vegetation type is sparse and merges into the road verge approximately 3 m inland.

In the open, unshaded areas at the foreshore was a herb layer of ***Sesuvium portucalastrum*** (Seaside purslane) and ***Ipomea sp.*** These species are typical coastal species, which are adapted to hot, salty conditions. Further inland, succession in vegetation type was observed with a transition to shrubs and grasses. The majority of the trees at the site consisted of mature tree species, approximately 2m (6ft) in height. The shrub layer was not well represented, and large areas under the trees were bare. The shrub layer was consistent with ***Panicum maximum*** (guinea grass). There was no tree canopy. The dominant plant was the Sea Grape (***Cocoloba uvifera***) with an occasional coconut (***Cocos nucifera***), trees common in coastal locations. The majority of the substrate was rocky but had variations including sand and loam.

There were no endemic, rare, threatened or endangered plant species observed at the site. Additionally, none of the plants have significant cultural or economic value. None of these trees will be removed to construct the manhole.

**TABLE 3-1: OBSERVED SPECIES AT THE LANDING SITE**

| FAMILY | SCIENTIFIC NAME | COMMON NAME |
|---|---|---|
| *Aizoaceae* | *Sesuvium portulacastrum* | Seaside purslane |
| *Combretaceae* | *Terminalia catappa* | West Indian Almond |
| *Gramineae* | *Panicum maximum* | Guinea grass |
| | *Ipomea pes-caprae* | Beach Morning Glory |
| *Palmae* | *Cocos nucifera* | Coconut |
| *Polygonaceae* | *Coccoloba uvifera* | Sea Grape |

Cable Housing Site - The cable house is to be sited on the Chas O. Ramson Limited facility in Reading. The site has no significant plant community. The site consist if the existing Ramson building and well manicured lawns.

##### 3.2.3.1.2 Faunal Survey

No bird species were observed on the site. This may be due to the fact that there are few trees at the site and not many for the purposed of feeding or nesting.

In addition, there were less than 5 burrows belonging to the species *Cardisoma guanhumi* (Great land crabs) observed on the site.

## 3.3 Marine Environment

### 3.3.1 Segment 1 – Bahamas to Bull Bay, St. Thomas

#### 3.3.1.1 Bull Bay

Landing Site - A marine assessment was conducted along a corridor no more than 1m wide; the cable is no more than 28.8mm wide, of the marine environment. Figure 4-6 details the coordinates along which the cable will be laid. The marine assessment utilized dives of the area, video and still photography to document the condition of the seabed and associated structures and marine life in the study area. The depth of the assessment was up to a maximum of 18.28m (60ft) which characterised the inshore (Fig. 4-6).

The selection of this landing site was due to the presence of an existing cable landing station and associated cable on sea bed.

##### 3.3.1.1.1 Inshore Survey

The inshore has a relatively flat substrate of white calcareous sand from near shoreline to about 450m where offshore distinction is made (Figure 4-6). This represents a depth of no more than 18m (60ft). Based on video-photography taken during the marine survey, the area is made of soft sandy substrate. It is accepted that various fishes (reef and otherwise) and other marine fauna may traverse the cable route. However, due to the nature of the cable laying activities and size of the cables being laid any interactions with marine fauna will be negligible. Of importance is the fact that no coral reefs lie in the path of the cable route.

There is no coral reef substrate along the survey path or rocky outcroppings.

## 3.3.2 Segment 2 – Bahamas to Tower Isle, St. Mary

### 3.3.2.1 Tower Isle

Landing Site - A marine assessment was conducted along a corridor no more than 1m wide; the cable is no more than 28.8mm wide, of the marine environment. Figure 4-4 details the coordinates along which the cable will be laid. The marine assessment utilized dives of the area, video and still photography to document the condition of the seabed and associated structures and marine life in the study area. The depth of the assessment was up to a maximum of 18.288m (60ft) which characterised the inshore.

The selection of this landing site was due to the absence/lack of coral reefs or seagrass beds along the cable corridor.

