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**THE SUITABILITY OF PROPOSED SITES IN
PORTLAND FOR THE RELOCATION OF PERSONS
AFFECTED BY THE OCTOBER/NOVEMBER 2001
FLOOD RAINS**

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TERMS OF REFERENCE

The Minister of Land and Environment, in response to the October to November 2001 flood rains that destroyed section of Portland and St. Mary, summoned several agencies, including the Water Resources Authority (WRA), to undertake the assessment of the suitability of proposed relocation sites for persons affected. The specific responsibility of the WRA was to assess the risk of flooding and groundwater pollution. The proposed sites were Lennox, Hart Hill, Caenwood, Passley Gardens, Darley, and Bybrook.

LENNOX RELOCATION SITE

Site Location

The Lennox relocation site is located along the main road between Black Hill and Low Leyton or approximately 5.5km west of Hope Bay (Map 1).

Map 1: Lennox Relocation Site and Runoff.



Overview and Drainage of Site

The Lennox site is to be used for the relocation of flood victims from Grants Gate. The site covers an area of 2.5 hectares and is bounded on the west by a ridge and to the south by Mt. James and Mt. Edwards (Map 2). The site is gentle sloping with a maximum elevation of 61metres (200ft).

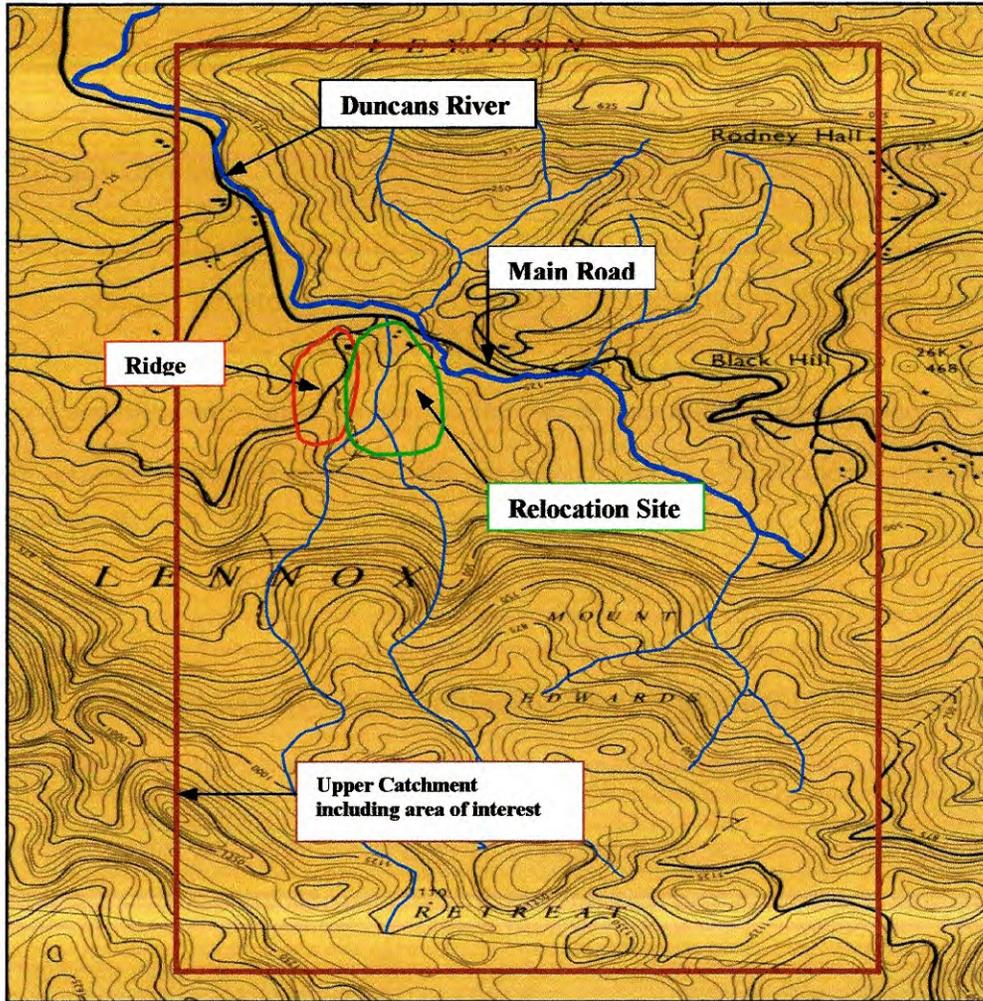
The site is bisected by a tributary of the Duncans River, which could impact on the site in the occurrence of a major rainfall event. Several other tributaries join the river to the east of the site and these could channel flood flows towards the site via the Duncans River that flows westward and just north of the site.

