



**U.S. Department of the Interior
NATIONAL PARK SERVICE
Virgin Islands National Park**



**Workplan for Level II
Environmental Site Assessment
Caneel Bay Resort**

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1.0 INTRODUCTION

This document is the *Workplan for Level II Environmental Site Assessment (ESA) of the Caneel Bay Resort (CBR) Property*. The CBR property is located on the west part of the island of St. John, U.S. Virgin Islands, in the Virgin Islands National Park (VIIS). The property consists of nine land tracts totaling 150.32 acres. The property is located approximately 1 mile northeast of the town of Cruz Bay. The property consists of a large vacation resort with approximately 100 buildings and structures used for lodging, food services, recreation, docks, marinas and maintenance services. The resort property is adjacent to Caneel Bay, to the west, and also includes several beaches and large areas of undeveloped woods. The National Park Service (NPS) currently owns the land but proposes to acquire ownership of the buildings and structures. The subject land tracts and parcels are:

Tract Number	Parcel	Appx. Acreage	Current Land Use
01-109	Remainder	127.70	Main Resort Area
01-112	9	6.17	Main Resort Area
01-113	10	0.58	Main Resort Area
01-114	11	1.59	Main Resort Area
01-106	20	9.30	Main Resort Area
01-107	21 & 22	1.97	Main Resort Area
04-102	5	1.01	Executive Housing
04-104	12	1.69	Employee Housing
04-115	12D	0.31	Marina

This workplan is the result of a Level I ESA that was completed for the property in September of 2012. The Level I ESA identified a number of recognizable environmental conditions (RECs) on the CBR property. The purpose of this workplan is to provide specific Level II activities to be conducted at each of the REC areas in order to determine if an actual release of hazardous substances or petroleum products has occurred. However, the extent of specific releases detected may not be fully delineated by this initial effort. If a significant release is identified, additional Level II assessment activities may be required.

The 2012 Level I ESA report provides additional site information, maps and photographs of the REC areas described in this workplan. This workplan is designed to be used in conjunction with the Level I ESA report and not as a stand-alone document.

2.0 METHODOLOGY

2.1 Fieldwork and Sampling

The fieldwork and sampling activities proposed in Section 3 should be conducted in general accordance with the Field Branches Quality System and Technical Procedures, U.S. Environmental Protection Agency (EPA), Region 4 (<http://www.epa.gov/region4/sesd/fbqstp/#GuidanceDocuments>).

Continuous soil cuttings should be collected from the proposed soil borings and soil sample locations. The lithologic and hydrogeologic properties of the soil should be recorded. The soil cuttings should be field-screened for the presence of volatile organic vapors (e.g., petroleum or solvents) using a calibrated photo-ionization detector (PID) or equivalent device. In addition, the soil cuttings should be observed for indications of potential contamination, such as staining, sheen and odors. The results of the field screening should be used to determine the locations or depth intervals of the samples to be collected, unless otherwise specified in this workplan. All samples should be collected from locations and/or depth intervals most likely to exhibit contamination.

2.3 Laboratory Data Interpretation

The soil, sediment and groundwater sample analytical results should be compared with the site screening levels found in the U.S. EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2012 (<http://www.epa.gov/region9/superfund/prg/>), or a more recent version if available.

The soil and sediment results should also be compared with ecological screening values for soil and sediment in *Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment* (EPA 2001) (<http://www.epa.gov/region4/superfund/programs/riskassess/ecolbul.html>).

The U.S. Virgin Islands Department of Planning and Natural Resources (DPNR) uses 100 milligrams per kilogram (mg/kg) of total petroleum hydrocarbons (TPH) as a cleanup criterion.

2.4 Laboratory Analytical Methods

The following are the laboratory analytical methods described in Section 3:

- Total petroleum hydrocarbons (TPH) diesel range organics (DRO), gasoline range organics (GRO) and oil range organics (ORO; EPA Method 8015C).
- Semi-volatile organic compounds (SVOCs; EPA Method 8270C).
- Benzene, toluene, ethylbenzene and total xylenes (BTEX; EPA Method 8260B).
- Polychlorinated biphenyls (PCBs; EPA Method 8082A).
- Organochlorine pesticides (EPA Method 8081A).
- Organophosphorous pesticides (EPA Method 8141A).