#### *3.3.2.1.1 Inshore Survey*

Waters extending from the shore out to a depth of 20ft showed no significant marina flora or fauna. The substrate is composed of coralline sandy soil and calcareous sediments produced by the calcareous alga, ***Halimeda copiosa***. There were few patches of seagrass found; predominantly turtle grass (***Thallasia testudinum***). Few fish species were encountered during the survey, with trumpet fish being the predominant one. It is accepted that various reef fishes and other marine fauna may traverse the cable route. However, due to the nature of the cable laying activities and size of the cables being laid any interactions with marine fauna will be negligible. Of importance is the fact that no coral reefs lie in the path of the cable route.

The sandy substrate is inhabited mainly by the burrowing bivalve mollusk, *Donax sp.*, as well as other burrowing invertebrates.

### 3.3.3 Segment 3 – Ocho Rios to Montego Bay

#### 3.3.3.1 Montego Bay

Landing Site - A marine assessment was conducted along a corridor no more than 1m wide; the cable is no more than 28.8mm wide, of the marine environment. Figure 4-2 details the coordinates along which the cable will be laid. The marine assessment utilized dives of the area, video and still photography to document the condition of the seabed and associated structures and marine life in the study area. The depth of the assessment was up to a maximum of 18.28m (60ft) which characterised the inshore (Fig. 4-2).

The selection of this landing site was due to the absence/lack of coral reefs or seagrass beds along the cable corridor. This route is also receiving significant inflow of fresh water and sedimentation from the Great River to the west. The near shore is predominantly rocky with sand patches on a small beach area with cliff formations on either side. The rocky area may be due to run-off influence from the roadway and informal settlement nearby, as well as the NWC drain that empties at the landing site.

##### *3.3.3.1.1 Inshore Survey*

Waters extending from the shore out to a depth of 60ft (a distance of 1000m) showed no significant marina flora or fauna. The substrate is composed of coralline sandy soil and calcareous sediments produced by the calcareous alga, *Halimeda copiosa*.

There were few patches of seagrass found; predominantly turtle grass (*Thallasia testudinum*). Few fish species were encountered during the survey, with trumpet fish being the predominant one. It is accepted that various reef fishes and other marine fauna may traverse the cable route. However, due to the nature of the cable laying activities and size of the cables being laid any interactions with marine fauna will be negligible. Of importance is the fact that no coral reefs lie in the path of the cable route.

The sandy substrate is inhabited mainly by the burrowing bivalve mollusk, *Donax sp.*, as well as other burrowing invertebrates.

## 3.4 Weather & Meteorology

### 3.4.1 Outline

Ideally, one should obtain data for weather and meteorological parameters from stations within the defined boundaries of the region in which an assessment is being made. However, there are only two groups of publicly accessible weather stations on the island that are in continuous operation – the ones at Norman Manley International Airport in Kingston and the other at Montego Bay International Airport in St. James. Therefore, all data for the weather and meteorology for any point on the island would have to be represented by data generated from one of these two weather stations on the basis of which ever is closest geographically and on the basis of land topography. Table 3-2 through to Table 3-6 represents summaries and averages of the data collected from the weather stations at the Norman Manley International Airport, and Table 3-7 through to Table 3-10 represents summaries and averages of the data collected from the weather stations at the Montego Bay International Airport. Both sets of tables show summaries and averages of the following parameters:

- Rainfall
- Air Temperature
- Dew Point Temperature
- Wind Direction (in degrees and by compass points)
- Wind Speed
- Relative Humidity
- Atmospheric pressure
- Solar Radiation (in Watts per metre square)

Two of the three project sites fall in reasonably close proximity to the weather stations from which data is available, namely the Bull Bay Site and the Montego Bay site. The third project site does not fall within any appreciable proximity to any publicly available weather station; therefore the weather data for that area will have to be determined on the basis described above. Although Tower Isle, St. Mary is geographically closer to the weather station at Norman International Airport, it is separated from southern Jamaica by the John Crow Mountains. Conversely, there is no dominant topographical elevation separating both North Coast Areas, both of which experience similar effects from the trade winds which blow North-easterly into the island. Therefore, Tower Isle, St. Mary is best compared with the weather data from Montego Bay International Airport, rather than the weather data generated at Norman Manley International Airport

### 3.4.2 Bull Bay, St. Thomas

The project area is located along the south-eastern coast of Jamaica, which is characterized by low and/or sporadic rainfall patterns during the course of the year (See Table 3-2 through to Table 3-6). This region is shielded by the John Crow Mountain and Blue Mountain ranges from the North-easterly trade winds which enter the island. This shielding effect results in the rapid condensation of the wind currents as they come off the mountain ranges, causing reduced precipitation as they flow into the Southern part of the island. This causes the above stated low and/or sporadic rainfall with not much overcast conditions being experienced.