Flood risk analysis of the area for rainfall events with intensities ranging from 208 to 639mm in 24 hours (return periods of 2 to 100 years) shows water depth buildup ranging from 0.63 to 1.31m and top width ranging from 17 to 25metres respectively (Table 1). The area for development will not be affected by the depth buildup because of its higher elevation (up to 31metres) above the minimum elevation. The main road, on the other hand, may be flooded. The depth of the river was not considered in the analysis the effect of which would be a reduction in the depth buildup. The top width indicates the spread of water over the ground surface.

Table 1: Rainfall Return Period Events

Return Period (yrs)	Rainfall Intensity (mm/24 hrs)	Peak Flow (Q) (m ³ /s)	Top Width (T) (m)	Depth (d)	
				(ft)	(m)
2	208	21.08	16.97	2.08	0.63
5	323	40.55	20.03	2.85	0.87
10	400	53.88	21.69	3.27	1.00
25	496	70.58	23.47	3.72	1.13
50	568	83.09	24.66	4.02	1.22
100	639	95.57	25.75	4.29	1.31

Map 2: Map Showing Lennox Relocation Site and Catchment



Impact of Resettlement on Runoff

The construction of buildings at the site is expected to increase runoff though the impact is not expected to be significant. There is no downstream settlement that would be impacted by this small additional runoff.

Domestic Water Supply

Domestic water is supplied to Lennox from the Crystal Springs. This spring is also the source for several other villages in the area and without any production/demand figures

it is difficult to state the reliability and capability of this source to meet all the demands. Spot measurements of flow for the Crystals Springs, measured on October 26, 1993, indicate 0.26 cubic metres per second.