- Herbicides (EPA Method 8151A).
- Nitrogen nitrate-nitrite (Method 353.2).
- Nitrogen nitrite (Method 354.1).
- Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) (EPA Methods 6010B and 7471A).

2.2 Field Quality Assurance/Quality Control (QA/QC) Samples

Limited numbers of field QA/QC samples will be collected. These will consist of two field duplicate samples, an equipment rinsate sample and three trip blank samples. The duplicate samples will consist of splits of a soil and a groundwater sample collected from the engineering area underground storage tank site and analyzed for BTEX; SVOCs and lead. The equipment rinsate sample will be collected from decontaminated soil sampling equipment and analyzed for TPH DRO and GRO; BTEX; SVOCs; PCBs; and RCRA metals. The trip blanks will be prepared and shipped with other samples being analyzed for BTEX; the trip blanks will be analyzed for BTEX only.

2.5 Subsurface Utilities

Where soil borings test pits or other ground intrusive activities are planned below 1 foot or to be installed using powered equipment, the locations of existing subsurface utilities should be determined prior to conducting these activities.

3.0 LEVEL I ESA SITE SUMMARY & PROPOSED SCOPE OF WORK

The following provides a summary of the RECs and areas/sites of concern identified on the CBR property in the Level I ESA report. Following each summary is the proposed scope of work for that area/site. The specific locations for each soil boring and sample are not provided; these should be determined in the field based on site conditions and professional judgment. Maps of the general areas on the CBR property proposed for Level II activities are provided in Attachment 1.

3.1 Engineering and Maintenance Area

Approximately 20 buildings are located in the engineering and maintenance area, which is in the southeast part of the property. The area is used by CBR for the repair and maintenance of buildings, vehicles, golf carts, and landscape maintenance equipment, and for charging vehicular batteries. Numerous open and closed containers of waste motor oil, and oil filters were present in this area. Automotive lead-acid batteries were observed on the concrete floors; the floors were stained from battery leakage. Several areas of oil stains on the work tables, concrete floors and on the soil outside the buildings were observed in this area. Numerous storm water drains are present near buildings with oil stained floors. The storm water drains and the surface drainage in the area appear to flow west and north to a small drainage ditch north of the engineering area. The drainage ditch is believed to eventually drain into Caneel Bay. The stained tables, floors and soil are considered to be a recognized environmental condition (REC). The contaminants of concern are oils, petroleum hydrocarbons, PCBs and metals.

Proposed Scope of Work - Engineering and Maintenance Area

The objective of the Level II activities at this area is to determine if contaminants from repair and maintenance activities have adversely affected the surface soils near the work areas and/or the sediment in the nearby drainage ditches.

The following is the proposed scope of work for this area:

- Collect six surface soil samples from representative areas adjacent to work areas having oil stains and stains from lead-acid batteries. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 feet below ground surface (BGS) to 0.5 feet BGS.
- Collect four sediment samples from the drainage ditches in the area and at locations immediately downstream from the engineering/maintenance area. Sediment samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil and sediment samples for TPH DRO, GRO and ORO; SVOCs; PCBs; and RCRA metals.

3.2 Former Underground Storage Tanks in Engineering Area

A flush-mounted monitoring well manhole was observed in the concrete pavement just south of the diving equipment storage building. CBR staff indicated that the well was installed to monitor underground fuel storage tanks (USTs) that were removed from that area in the 1990s. CBR staff stated that no contamination was detected in the well. However, no documentation of the

UST removal or soil or groundwater sampling have been made available. The former USTs and monitoring well are considered to be a REC. It is possible that leaded fuels were stored in the USTs. The contaminants of concern are gasoline and diesel constituents and lead.

