

A meeting with the BEST project team, BVI project manager and oceanographer/water quality specialist, and PRSC and its consultants was held in the BEST offices in Nassau on June 1, 2006. An overview and update of the status of the project development and design was provided by PRSC, followed by a discussion of specific issues, comments, questions and responses raised in BVI’s and BEST’s most recent correspondence with PRSC. Discussions during the meeting provided clarification of specific inquiries and responses, as well as a better understanding of major issues of concern and the responsibilities and positions of all parties involved. The outcome of the meeting was a request for additional information and studies to be performed by PRSC to better define and evaluate the nature and extent of potential impacts from the proposed and alternative project designs, and the effectiveness and long term viability of the proposed mitigation measures. A list of meeting attendees was attached as an appendix to the original report.

In response to the additional information and clarifications requested in the June 1, 2006 meeting, PRSC’s consultant transmitted electronic copies by e-mail to BVI staff on Saturday June 17, 2006, and official stamped hard copies of the same were received by mail from BEST on June 26, 2006, of the following for review:

- EIA – Response to Request for Additional Information Supplement #6 dated June 2006.

BVI reviewed this submittal and then prepared this memo, which summarizes BVI’s findings, conclusions and recommendations based on review of these listed materials and current BEST guidelines, site visit, and the June 1, 2006 project meeting discussions.

## **3.0 Review Findings**

### **3.1 EIA Content**

The original EIA document did not address all the items and issues outlined in the BEST EIA guidelines for Housing Developments and Commercial Boat Harbours. This is at least partially the result of PRSC's decision to submit the EIA before having any consultations or scoping meetings with BEST to establish a mutually agreed Terms of Reference for preparation of the EIA. Unfortunately, this necessitated a series of comments and questions from BEST and responses from PRSC to identify and define many key project features, construction and operations activities and management practices in sufficient detail to evaluate the nature and extent of potential impacts as well as the effectiveness of proposed mitigation measures and management practices.

A summary of the more significant elements found to be lacking minimum specificity or altogether absent:

- **Project Background** – Descriptions of the site selection process, process flow/material balance/water mass balance diagrams, and management plans and practices for dredging, fuels, chemicals, hazardous materials and solid waste were not adequately provided. Written evidence of adequate capacity and willingness to provide desired potable water, wastewater treatment and solid waste management services were also not provided, nor was evidence of direct consultations with Bahamian agencies.
- **Legal & Administrative Framework** – No reference or descriptions of applicable national laws and regulations are provided - other than Section 4.27 stating that pertinent laws and regulations are “Not known”.
- **Baseline Conditions** – The zones of impact are ill-defined. Existing surface and marine water quality were not addressed, and only ambiguous qualitative descriptions of existing air quality and noise were provided. Socio-economic baselines of existing labor force and traffic/transportation conditions were never sufficiently quantified.
- **Characterization of Impacts** – Description of assessment methodologies were limited to terrestrial fieldwork and marine studies undertaken. The criteria used to characterize impacts (extent, intensity, duration and frequency, risk, reversibility, etc.), which are generally described as either negligible moderate or significant in the EIA text and tables, was never established. Residual and cumulative impacts are addressed in a one-half page summary in Chapter 7.

It is further noted that project design is still in the conceptual stages and continues to evolve, as evidenced in PRSC's five sets of supplemental responses and information submittals provided in reply to BEST questions and comments.

Thus, the EIA document itself does not fully comply with applicable BEST EIA guidelines requirements nor does it meet general industry standards for minimum content and document completeness. However, the supplemental information submitted provides

for a more complete administrative record upon which to evaluate the nature, extent and acceptability of the potential environmental and social impacts.

### **3.2 Impact Assessment Methodology**

Several field surveys and modeling studies were conducted to evaluate potential impacts of the project. Some of these were included in the original EIA submittal and others were submitted as Supplemental Information. The studies included the following:

- **Groundwater** – HallTech drilled twelve test wells in February 2005 to define the thickness and lateral extent of the freshwater layer, brackish layer and saltwater layer below the project site. Samples of borehole cuttings were collected at 5 foot intervals for lithological analysis, and rate of penetration tests were performed to determine the hardness of subsurface formations. Once the wells were allowed to equilibrate over a 5 day period, the depth to the water table, salinity, temperature, conductivity and total depth of the test well were measured. The location of the wells and the methodology utilized is sufficient to provide a hydrogeological assessment of the groundwater configuration.