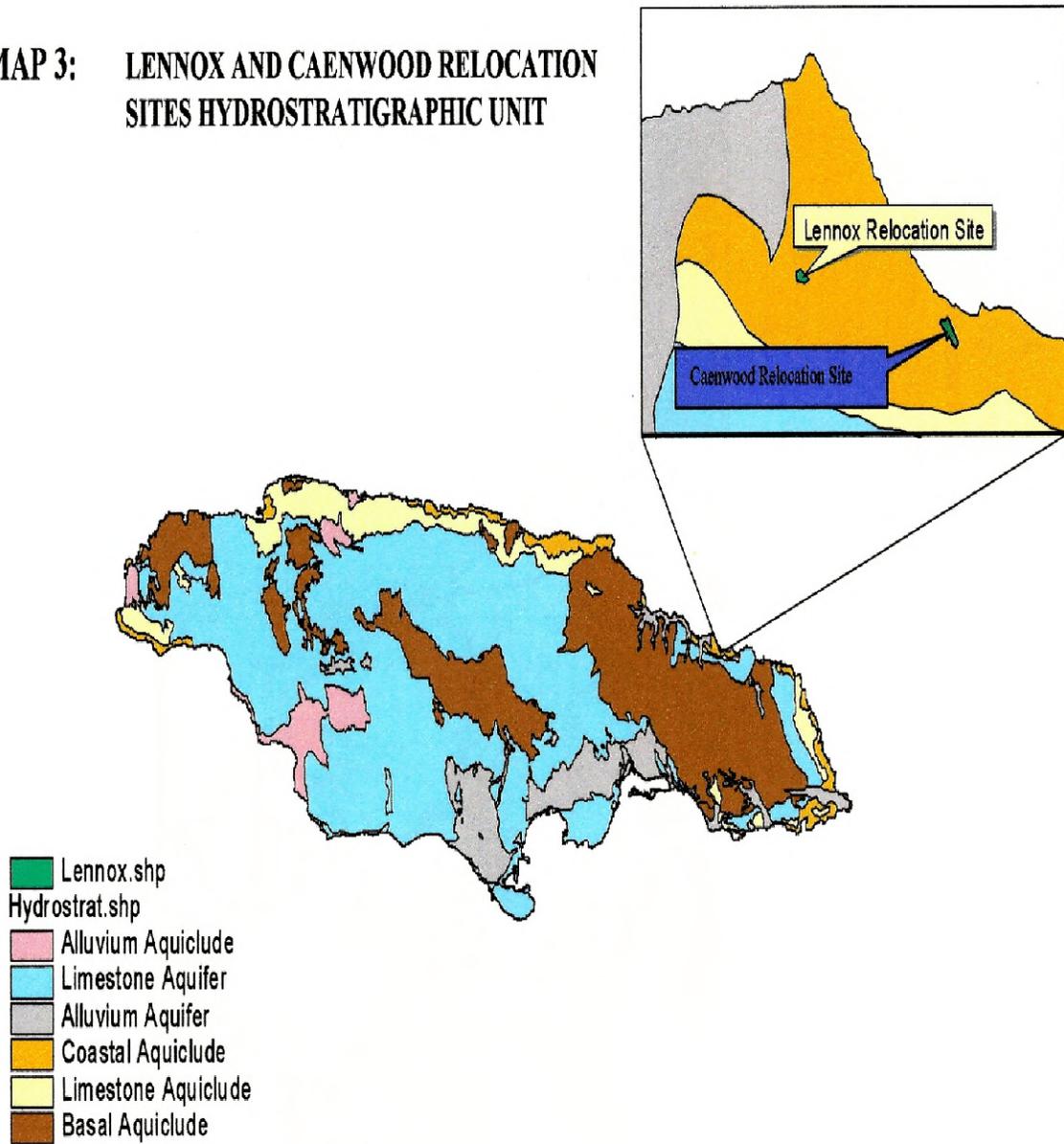
Sewage Disposal

There is no sewage infrastructure at the site despite the already existing settlements. The coastal limestone formation, which is classified hydrostratigraphically as an aquiclude, underlies the area (Map 3). An aquiclude is a rock formation of low permeability with little potential for water resources development. The use of absorption/soakaway systems for sewage disposal should pose no risk to water resources.

Site Suitability

The site is suitable for the relocation of persons affected by the October/November flood rains.