Proposed Scope of Work - Former USTs in Engineering Area

The objective of the Level II activities at this area is to determine if contaminants from leaking fuel USTs remain in this area and have adversely affected the soil or groundwater near the former USTs.

The following is the proposed scope of work for this area:

- Install four soil borings or test pits in the locations of the former USTs to the water table (approximately 10 to 15 feet BGS). Collect one soil sample from each borehole from the depth interval exhibiting the strongest indication of fuel contamination, including fuel staining, elevated organic vapors (based on PID screening) or fuel odors. In the absence of indications of fuel contamination, collect samples from the water table to one foot above the water table.
- Install a temporary monitoring well in the most downgradient soil borehole (based on topography). Collect a groundwater sample from the well.
- Evaluate the existing monitoring well to determine if a representative groundwater sample can be obtained. The well would need to be thoroughly purged to remove stagnant water. If feasible, collect the groundwater sample from the existing monitoring well instead of the temporary well.
- Analyze the soil and groundwater samples for BTEX; SVOCs and lead.

3.3 Grounds and Landscaping – Chemical Storage Sheds

Approximately six buildings and sheds are located in this area, which is just west of engineering. The area is used for growing plants, landscape equipment repairs, and storage of lawn and garden chemicals and supplies. Several storage buildings were observed with bags and containers of various pesticides, herbicides and fertilizers; these materials were observed to have leaked or spilled onto the unpaved floors of the sheds. These leaked or spilled materials are considered to be a REC. The contaminants of concern are pesticides, herbicides, nitrates, nitrites and metals.

Proposed Scope of Work - Chemical Storage Sheds

The objective of the Level II activities at this area is to determine if contaminants from the chemical storage sheds have adversely affected the surface soils near the sheds.

The following is the proposed scope of work for this area:

- Collect six surface soil samples from representative areas in or adjacent to sheds and areas used for storage of pesticides, herbicides and fertilizers. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil samples for organochlorine pesticides; organophosphorous pesticides; herbicides; nitrogen nitrate-nitrite; nitrogen nitrite; and RCRA metals.

3.4 Grounds and Landscaping – Equipment Maintenance Building

An open-sided equipment maintenance building was observed to have numerous pieces of oily equipment, oil stained tables, oil-stained concrete floors, an open container of used motor oil, and numerous cans of gasoline and oil. An oily odor was present in this area. The oil-stained tables and floors are considered to be a REC. The contaminants of concern are oils, petroleum hydrocarbons, and metals.

Proposed Scope of Work- Equipment Maintenance Building

The objective of the Level II activities at this area is to determine if contaminants from the maintenance building have adversely affected the surface soils near the building.

The following is the proposed scope of work for this area:

- Collect two surface soil samples from representative areas near the maintenance building. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil samples for TPH GRO and ORO; SVOCs; and RCRA metals.

3.5 Emergency Generator Building

This building is west of engineering and houses two large diesel-powered emergency electric generators. A strong oily odor was present in the building. The concrete floor beneath the generators was oil stained. Several large lead-acid batteries were present on the floor of the building. Two shallow floor gutters in the building appear to discharge oil or other liquid leaks from the generators to the soil outside on the northeast side of the building; two areas of oil-stained soil were present on the ground beneath these two discharge points. The oil-stained floors and soil are considered to be a REC. The contaminants of concern are oils, petroleum hydrocarbons, and metals.

Proposed Scope of Work - Emergency Generator Building

The objective of the Level II activities at this area is to determine if contaminants from the emergency generator building have adversely affected the surface soils near the building.

The following is the proposed scope of work for this area:

- Collect four surface soil samples from representative areas on the northeast side of the building. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil samples for TPH DRO and ORO; SVOCs; and RCRA metals.

3.6 Wastewater Treatment Plant

An approximately 5' diameter oil stain was observed on the concrete floor of a small pump building for the plant. An approximately 2' diameter oil stain was observed on the ground near the treatment plant buildings. The soil stain appeared to be oil that leaked from a vehicle or other equipment previously parked at that location. The oil-stained floor and soil are considered to be RECs. The contaminants of concern are oils, petroleum hydrocarbons, PCBs and metals.