Typical of coastal regions is the effect of land and sea breeze, in which there is an expected gentle moist breeze coming on-land from the sea during the course of the day, and a gentle breeze flowing off-land to the sea during the night time. This event is a characteristic of the thermal properties of both the land and the sea and would not significantly affect weather in a general way.

The nature of this project, from construction through to operation dictates that the weather regime experienced in this area, will not have any impact on this project.

**TABLE 3-2: WEATHER DATA AVERAGES FOR 1997 – NORMAN INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| February | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| March | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| April | 73.88 | 106.56 | 26.63 | 21.58 | 7.54 | 111.55 | 1013.43 | 0.00 | 3.76 |
| May | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| June | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| July | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| August | 72.22 | 142.68 | 29.99 | 24.29 | 10.53 | 151.03 | 1012.85 | 0.00 | 228.54 |
| September | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| October | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| November | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| December | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| **Average** | 73.05 | 124.62 | 28.31 | 22.93 | 9.03 | 131.29 | 1013.14 | 0.00 | 116.15 |

KEY: ★★★ - Denotes data unavailability

**TABLE 3-3: WEATHER DATA AVERAGES FOR 1998 – NORMAN INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 76.68 | 146.22 | 27.62 | 22.95 | 7.84 | 153.69 | 1012.42 | 0.56 | 186.33 |
| February | 73.14 | 161.03 | 27.10 | 21.66 | 10.36 | 166.44 | 1011.90 | 0.12 | 211.15 |
| March | 79.67 | 133.75 | 27.48 | 23.47 | 7.60 | 142.22 | 1012.01 | 1.16 | 205.63 |
| April | 72.08 | 144.79 | 28.27 | 22.52 | 6.85 | 156.31 | 1012.10 | 0.55 | 145.06 |
| May | 73.12 | 139.60 | 29.33 | 23.83 | 8.12 | 147.36 | 1011.70 | 0.09 | 268.45 |
| June | 73.26 | 135.96 | 30.46 | 24.98 | 10.76 | 142.58 | 1012.55 | 0.19 | 262.26 |
| July | 74.23 | 139.81 | 29.96 | 24.68 | 9.04 | 146.71 | 1012.66 | 0.28 | 221.76 |
| August | 77.65 | 145.05 | 30.06 | 25.66 | 6.89 | 153.95 | 1005.18 | 0.43 | 145.33 |
| September | 78.65 | 120.24 | 29.56 | 25.38 | 8.67 | 126.47 | 1003.76 | 4.27 | 22.12 |
| October | 81.03 | 141.51 | 30.11 | 26.06 | 7.48 | 146.19 | 1008.54 | 0.28 | 73.05 |
| November | 81.65 | 143.61 | 28.15 | 24.58 | 6.48 | 154.17 | 1004.92 | 3.79 | 0.15 |
| December | 80.12 | 143.90 | 27.48 | 23.54 | 5.81 | 155.09 | 1011.02 | 0.84 | 0.01 |
| **Average** | 76.77 | 141.29 | 28.80 | 24.11 | 7.99 | 149.26 | 1009.90 | 1.05 | 145.11 |