The data obtained from this assessment was used as inputs for the groundwater modeling which was undertaken to determine the effects of the marina on the freshwater aquifer. The data was also used in evaluation of the effects of project lakes on the aquifer. Assessments also considered the potable and irrigation water requirements of the project.

- **Terrestrial Ecology** – Field surveys of terrestrial habitats were carried out in the dry winter (December 2004 through early January 2005) and wet summer (July 2005) seasons. Aerial photos were consulted to locate and identify landscape features that were then accessed for pedestrian survey. Altogether 36 data points were established and surveyed to characterize habitat types; determine percent cover of canopy, midstory and groundcover vegetation; identify any exotic or rare species; observe wildlife including birds, mammals, reptiles and amphibians; identify and list plant species including invasive species, and to photograph existing conditions. The results of these terrestrial surveys were used to inventory and map the resources, which allowed for quantification of impacts associated with the proposed development.
- **Coastal Conditions** – Smith Warner International conducted numerous field studies to determine the baseline conditions of the shoreline morphology and sea bed bathymetry. Field data collection included a bathymetric survey, shoreline mapping, current measurements using drogues and a current meter, tide measurements, benthic surveys and characterization of marine habitats. Additionally, interviews of local diving operators and an underwater video of the proposed marina entrance channel corridor were conducted.

Efforts undertaken to assess potential impacts included modeling studies to determine circulation patterns; modeling to describe the wave climate for normal and hurricane conditions; hydrodynamic and water quality modeling for the marina; and an analysis of sediment transport and the effects of the channel entrance, jetties and beach nourishment on sediment transport and beach width.

All of the field studies generally followed recognized industry practices to the extent that existing baseline conditions could be sufficiently characterized. Although uncertainty exists with any modeling effort, the results obtained from the modeling and other analyses appear to produce reasonably reliable results.

In addition to the foregoing field studies and modeling analyses, the following information from secondary sources was compiled and used in the EIA analysis:

- Climate information including winds, rainfall, and hurricane events
- Information on site geology and aquifers
- Cultural, archaeological and historic resources

It is observed that no direct measurements through physical monitoring, sampling and analysis were made to quantitatively characterize baseline existing ambient air quality, noise levels, seawater quality, or current traffic loads on South West Bay Road.

Because the methodology for characterizing the significance of potential impacts was never fully explained in the EIA or supplemental submittals, evaluation of the nature and extent, intensity, duration, permanence and ultimately risks and significance of the impacts were for the most part left up to the reader (BEST) to determine.

### ***3.3 Environmental Impacts and Mitigation***

The primary components of this project include development of a golf course, marina with jetties and entrance channel, residential housing units, and an equestrian center. The project has the potential to affect the physical environment, biological communities and socioeconomic environment of New Providence Island. Some of the primary environmental concerns for this project included the following:

- Marina design especially the flushing rate and material used for piers
- Marina jetties including their effect on sand drift, accumulation, and erosion and the methods for and financing of beach maintenance and restoration.
- Marina access channel including dredging, reef ball relocation, and maintenance
- Golf course especially the use and control of fertilizers, herbicides and pesticides, the impact of ponds and water hazards on the freshwater lens, and sources of irrigation water
- Terrestrial landscaping including replacing invasive species with native species, the percentage of retained open space, and preservation areas
- Housing especially coastal set backs
- Storm water management for all areas of the project

BVI's findings with regard to the extent of potential impacts to the existing environmental conditions from these project activities and adequacy of mitigation measures proposed is summarized below.

### **Groundwater Resources**

Potentially significant impacts to groundwater resources could arise from the application and management of fertilizers, herbicides, and pesticides particularly on the golf course, as well as from salt water intrusion from construction of the marina.

- To minimize the risk of contamination from fertilizers, herbicides, and pesticides, the acreage of water features on the golf course was reduced from about 60 acres to about 20 acres. In addition, the lakes and ponds will be lined. Irrigation water for the golf course and common areas of the project will come primarily from three sources: (1) storm water management ponds constructed on the golf course, (2) treated effluent from the Airport Industrial Park WWTP, and (3) a reverse osmosis plant to be constructed on the site. In addition, groundwater may be extracted from the site and used for irrigation.
- Installation of a curtain wall to a depth in excess of 19 ft below MSL should minimize the loss of freshwater into the marina and the migration of salt into the freshwater lens. Some storm water will be directed to the golf course and used for irrigation.
- Storm water wells will be constructed such that storm water will not enter the freshwater lens.