Proposed Scope of Work - Wastewater Treatment Plant

The objective of the Level II activities at this area is to determine if contaminants from the emergency generator building have adversely affected the surface soils near the building.

The following is the proposed scope of work for this area:

- Collect two surface soil samples from representative areas near the pump building. In addition, collect one surface soil sample from the soil stain area. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil samples for TPH ORO; SVOCs; PCBs and RCRA metals.

3.7 Debris Landfill Near Honeymoon Beach

This landfill is an open area near Honeymoon Beach in the southwest part of the resort area. The landfill is used to dispose of “organic” materials including wood scraps, trimmed vegetation and inert debris. The area is reported to have periodically received sludge from the CBR wastewater treatment plant. Even though the treated wastewater is believed to have been primarily sanitary sewage, it is possible that the sludge contained heavy metals or other chemical contaminants. The debris landfill is considered to be a REC. The contaminants of concern are petroleum hydrocarbons, pesticides, herbicides, PCBs and metals.

Proposed Scope of Work - Debris Landfill

The objective of the Level II activities at this area is to determine if contaminants from the sludge or other items deposited at the landfill have adversely affected the shallow soil.

The following is the proposed scope of work for this area:

- Divide the landfill area into four quadrants. Divide each quadrant into four sub-quadrants. Install one soil boring from 0.0 to 1.0 feet BGS in each of the sixteen sub-quadrants. Soil borings should be installed and samples should be collected with hand augers or other manual equipment. Prepare one composite soil sample from each quadrant using the soil from the four sub-quadrants.
- If a suspected source of contamination is observed in a quadrant, collect a discreet representative sample from that source in lieu of the composite sample for that quadrant.
- Analyze the soil samples for SVOCs; PCBs; organochlorine pesticides; organophosphorous pesticides; herbicides; and RCRA metals.

3.8 Marina and Fuel Facility

The marina and fuel facility are located on the west facing shore of Cruz Bay, approximately 0.5 miles south of the main resort area. The marina facility is reported to have operated at this location since the 1960s. The marina is currently used for support of the resort vessels, which include three ferries and a smaller motor boat. The facility includes a large concrete mooring dock; fuel pumps on the dock; subsurface fuel pipes; above ground storage tanks (ASTs) for gasoline, diesel and waste oil; and two buildings used for offices, repair parts storage, repair material storage (e.g., oil, lubricants, batteries, engine coolant, etc.), and for conducting boat

equipment repairs. CBR staff stated that no reportable spills have occurred from the ASTs or piping at the facility. The following areas of concern were observed in this area:

- The grounds of the marina near the water were reported to have been formerly used for repairs and maintenance of dry-docked boats, including boat-bottom re-painting. Boat bottom paints are known to have contained heavy metals. Sanding of old bottom paints may have contaminated surface soils and bay sediment with metals. Pieces of fiberglass and polyurethane or epoxy resin were observed on the ground in this area. An oil-stained wooden pallet was also observed on the ground in this area.
- Oil-stained concrete floors and an oily odor were present in the west building near open and closed containers of waste oil. Approximately ten lead-acid batteries were observed to be stored on the concrete floor; the floor near the batteries was stained. Numerous containers of paints, oils and cleaners were present in the west building. Outboard motors, fuel cans, air compressors and electric generators were also present in the building.
- The past and current operation of the marina, the fueling station, the fuel and waste oil ASTs, the fuel pipeline and boat repair facility (since the 1960s) are considered to be a REC for this tract. It is possible that lead-containing fuels were used in the past.

Proposed Scope of Work – Marina Boatyard Area

The objective of the Level II activities at this area is to determine if contaminants from the former marina boatyard area have adversely affected the surface soils in the former boatyard area or the sediment in the adjacent Cruz Bay. The contaminants of concern are petroleum hydrocarbons and metals.