KEY: ★★★ - Denotes data unavailability

**TABLE 3-4: WEATHER DATA AVERAGES FOR 1999 – NORMAN INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 75.75 | 141.61 | 26.55 | 22.08 | 7.41 | 152.12 | 982.99 | 0.20 | 0.47 |
| February | 73.78 | 152.68 | 25.25 | 20.89 | 7.40 | 163.37 | 961.46 | 0.30 | 0.66 |
| March | 74.45 | 153.67 | 26.72 | 21.84 | 7.17 | 165.06 | 996.66 | 0.00 | 0.26 |
| April | 74.99 | 124.49 | 27.73 | 22.72 | 8.74 | 130.96 | 1013.46 | 0.00 | 0.00 |
| May | 78.52 | 123.00 | 28.44 | 24.24 | 8.50 | 128.57 | 1012.97 | 0.00 | 0.00 |
| June | 78.23 | 133.04 | 28.92 | 24.59 | 9.53 | 136.99 | 1012.31 | 0.21 | 0.06 |
| July | 77.42 | 146.62 | 29.30 | 24.77 | 9.21 | 153.79 | 1013.39 | 0.24 | 0.00 |
| August | 80.13 | 140.39 | 29.34 | 25.44 | 7.42 | 148.16 | 1011.78 | 0.32 | 0.00 |
| September | 83.75 | 138.69 | 28.82 | 25.68 | 6.22 | 147.46 | 1009.22 | 5.63 | 0.06 |
| October | 86.76 | 141.94 | 28.48 | 25.93 | 6.95 | 151.16 | 1010.74 | 0.60 | 0.00 |
| November | 85.31 | 130.13 | 27.30 | 24.39 | 5.94 | 141.21 | 1009.61 | 1.23 | 0.00 |
| December | 73.53 | 142.36 | 26.49 | 21.13 | 5.96 | 153.69 | 1010.21 | 0.19 | 0.01 |
| **Average** | 78.55 | 139.05 | 27.78 | 23.64 | 7.54 | 147.71 | 1003.73 | 0.75 | 0.13 |

KEY: ⋆⋆⋆ - Denotes data unavailability

**TABLE 3-5: WEATHER DATA AVERAGES FOR 2000 – NORMAN INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 78.67 | 133.39 | 26.74 | 22.55 | 5.89 | 142.23 | 1010.22 | 0.00 | 0.00 |
| February | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| March | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| April | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| May | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| June | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| July | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| August | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| September | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| October | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| November | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| December | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| **Average** | 78.67 | 133.39 | 26.74 | 22.55 | 5.89 | 142.23 | 1010.22 | 0.00 | 0.00 |

KEY: ⋆⋆⋆ - Denotes data unavailability

**TABLE 3-6: WEATHER DATA AVERAGES FOR 2004 – NORMAN INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 59.63 | 105.64 | 25.30 | 19.75 | 7.80 | 112.84 | 927.22 | 0.91 | 15.11 |
| February | 57.01 | 117.89 | 26.03 | 17.85 | 8.83 | 127.51 | 941.25 | 0.94 | 16.87 |
| March | 57.76 | 137.10 | 25.87 | 18.04 | 8.34 | 148.66 | 931.62 | 0.95 | 13.99 |
| April | 60.56 | 107.62 | 27.30 | 19.24 | 7.87 | 116.33 | 988.78 | 0.21 | 1.80 |
| May | 61.88 | 99.50 | 27.31 | 26.29 | 9.27 | 110.20 | 950.36 | 0.91 | 1.11 |
| June | 57.04 | 94.02 | 28.86 | 20.26 | 12.72 | 98.49 | 968.43 | 0.20 | 1.76 |
| July | 63.11 | 118.20 | 28.85 | 21.33 | 9.50 | 125.83 | 998.57 | 0.43 | 0.18 |
| August | 59.71 | 103.09 | 28.53 | 20.80 | 11.36 | 109.45 | 951.32 | 1.93 | 1.06 |
| September | 68.43 | 148.52 | 28.50 | 22.02 | 5.64 | 152.50 | 1011.14 | 3.35 | 1.21 |
| October | 64.51 | 183.26 | 28.66 | 21.21 | 5.29 | 182.51 | 1011.97 | 0.76 | 0.13 |
| November | 59.65 | 179.51 | 27.85 | 19.14 | 5.86 | 180.17 | 1013.20 | 0.07 | 0.62 |
| December | 64.24 | 161.21 | 26.87 | 19.44 | 5.43 | 161.41 | 1014.74 | 0.01 | 6.37 |
| **Average** | 61.13 | 129.63 | 27.49 | 20.45 | 8.16 | 135.49 | 975.72 | 0.89 | 5.02 |