Implementation of the proposed mitigation measures should be sufficient to protect groundwater resources. In addition, the following measures are recommended:

- The types of fertilizers, herbicides, and pesticides and proper handling procedures should be identified in the EMP.
- Groundwater monitoring should be conducted to ensure that water from constructed lakes and the marina is not contaminating the freshwater lens.

### **Terrestrial Resources**

Construction and operation of the project will cause adverse impacts to biological resources on the project site. Beneficial impacts will also occur as a result of the project.

- Many areas of the project site have been impacted by previous activities. There has been a loss of habitat, decreased wildlife value, and the spread of exotic species.
- Development of the project will result in significant loss of natural vegetation.
- Fragmentation is already occurring on the site which has led to decreased wildlife value and has contributed to the spread of exotic species. Natural habitats will become more fragmented and there will be a loss of connectivity between natural areas thereby further decreasing the wildlife value.
- A total of about 400 acres of natural habitat will be impacted by the project.
- Mitigation for the reduction in habitat include restoration of a conservation area, preservation of natural buffers along the gold course and within the residential

areas, and establishment of green space in the residential areas and around the golf course.

- Beneficial impacts include removing significant growths of exotic and/or invasive species, preserving the coastal vegetation, using native species to the extent possible when replanting areas on the golf course and in the residential areas, and imposing restrictions on land clearing in residential covenants.

The mitigating measures proposed by the project proponent are reasonable.

### **Coastal Resources**

Construction of the project will have significant impacts on coastal resources.

- Jetties proposed to stabilize the entrance to the marina, prevent sand accumulation in the marina entrance, and reduce waves inside the marina will cause a significant adverse impact to longshore transport of sand, resulting in sand accumulation behind the east jetty and erosion near the west jetty.
- To mitigate impacts to the disruption of longshore transport of sand and beach erosion, the proponent has proposed to (1) pre-nourish the existing beaches with sand to minimize the erosion, (2) construct a sediment trap near the end of the east jetty, (3) monitor beach profiles to measure the rates of sand accumulation and erosion, (4) provide continuing maintenance dredging and beach nourishment to maintain beach profiles, and (5) establish funding mechanisms to ensure that financial resources are available to pay for the dredging and beach nourishment program.
- An alternative of a marina without jetties was also investigated. This analysis concluded that the marina entrance would still be a disruption in alongshore sediment transport and that erosion on the west side of the marina entrance would still occur. Maintenance dredging would be required at more frequent intervals and the protection against waves afforded by the jetties would not exist.
- It is estimated that the proposed maintenance dredging and beach re-nourishment will be required every 3 to 4 years.
- Albany development covenants provide for several funding mechanisms, including levying common and special assessments on property owners and transactional community enhancement fees.
- If construction occurs too close to the beach area, coastal vegetation could be lost and the beach could be adversely affected. PRSC has agreed to a 75 foot setback wherein construction will not occur except for walkways to provide beach access for residents.

Implementation of the setbacks and the beach enhancement and re-nourishment program will provide substantive mitigation for the coastal impacts. However, if the proposed beach re-nourishment mitigation program is not continuously and sufficiently maintained and implemented, significant erosion of coastal resources will occur, potentially all the way back to the limestone ridge. Accordingly, legally binding commitments and assurances to continuously maintain the mitigation program should be obtained from PRSC, such as:



- Incorporating a continuing financial obligation and commitment on the Albany Board of Directors and Albany Yacht Club to fully fund all beach restoration activities and accounts into the Heads of Agreement.
- Grant an easement for the entrance channel with a reservation of rights to remove the jetties from the marina entrance should the beach re-nourishment program be deemed insufficient or in arrears, and require a performance bond be provided to cover the costs of removal of the jetties.

Alternatively, if sufficient assurances cannot be provided, prohibiting development of the marina feature will eliminate the risks of incurring these significant adverse impacts altogether.

### **Marine Resources**

Construction and operation of the marina, jetties, and access channel and construction of other project components near the beach have the potential to cause adverse impacts to the marine environment.