The following is the proposed scope of work for this area:

- Collect four surface soil samples from representative areas in the former boatyard area. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Collect two sediment samples from Cruz Bay adjacent to the former boatyard area. Sediment samples should be collected with a dredge or other manual equipment from a depth of 0.0 to 0.5 feet below the surface of the bottom.
- Analyze the surface soil and sediment samples for SVOCs; and RCRA metals.

Proposed Scope of Work – Marina West Building Area

The objective of the Level II activities at this area is to determine if contaminants from repair and maintenance activities in and around the west building have adversely affected the surface soils near the building. The contaminants of concern are petroleum hydrocarbons, fuel constituents, PCBs and metals.

The following is the proposed scope of work for this area:

- Collect six surface soil samples from representative areas around the building. Soil samples should be collected with hand augers or other manual equipment from a depth of 0.0 to 0.5 feet BGS.
- Analyze the surface soil samples for TPH DRO, GRO and ORO; BTEX; SVOCs; PCBs; and RCRA metals.

Proposed Scope of Work – Marina Fuel System

The objective of the Level II activities at this area is to determine if contaminants from possible leaks from the diesel and gasoline fuel system have adversely affected the soil. The contaminants of concern are gasoline and diesel fuel constituents and lead.

The following is the proposed scope of work for this area:

- Install six soil borings to the water table (approximately five feet BGS) in the vicinity of the fuel storage tanks and subsurface pipelines leading to the dock. Screen soils for fuel contamination visually and with a PID. If evidence of fuel contamination is detected, collect three soil samples from locations or depths most likely to exhibit contamination. In the absence of indications of fuel contamination, collect three soil samples from the water table to one foot above the water table.
- Analyze the soil samples for TPH DRO and GRO; BTEX; SVOCs; and lead.

3.9 Former Marina Fuel Tanks

This area is located northeast of the marina and is the location of one or more former fuel ASTs which served the nearby marina facility. An underground pipeline is reported to have conveyed fuel from the ASTs to the marina. The former location of the fuel ASTs is an overgrown area with two concrete tank support structures. No direct evidence of fuel spills or releases was observed in this area. However, the past operation of the fuel ASTs and underground pipeline is considered to be a REC. It is possible that leaded fuels were stored in the ASTs. The contaminants of concern are gasoline and diesel constituents and lead.

Proposed Scope of Work - Former Marina Fuel Tanks

The objective of the Level II activities at this area is to determine if contaminants from leaking fuel ASTs and pipelines remain in this area and have adversely affected the soil near the former USTs.

The following is the proposed scope of work for this area:

- Install eight soil borings or test pits in the locations of the former ASTs and pipelines to the water table (approximately 5 to 10 feet BGS). Install three of the borings at the former AST locations and five along the former pipeline leading to the marina. Collect one soil sample from each borehole from the depth interval exhibiting the strongest indication of fuel contamination including fuel staining, elevated organic vapors (based on PID screening) or fuel odors. In the absence of indications of fuel contamination, collect samples from the water table to one foot above the water table.
- Analyze the soil samples for TPH DRO and GRO; BTEX; SVOCs; and lead.

3.10 Emergency Generator Fuel Tanks - Excluded

Three ASTs are present just north of the emergency generator building. One AST is approximately 20,000 gallons in capacity and appears to hold diesel fuel for the emergency generators. One AST is approximately 10,000 gallons and appears to hold gasoline. One AST is approximately 500 gallons and appears to hold gasoline. A diesel and gasoline fuel

dispenser was present in the area. A diesel fuel leak is reported to have occurred in 2010; the fuel-impacted soil is reported to have been excavated, covered with a tarp and placed on a concrete pad near the ASTs. A covered area of stockpiled soil (approximately 15' by 40') was observed in this area; however, the exact area from which the soil was excavated was not determined. Fuel-impacted soils are believed to still be present in the subsurface.