KEY: ★★★ - Denotes data unavailability

### 3.4.3 Montego Bay and Tower Isle, St. Mary

Tower, Isle St. Mary is located on the North-Eastern coast of the island and lies in close proximity to the base of the John Crow Mountain. This section of the island comes under direct influence from the North-easterly trade winds, which must ascend the mountain ranges that act as the backdrop to the St. Mary area. The ascent of these mountain ranges causes condensation that eventually leads to precipitation and rainfall in these areas. Therefore, this area is generally characterized by frequent rainfall or overcast conditions in comparison to the southern sections of the island. The weather data for the Tower Isle areas can be characterized but not completely mimicked by Table 3-7 through to Table 3-10

The Montego Bay area is located on the North-Western coast of the island and is also directly affected by the North-Easterly trade winds in a similar fashion as Tower Isle, St. Mary. However, it is not as close in proximity to a mountain range as the Tower Isle, St. Mary site, neither is its watershed area(s) as intact as those in St. Mary. As such, it is not expected to experience as much rainfall as the Tower Isle site. Typical weather data for the Montego Bay area is illustrated in Table 3-7 through to Table 3-10.

Typical of coastal regions is the effect of land and sea breeze, in which there is an expected gentle moist breeze coming on-land from the sea during the course of the day, and a gentle breeze flowing off-land to the sea during the night time. This event is a characteristic of the thermal properties of both the land and the sea and would not significantly affect weather in a general way.

No parameter of the weather regime reviewed indicates that the project would have any associated problems during any of its phases. The higher rainfall potential in this area will make it necessary for heightened consideration of the prevention of erosion, sedimentation, and silting which could be a possibility during the construction phase.

**TABLE 3-7: WEATHER DATA AVERAGES FOR 2001 – MONTEGO BAY INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| February | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| March | *** | *** | *** | *** | *** | *** | *** | *** | *** |
| April | 74.27 | 95.69 | 27.28 | 22.27 | 7.38 | 96.37 | 1015.80 | 0.07 | 224.14 |
| May | 77.13 | 110.72 | 27.52 | 23.09 | 5.94 | 112.56 | 1013.10 | 3.67 | 203.05 |
| June | 73.59 | 100.69 | 28.72 | 23.48 | 7.22 | 101.49 | 1014.92 | 0.48 | 223.97 |
| July | 75.98 | 109.87 | 29.43 | 24.22 | 6.57 | 104.39 | 1018.00 | 4.00 | 247.55 |
| August | 75.50 | 99.20 | 29.33 | 24.48 | 6.94 | 99.92 | 1013.87 | 1.59 | 201.40 |
| September | 75.91 | 115.30 | 28.63 | 23.91 | 5.37 | 117.08 | 1011.15 | 2.60 | 185.28 |
| October | 78.39 | 104.84 | 28.17 | 23.98 | 5.97 | 106.20 | 1012.16 | 3.52 | 151.63 |
| November | 77.30 | 90.03 | 26.97 | 22.57 | 7.36 | 90.86 | 1012.54 | 2.73 | 131.18 |
| December | 80.28 | 89.60 | 26.87 | 23.13 | 7.14 | 90.57 | 1011.65 | 2.24 | 132.07 |
| **Average** | 76.48 | 101.77 | 28.10 | 23.46 | 6.66 | 102.16 | 1013.69 | 2.32 | 188.92 |