MAP 3: LENNOX AND CAENWOOD RELOCATION SITES HYDROSTRATIGRAPHIC UNIT

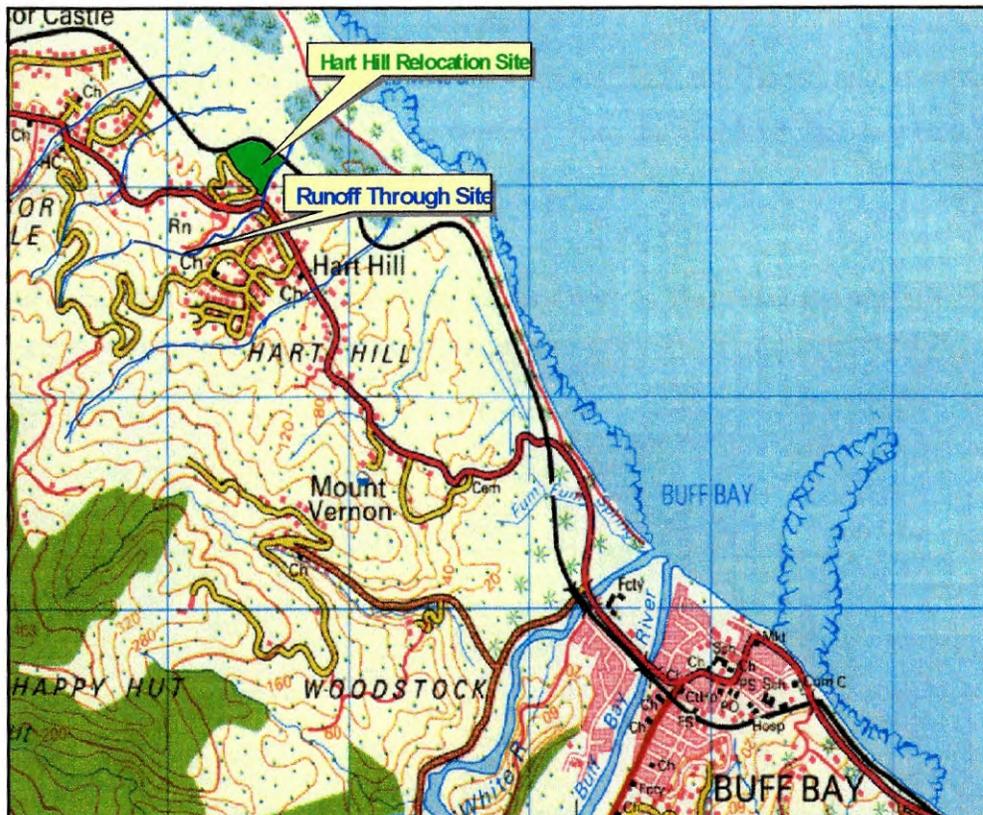


HART HILL RELOCATION SITE

Site Location

The Hart Hill relocation site is located approximately 5.3km west of Buff Bay (Map 4).