An approximately 3' by 6' area of fuel-stained soil was observed near the 500-gallon gasoline AST beneath a 1.5-inch diameter steel pipe that was dripping fuel. The fuel appeared to be diesel; however, the source of the leaking fuel was not determined. An approximately 5' by 12' area of distressed vegetation and fuel-stained soil was observed just east of the 10,000-gallon gasoline AST; the leaked fuel appeared to be gasoline. The depth of the fuel-impacted soil was more than 6 inches. The past and current fuel leaks and fuel-impacted soils in this area are considered to be RECs.

Based on recently received information, the fuel leaks and spills at the ASTs near the emergency generator building appear to be documented by the local environmental regulatory authority (DPNR) and are expected to be addressed by CBR. Therefore, the fuel leaks and spills associated with the ASTs are excluded from the proposed Level II activities contained in this workplan.

3.11 Summary of Proposed Samples

The following is a summary of the proposed samples and analytical parameters for each area or site.

Table 1: Summary of Proposed Samples

Site/Area Name	Proposed Number of Samples			Analytical Parameters
	Soil	Sediment	Groundwater	
Engineering & Maintenance	6	4		TPH DRO, GRO & ORO; SVOCs; PCBs; RCRA metals
Engineering - Former UST	4		1	BTEX; SVOCs; lead
Grounds & Landscaping – Chemical Storage Sheds	6			Organochlorine pesticides; Organophosphorous pesticides; Herbicides; Nitrogen nitrate-nitrite; Nitrogen nitrite; RCRA metals
Grounds & Landscaping – Equipment Maintenance Building	2			TPH GRO and ORO; SVOCs; RCRA metals
Emergency Generator Building	4			TPH DRO and ORO; SVOCs; RCRA metals
Wastewater Treatment Plant	3			TPH ORO; SVOCs; PCBs; RCRA metals
Debris Landfill Near Honeymoon Beach	4			SVOCs; PCBs; Organochlorine pesticides; Organophosphorous pesticides; Herbicides; RCRA metals
Marina Boatyard	4	2		SVOCs; RCRA metals
Marina West Building	6			TPH DRO, GRO and ORO; BTEX; SVOCs; PCBs; RCRA metals
Marina Fuel System	3			TPH DRO & GRO; BTEX; SVOCs; lead
Former Marina Fuel Tanks	8			TPH DRO & GRO; BTEX; SVOCs; lead

3.0 LEVEL II ESA REPORT

Upon receipt of the soil, sediment and groundwater sample analytical results, a report should be prepared which summarizes the field and laboratory results. The soil, sediment and groundwater sample analytical results should be compared to the screening criteria listed in Section 2.3.

The report should be reviewed and signed by a professional geologist (P.G.) or professional engineer (P.E.) licensed in a U.S. state or territory. The report should include recommendations for no further action, additional sampling, and/or corrective actions, as appropriate.

4.0 REFERENCES

Level I Pre-Acquisition Environmental Site Assessment Survey, Caneel Bay Resort, Various Tracts, Barksdale and Associates, Inc., September 2012

U.S. EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2012 (<http://www.epa.gov/region9/superfund/prg/>)

Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment (EPA 2001) (<http://www.epa.gov/region4/superfund/programs/riskassess/ecolbul.html>).

Field Branches Quality System and Technical Procedures, U.S. Environmental Protection Agency (EPA), Region 4 (<http://www.epa.gov/region4/sesd/fbqstp/#GuidanceDocuments>)

ATTACHMENT 1

Site Location Maps



AR 000192

Approximate
Boundary of Main
Resort Property

Maintenance &
Engineering

Grounds &
Landscaping

Debris Landfill

Emergency
Generator Fuel
Storage Area

North

Figure 1: Main Resort Area

North



Former Fuel ASTs &
Pipeline to Marina

NPS Visitors
Center

Approximate
Boundary of
Marina Area

Cruz Bay

Town of
Cruz Bay

Figure 2: Marina Area









Figure 5 – Marina Area
Caneel Bay Resort – Level II Workplan