KEY: ★★★ - Denotes data unavailability

**TABLE 3-8: WEATHER DATA AVERAGES FOR 2002 – MONTEGO BAY INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ º | Air Temperature/ ºC | Due Point / ºC | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 77.79 | 88.06 | 26.31 | 25.25 | 8.14 | 90.68 | 1015.51 | 0.61 | 143.74 |
| February | 74.81 | 89.56 | 26.32 | 21.41 | 6.63 | 92.00 | 1015.63 | 0.32 | 167.08 |
| March | 72.78 | 86.51 | 26.94 | 21.56 | 7.35 | 88.63 | 1015.34 | 0.30 | 212.38 |
| April | 73.11 | 73.68 | 27.12 | 21.79 | 8.19 | 74.69 | 1014.71 | 0.28 | 230.11 |
| May | 77.22 | 87.57 | 27.80 | 23.35 | 7.19 | 88.79 | 1013.56 | 3.33 | 180.44 |
| June | 76.80 | 99.90 | 28.28 | 23.73 | 6.37 | 101.94 | 1013.91 | 3.55 | 197.92 |
| July | 73.96 | 93.63 | 29.14 | 23.94 | 6.97 | 95.17 | 1015.79 | 0.71 | 212.40 |
| August | 75.22 | 98.31 | 28.92 | 24.02 | 6.37 | 100.28 | 1014.15 | 1.52 | 187.20 |
| September | 77.65 | 104.35 | 28.29 | 23.92 | 5.32 | 106.66 | 1011.32 | 3.48 | 140.16 |
| October | 78.59 | 102.57 | 28.18 | 24.06 | 5.28 | 104.42 | 1010.98 | 2.18 | 164.85 |
| November | 78.61 | 99.98 | 28.00 | 23.87 | 5.39 | 101.51 | 1013.55 | 1.37 | 145.72 |
| December | 78.08 | 100.79 | 26.93 | 22.71 | 5.85 | 102.84 | 1015.01 | 1.26 | 127.45 |
| **Average** | 76.22 | 93.74 | 27.68 | 23.30 | 6.59 | 95.64 | 1014.12 | 1.58 | 175.79 |

KEY: ★★★ - Denotes data unavailability

**TABLE 3-9: WEATHER DATA AVERAGES FOR 2003 – MONTEGO BAY INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ ° | Air Temperature/ °C | Due Point / °C | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 80.29 | 90.87 | 26.00 | 22.26 | 6.60 | 93.40 | 1015.52 | 5.73 | 115.70 |
| February | 76.08 | 99.52 | 26.64 | 24.55 | 5.91 | 101.54 | 1014.78 | 0.08 | 170.39 |
| March | 74.13 | 117.74 | 27.23 | 22.12 | 5.54 | 121.24 | 1012.79 | 0.46 | 191.81 |
| April | 77.26 | 109.61 | 27.37 | 22.97 | 6.55 | 112.45 | 1012.49 | 1.90 | 206.87 |
| May | 75.83 | 104.53 | 28.28 | 23.52 | 6.20 | 105.93 | 1013.18 | 1.87 | 202.88 |
| June | 76.50 | 108.08 | 28.37 | 23.77 | 5.83 | 109.65 | 1012.67 | 2.93 | 207.39 |
| July | 77.28 | 93.21 | 28.74 | 24.29 | 7.11 | 94.33 | 1014.63 | 1.12 | 207.19 |
| August | 81.34 | 105.40 | 28.59 | 25.01 | 5.58 | 106.91 | 1014.28 | 3.60 | 200.40 |
| September | 79.02 | 116.16 | 28.69 | 24.62 | 4.96 | 117.14 | 1012.63 | 0.47 | 191.03 |
| October | 79.98 | 111.72 | 28.49 | 24.64 | 4.40 | 113.26 | 1010.89 | 0.07 | 163.77 |
| November | 80.20 | 86.41 | 27.76 | 24.06 | 7.01 | 87.29 | 1011.59 | 12.60 | 138.91 |
| December | 78.69 | 87.80 | 26.59 | 24.47 | 7.74 | 90.90 | 1013.95 | 0.39 | 120.89 |
| **Average** | 78.05 | 102.59 | 27.73 | 23.86 | 6.12 | 104.50 | 1013.28 | 2.60 | 176.44 |