- The original proposed channel alignment has been moved to address concerns related to dive operations and impacts to coral. Constructing the channel would require dredging of about 140,000 m<sup>3</sup> of sand and rock material.
- Turbidity generated during dredging will be a significant but short term impact on marine water quality. The proponent proposed to use weighted silt curtains to limit the impact of dredging and minimize the impacted area.
- Channel dredging will also eliminate about 5.3 acres of seagrass/algal turf habitat. Creation of rock ledge habitat will mitigate this impact.
- Coral balls will require relocation prior to construction, and will need to be addressed as part of a coral relocation plan to be included in the EMP.
- The design of the marina incorporates some features to enhance flushing such as rounded corners and a sloping bottom to avoid “dead spots” within the marina. Modeling was conducted to determine if flushing of the marina would achieve the goal of 90 percent removal within 24 hours. Simulations were made for a release of a pollutant on the start of a flood tide for both spring and neap tide conditions. Results showed that flushing was better for the spring tide condition but that the goal of 90 percent removal was achieved for both conditions.
- It is noted that the marina flushing modeling does not include the island feature depicted in many of the marina drawings. It is possible that the island feature may improve flushing by increasing the tidal prism and possibly inducing circulation around the island. However, the effect of the marina island has not been analyzed. At a meeting on June 1, 2006 Albany project representatives agreed to eliminate the island from the design.
- Storm water will not be discharged into the marine environment.

The mitigation measures proposed by PRSC appear reasonable. However, it is recommended that these measures be enhanced by:

- Development of detail dredging plan to be included in the EMP, which should include measures to minimize turbidity, measures that will be undertaken if blasting is required to remove rock, and plans for dredged material disposal.

- Inclusion of a coral relocation plan in the EMP, which should provide for pre-construction inventory of all coral resources that will be impacted and relocation methodology and locations.
- Providing reports to BEST of all monitoring of beach profiles to track erosion and deposition of beach sands.
- Inclusion of a marina water quality monitoring program in the EMP that expands parameters and sampling frequency proposed in Supplement # 1. The water quality monitoring plan should also include a discussion of how the data will be analyzed and reported.

### **Air Quality**

Based on the project description, impacts to air quality from construction activities should be temporary, and operation of minor sources of potential air pollutant emissions should result in minimal impacts to existing air quality.

### **Noise**

While noise levels are expected to increase over current baseline conditions, the mostly residential and recreational nature of project activities is not expected to be a nuisance to neighboring land uses or create any unacceptable increases to current background levels.

### **Cultural Resources**

Planned preservation of the Fisherman's Cottage ruins will adequately mitigate any potential permanent loss of archeological and cultural resources on the project site.

### **Socio-Economic Resources**

The development is characterized as mostly a second and third home community, and as a result will have substantially less demands on existing island infrastructure than a primary residential community, especially with regard to educational and medical services. Increased demands for water supply, wastewater treatment and solid waste disposal should not unduly stress existing services. Cumulative impacts from the additional residents and visitors combined with the relocation of South West Bay Road and development of nearby commercial port facilities could be problematic. Positive impacts in terms of increased employment opportunities and revenues to supporting businesses and the Government will benefit the island economy.

## **4.0 Conclusions and Recommendations**

Procedurally, the environmental assessment undertaken by PRSC deviated from the normal EIA steps and guidelines established by BEST. PRSC chose to prepare and submit its project EIA without conducting any preliminary consultations or scoping meetings with BEST to obtain applicable EIA guidelines or attempt to establish a Terms of Reference for preparation of the EIA. As a result, while it did provide detail analysis of several key potential impacts of concern, the EIA as originally submitted failed to address all the items and issues outlined in the BEST EIA guidelines for Housing Developments and Commercial Boat Harbours. The administrative record subsequently

established through numerous rounds of questions and comments from BEST and responses from PRSC ultimately provided a complete description of project features and activities, and a basis for evaluating the sufficiency of all relevant investigations, analyses and characterizations.

Based on the information presented in the EIA, subsequent supplemental submittals, and meetings and discussions, the proposed Albany Project will produce varying impacts to the existing environmental and socio-economic conditions of New Providence Island. The resources that will be impacted to a potentially significant extent include groundwater, terrestrial habitats, marine ecology, coastal shoreline, cultural resources, and road traffic. Lesser impacts may occur to baseline air quality, noise, land use and socio-economic conditions. Most all of these impacts will occur in the general vicinity of the proposed project location on the southwestern area of the island.