Map 4: Hart Hill Relocation Site and Runoff



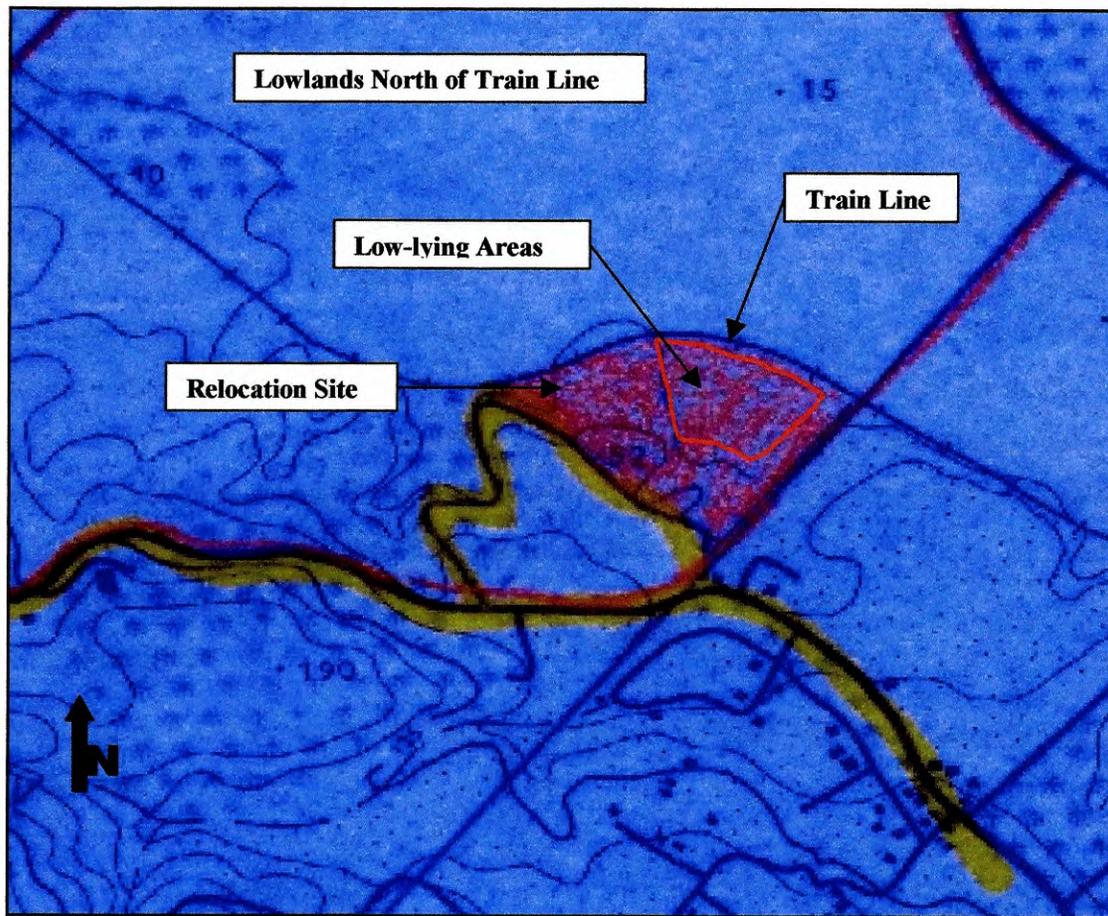
Overview and Drainage of Site

The Hart Hill site is to be used for the relocation of flood victims from Swift River and Bybrook. The site covers an area of 4 hectares and is bounded to the north by the train line. Approximately 2.4 – 3.2 hectares are suitable for development. The rest consists of low-lying areas that become flooded during rainfall. There was no surface water in these low-lying areas at the time of the visit. The site is gentle sloping with a maximum elevation of 16metres (52ft).

To the east of the site is a vegetative waterway that channels runoff from hills south of the site into the low-lying areas, which contributes to the flooding of these areas during rainfall. Several other waterways channel runoff into lowlands north of the train line. These runoffs are not expected to impact on the relocation site. The large area covered by these lowlands reduces flood risk at the site by accumulating runoff from the site and discharging into the sea (Map 5).

The site is said to be managed by the Coconut Industry Board and is currently planted with coconuts. Approval may be required from the Coconut Industry Board to develop the site.

Map 5: Map Showing Low-lying Areas Close to Hart Hill Relocation Site



Impact of Resettlement on Runoff

The construction of buildings at the site is expected to increase runoff though the impact is not expected to be significant. There is no downstream settlement that would be impacted by this additional runoff.

Domestic Water Supply

Domestic water is supplied to Hart Hill from the Windsor Castle water supply. This water supply is also the source of water for several other villages in the area. The demand of 0.4mgd (million gallons per day) against a production capacity of 0.17mgd represents a shortfall of 0.23mgd or 58% (*Parish Profiles, Portland Parish Profiles*). Additional demand on this water resource will only increase the shortfall that already exist. More water sources need to be identified to supplement the current water supply.