KEY: ★★★ - Denotes data unavailability

**TABLE 3-10: WEATHER DATA AVERAGES FOR 2004 – MONTEGO BAY INTERNATIONAL AIRPORT AUTOMATIC WEATHER STATIONS**

| Month | Relative Humidity %RH | Wind Direction/ ° | Air Temperature/ °C | Due Point / °C | Wind speed/ Knts | Wind Direction/ LogUnits | Atmospheric Pressure Pressure/ mBar | Rainfall /mm | Solar Radiation W/m2 |
|---|---|---|---|---|---|---|---|---|---|
| January | 76.10 | 89.52 | 25.95 | 21.34 | 6.99 | 92.81 | 1016.04 | 0.32 | 145.87 |
| February | 74.65 | 95.67 | 26.39 | 21.45 | 7.53 | 99.91 | 1016.18 | 0.26 | 161.29 |
| March | 76.38 | 94.12 | 26.50 | 21.94 | 8.23 | 94.29 | 1015.67 | 0.44 | 199.66 |
| April | 76.91 | 97.76 | 26.77 | 22.28 | 6.93 | 97.86 | 1014.04 | 2.09 | 222.19 |
| May | 80.74 | 99.64 | 27.73 | 24.06 | 6.91 | 100.27 | 1013.30 | 0.80 | 199.72 |
| June | 76.74 | 102.79 | 28.88 | 24.33 | 7.54 | 102.75 | 1015.33 | 0.76 | 216.87 |
| July | 78.38 | 120.33 | 28.69 | 24.49 | 5.65 | 120.82 | 1013.92 | 1.63 | 203.13 |
| August | 78.43 | 117.95 | 28.94 | 24.96 | 5.92 | 118.04 | 1013.16 | 1.12 | 206.93 |
| September | 74.71 | 135.47 | 26.60 | 23.80 | 4.77 | 136.43 | 915.69 | 5.56 | 158.13 |
| October | 78.76 | 108.84 | 28.29 | 24.32 | 5.66 | 109.01 | 998.24 | 0.73 | 177.39 |
| November | 75.57 | 98.47 | 29.28 | 22.74 | 8.62 | 98.49 | 1004.27 | 0.29 | 151.94 |
| December | 81.09 | 94.13 | 26.42 | 22.87 | 8.59 | 94.11 | 1012.80 | 2.35 | 124.40 |
| **Average** | 77.37 | 104.56 | 27.54 | 23.21 | 6.94 | 105.40 | 1004.05 | 1.36 | 180.63 |

KEY: ★★★ - Denotes data unavailability

## 3.5 Weather Impact on Project

While there are variations in the weather patterns between the north and south coasts of the island, it is not envisioned that any of the parameters assessed in this section will have any negative impacts on the establishment, operation or maintenance of the project.

## 3.6 Natural Hazard Vulnerability.

### 3.6.1 Outline

The proposed project consists of two concurrent operational phases:

1. An offshore operational phase.
2. An onshore operational phase.

The components of both phases will set the baseline for the operation of the proposed cable infrastructure, and therefore must be considered when estimating the vulnerability of the proposed infrastructure to nature. The operational infrastructure has the potential to be affected, to some degree, by existing climatic and potential weather patterns, geological activity (specifically tectonic activity) and the hydrostratigraphy (especially in relation to flooding potential) of the various regions where cable installation and laying is proposed to occur. For the purposes of this Environmental Impact Assessment offshore consideration will be given only up to the boundary of the Jamaican coastal waters – beyond that is beyond the jurisdiction of this assessment, however, if necessary, references to any pertinent and appropriate similarities in the region will be incorporated.

#### 3.6.1.1 Offshore Cable Operations

The offshore cable operational phase is slated to occur in two distinct phases:

1. Deep-shore operations

2. Near shore operations (this is a transition into the onshore cable operational phase.)

Common to both phases is the medium of operation (water) and, as such, are likely to be affected by wave action that is generated from aggressive deep water movement, which is caused by storm surges and tectonic activity. Extreme occurrences of either of these events could cause unlikely cable failure through abrasion and or instantaneous or gradual extension of the cable beyond the elastic limits of its component materials. However, as with every event, there is a threshold required for noticeable occurrence and also a limit at which the event will cause unfavorable results; therefore, it is arbitrary to assume that any storm surge or tectonic activity will cause any unlikely cable failure. Although there is no pragmatic way to define exactly what level of displacement in the sea floor (vertical and horizontal) or what type of storm surge will generate a certain definable stress on the cable, it is statistically possible to conclude from Table 3-11 that both abrasion and tectonic activity rarely causes cable failure. Implicit in the data, is the fact that these events rarely generate the forces required to exceed the limits of the cable materials' strength. Therefore, one can assume that the combined material strength of the cable materials have been designed to withstand common abrasion forces resulting from water movement, and the effects of common minor plate movement. Keep in mind that there are miles of this type of cable deployed worldwide under a wide variety of marine and seismic conditions that are fully functional.