Potentially significant environmental impacts of concern:

**Groundwater Resources** - Potentially significant impacts to groundwater resources will be mitigated by installation of an impervious membrane “curtain wall” of yet to be defined materials to prevent salt water intrusion from the marina, and lining of all golf course ponds and other water features with flexible impervious membrane materials. The curtain wall will also minimize the loss of freshwater to the marina.

**Terrestrial Resources** - Permanent losses of over 400 acres of terrestrial habitats will be mitigated by establishment of a natural conservation area in the northwest corner of the project and incorporation of natural vegetation and landscaping on residential lots and buffer zones.

**Coastal Resources** - Construction of the project, and particularly its marina and associated entrance channel dredging and jetties, will have significant impacts on the existing near shore and coastline conditions. An agreed 75’ permanent structure construction set-back and the proposed beach enhancement and continuing renourishment program will provide adequate mitigation so long as the proposed program and financial assurance is maintained.

If and when the proposed continuing beach re-nourishment mitigation program is not sufficiently maintained and implemented, significant impacts in terms of coastal resources erosion will occur. Assurances that the mitigation program be continuously maintained should be sought from PRSC by either:

- Incorporating a continuing financial obligation and commitment on the Albany Board of Directors and Albany Yacht Club to fully fund all beach restoration activities and accounts into the Heads of Agreement, and/or
- Granting of an easement for the entrance channel with a reservation of rights to remove the jetties from the marina entrance should the beach re-nourishment program be deemed insufficient or in arrears, and require a performance bond be provided to cover the costs of removal of the jetties.

Alternatively, elimination of the marina feature will avoid incurring these adverse impacts altogether.

**Marine Resources** - Construction of a marina entrance channel will result in the permanent elimination of about 5.3 acres of seagrass/algae turf habitat. Creation of rock ledge habitat and attempts to relocate coral balls will provide some mitigation of these impacts. Turbidity generated during dredging will be a significant but short term impact on marine water quality. Proper use of weighted silt curtains will limit these turbidity impacts. Alternative designs of marina entrance without jetties would increase the frequency of dredging operations and associated turbidity impacts.

BVI finds that while some significant impacts to and losses of existing environmental resources will occur if the Albany project is approved as proposed, substantial mitigation of these impacts can be achieved through implementation of proposed actions and best management practices throughout construction and operation activities.

Due to the continually evolving nature of the project design and requirement to assure all significant environmental and socio-economic impacts that may potentially arise from construction and operation are adequately avoided, mitigated and/or managed, it is recommended that a detailed and comprehensive Environmental Management Plan be developed and approved by BEST as a pre-condition to authorizing any project construction activities to proceed. This comprehensive EMP should include at a minimum:

- Beach enhancement, re-nourishment and monitoring plan
- Dredging plan for the access channel and marina entrance
- Coral relocation plan
- Marina water quality monitoring plan
- Groundwater monitoring plan
- Storm water management plan
- Hazardous materials, fuels and chemicals management plan
- Waste management plan
- Landscaping and maintenance plan
- Noise and odour control plan
- Construction erosion and sediment control plan
- Personnel environmental training and awareness plan
- Health and safety plan
- Spill control, emergency response and contingency plans
- Environmental management, reporting and recordkeeping systems

This EMP should set forth in sufficient detail all the design measures, monitoring programs, best management practices, and emergency and contingency plans to assure BEST that all the potential impacts are methodically controlled and suitably mitigated.

In summary, BVI's independent review finds that:

(1) While the EIA and supplemental submittals did address all the significant issues of concern, the EIA itself did not completely followed applicable EIA guidelines and standards as identified by BEST.

(2) Altogether, the EIA and supplemental submittals and meetings provided a sufficient description of project features and activities, investigations of baseline conditions, and impact analyses performed to reasonably determine the extent and significance of potential project impacts.

(3) Due to the evolving nature of the project design, a detailed EMP outlining all the environmental impact mitigation design measures and management practices to be implemented should be reviewed and approved by BEST before any construction activities are authorized to commence. Additionally, binding legal assurances should be obtained to assure continuous maintenance of the beach re-nourishment mitigation program into the future.