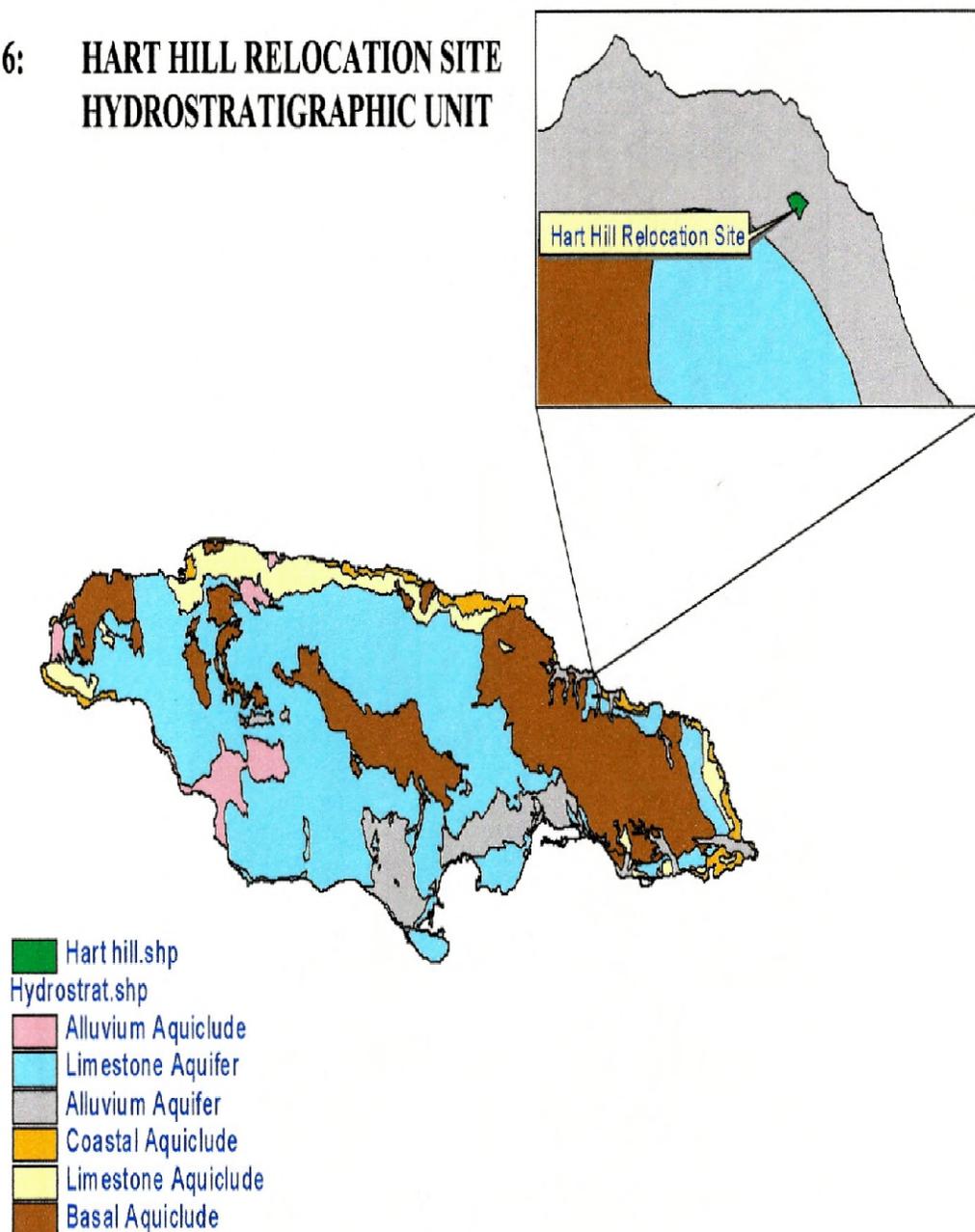
Sewage Disposal

There is no sewage infrastructure at the site. The alluvium formation, which is classified hydrostratigraphically as an aquifer, underlies the area (Map 6). An aquifer is a rock formation of high permeability with high potential for water resource development and because of its high permeability groundwater pollution vulnerability is also high. These, in addition to the proximity of the site to the coast and the uncertainty of the groundwater flow direction and depth make the use of absorption/soakaway pits for sewage disposal unsuitable. The WRA recommends the use of septic tank with tile field for sewage disposal at this site.

Site Suitability

The site is suitable for the relocation of persons affected by the October/November flood rains.