The deep shore aspect of the cable operations can be generally regarded as unaffected by storm surges. Storm surges do not usually disturb the ocean bottom in deep waters by virtue of deep water depth in relation to the volume of water that is displaced. However, pronounced effects are estimated as likely for near-shore operations as the cable makes the transition to onshore operations. However, as stated earlier, it is difficult to correlate storm surge magnitude with sustainable cable integrity – one can only assume that cable breakage is unlikely to occur due to the design and established track record of the industry. Cable breakage is unlikely in and of itself to result in environmental degradation or negative environmental impacts.

**TABLE 3-11: PERCENTAGE OF FAILURE CAUSES FOR 380 REPORTED CABLE FAULTS**

| Cause | Count | % |
|---|---|---|
| Abrasion | 18 | 4.7% |
| Anchor | 49 | 12.9% |
| Branching Unit | 2 | 0.5% |
| Cable or Survey Ship Activity | 5 | 1.3% |
| Dredging/Drilling and Pipe Installation | 12 | 3.2% |
| Earthquake or Seabed Movement | 10 | 2.6% |
| Equaliser | 1 | 0.3% |
| Fatigue | 1 | 0.3% |
| Fishing Activity | 184 | 48.4% |
| Impact by Hard Object | 5 | 1.3% |
| Insulation Failure | 3 | 0.8% |
| Jointing Box | 5 | 1.3% |
| Manufacturing Defect - Cable | 4 | 1.1% |
| Repeater | 17 | 4.5% |
| Unknown - Cable Deliberately Cut | 1 | 0.3% |
| Unknown - Cable Mauled | 6 | 1.6% |
| Unknown - Cable not repaired | 1 | 0.3% |
| Unknown - Fibre Attenuation | 5 | 1.3% |
| Unknown - Kinks, Twists, Loops | 9 | 2.4% |
| Unknown - Shunt Fault | 31 | 8.2% |
| Unknown - Tension Break | 11 | 2.9% |
| TOTAL | 380 | |

### 3.6.1.2 Onshore Cable Operations

The onshore cable operation has two (2) distinct areas of operation:

1. Onshore shelter station where data relay is done
2. Terrestrial areas:
   a. Above ground, along existing electrical high tension wires
   b. Underground, on route to installation or relay areas

Given the degree and frequency of seismic activity in Jamaica (See Section 3.6.2), seismic activity is not expected to generally affect either the terrestrial areas or the on-shore shelter station area in a critical way. Further, it is assumed that existing infrastructure would have been approved for construction with considerations being given to flooding vulnerability, land slippage vulnerability and seismic activity. Given the relationship between existing infrastructure and the proposed cable network, the hazard vulnerability will depend largely on the approved infrastructure, in which the cable and associated equipment are housed.

Of considerable concern is the potential effect of storm surge on the on-land shelter station which houses the electronic equipment for data relay. Effects from flooding and battering due to these storm surges could pose problems for both the electronic equipment and the building's structural integrity. Therefore, the building has been designed to be at a proposed height of at least 3m above sea level, which is estimated to give it sufficient clearance from normal storm surge activity. Regardless, the terrain of the sites is estimated to exceed this proposed minimum requirement. It is not anticipated that even if the buildings and equipment were to be damaged by natural hazards that it would result in a negative environmental impact, since no chemicals, etc would be involved.

### 3.6.2 Seismic Activity

Jamaica lies in the seismically active northern plate boundary zone of the Caribbean Plate (Draper et al., 1994 and Figure 3-8). High magnitude earthquakes originating from as far away as the south coast of Cuba may be felt in Jamaica. For example the Cabo Cruz earthquake of magnitude 6.9 which occurred in May 1992 was felt with intensity 4 in Kingston, Jamaica. The 1993 earthquake of magnitude 5.4 which originated in Jamaica was felt in Cuba