**Map 6: HART HILL RELOCATION SITE
HYDROSTRATIGRAPHIC UNIT**

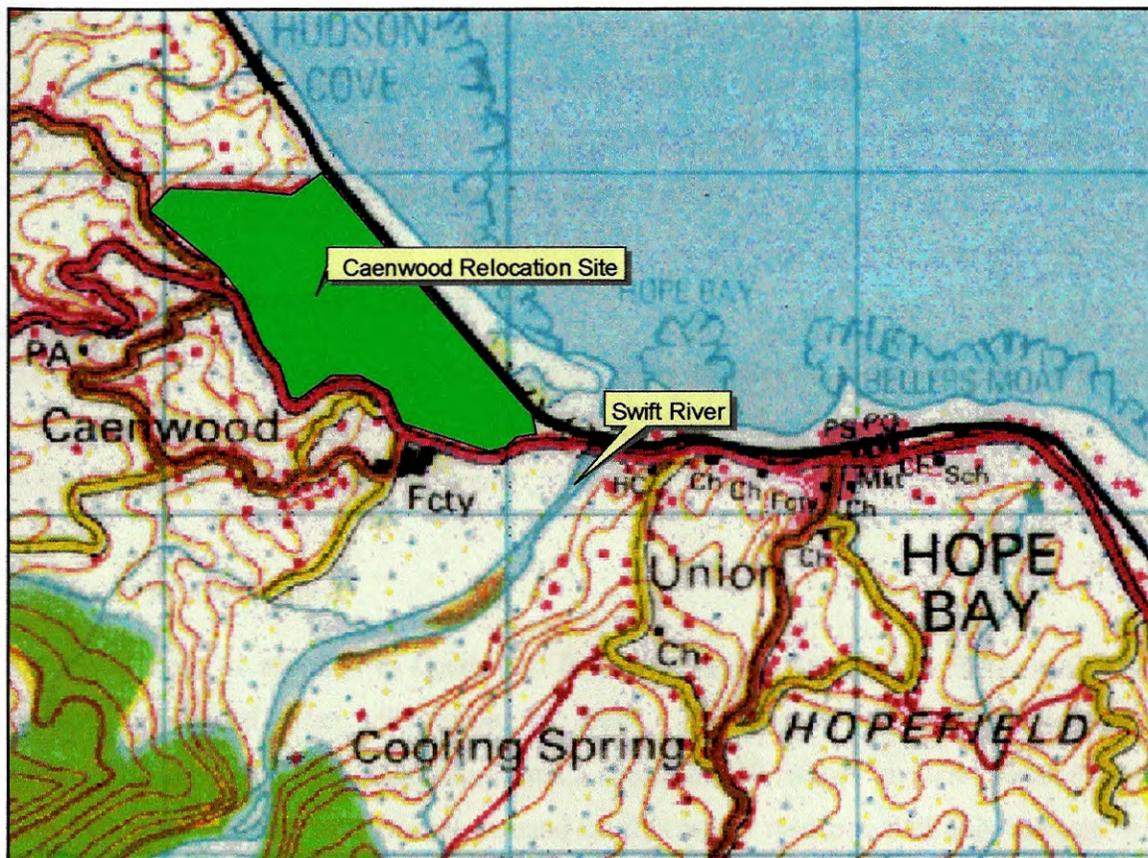


CAENWOOD RELOCATION SITE

Site Location

The Caenwood relocation site is located just west of the Swift River or approximately 2.0km west of Hope Bay (Map 6).

Map 6: Caenwood Relocation Site



Overview and Drainage of Site

The Caenwood relocation site is bounded on the north by the train line and to the south by the main road. The site has a ridge located at its center with a maximum elevation of 23metres (75ft).

Runoff from hills south and west of the site is channeled into the area, which could impact on the site in the occurrence of a major rainfall event. Stagnant water from the October/November flood rains was still present on the ground surface at the time of the visit, indicating high water table or poor drainage of the soil. This may provide a breeding ground for mosquitoes and other waterborne vectors. During flood events, the site may be inaccessible by ground vehicles or by walking.

Impact of Resettlement on Runoff

The construction of buildings at the site is expected to increase runoff though the impact is not expected to be significant. There is no downstream settlement that would be impacted by this small additional runoff.

Domestic Water Supply

Domestic water is supplied to Caenwood from the Daniels River. This River is also the source for several other villages in the area. The demand of 0.60mgd against a production capacity of 0.06mgd represents a shortfall of 0.54mgd or 90% (*Parish Profiles, Portland Parish Profiles*). Additional demand on this water resource will only increase the shortfall that already exist. Additional water sources need to be identified to supplement the current water supply.

Sewage Disposal

There is no sewage infrastructure at the site. The Caenwood site is located on the same coastal limestone formation as the Lennox relocation site (see Sewage Disposal for Lennox and Map 3). The use of adsorption/soakaway systems for sewage disposal should pose no risk to water resources.

Site Suitability

The site is not suitable for the relocation of persons affected by the October/November flood rains because of the potential for flooding of the low areas of the site.

PASSLEY GARDENS, DARLEY AND BYBROOK RELOCATION SITES

The touring party did not visit the proposed sites at Passley Gardens, Darley and Bybrook. The specific relocation site for Passley Gardens was not known while Darley and Bybrook were not visited on advice of members of the touring team that those sites were not suitable for development based on their knowledge of the areas. Darley is susceptible to flooding and in the flood rains of May 1993 the community was relocated.

Conclusions

The Lennox and Hart Hill sites are suitable for the relocation of persons affected by the flood rains. The Caenwood site is not suitable because of the potential for flooding at that site. Passley Gardens, Darley and Bybrook were not visited.

Recommendations

1. Additional water sources should be identified to supplement the current water supply at both Lennox and Hart Hill sites.
2. Absorption/soakaway pits can be used for sewage disposal at the Lennox relocation site where because of the geology they pose no threat to groundwater resources.
3. Septic tank and tile field are recommended for sewage disposal at the Hart Hill relocation site because of the threat to groundwater resources.

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