DEPARTMENT OF ENVIRONMENT
CAYMAN ISLANDS GOVERNMENT

Coastal Works Review

Newlands Sound Development c/o Harilyn Bodden

The Isles at Newlands, Hirst Rd. – Proposed Offshore Access Channel

Block: 27B **Parcel:** 115

Ref: DOE/CWK/439

PREPARED FOR: MINISTRY OF SUSTAINABILITY & CLIMATE RESILIENCY

September 16, 2022

Coastal Works Review

Newlands Sound Development – Proposed Channel for Residential Subdivision
Block: 27B **Parcel:** 115

Project Proposal

The Applicant – Newlands Sound Development Ltd., c/o Harilyn Bodden - is seeking permission to dredge an access channel measuring approximately 100 feet wide by 1,626 feet long by 5 feet deep as shown in Figure 1.

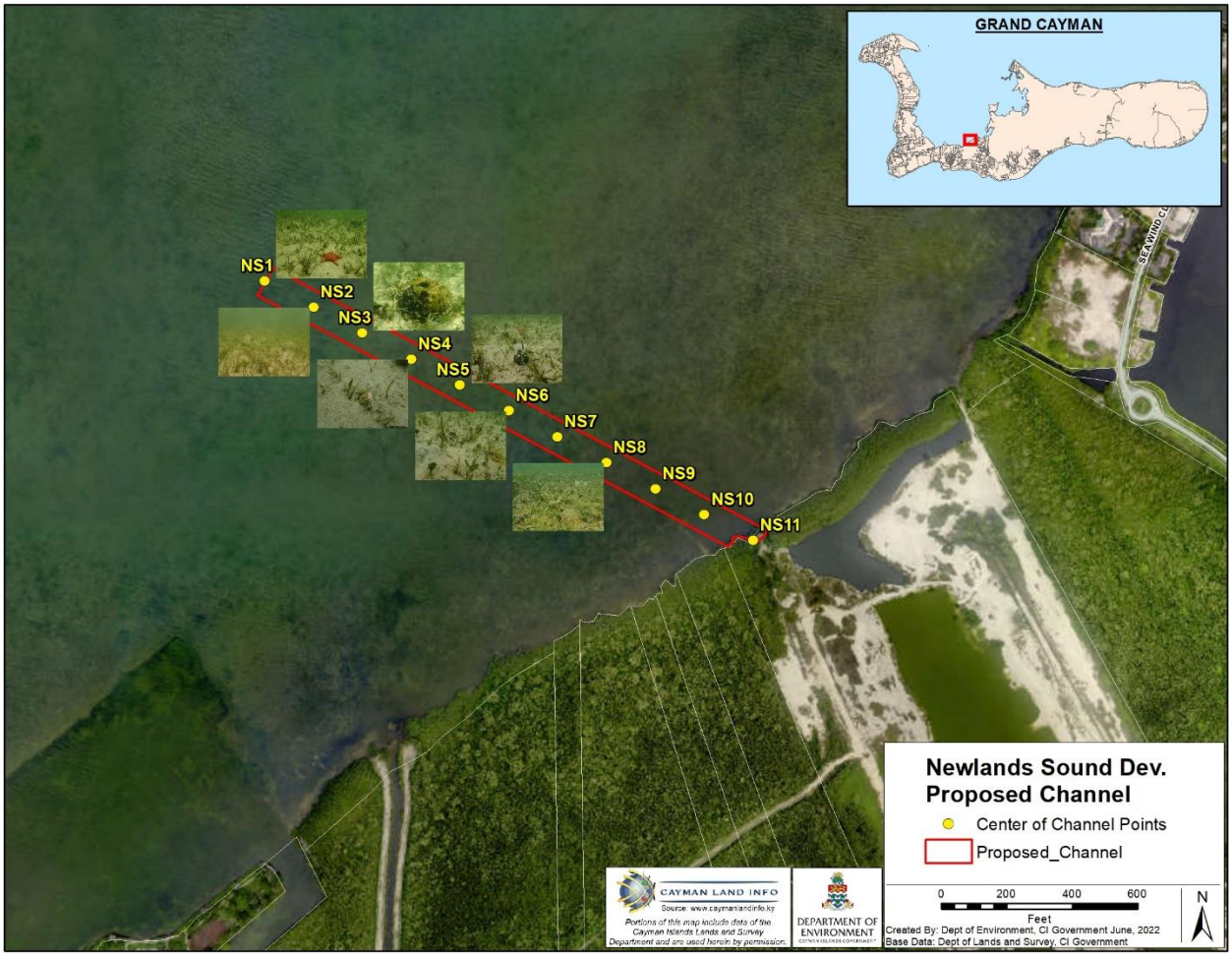

Figure 1: Lands and Survey 2018 aerial imagery with the applicant's site plan overlaid showing the proposed channel outlined in red.

The Applicant's coastal works application form states that the channel is proposed to provide marine access to a proposed 143-lot canal front residential subdivision on Block 27B Parcel 115. The Applicant further states in their application form that the channel is being proposed because the depth of the water

at the shore is approximately 1.32 feet below Mean Sea Level (MSL), sloping gradually to a depth of 5 feet below MSL approximately 1,180 feet from the shore and that the existing depth will not accommodate recreational motorised watercrafts with a draft of 2 to 3 feet.

The Applicant has indicated that the channel will be dredged using a 370 hp portable dredger with a 12-inch suction cutter head with a standard 10-inch or 12-inch pipeline. The dredged material will be pumped ashore into a de-watering area on Block 27B Parcel 115 via a 12-inch diameter pipe.

The total estimated volume of dredged material is 67,885 cubic yards. The Applicant has indicated in a cover letter included with their submissions that the material dredged from the channel excavation will be used to fill the remainder of Block 27B Parcel 115 which is '*currently below minimum levels prescribed by the Central Planning Authority (CPA)'*.

According to the Applicant's application form, the works will affect approximately 3.8 acres of Crown property and includes the removal of 0.35 acres of mangroves and 3.5 acres of seagrass.

Environmental Overview & Impacts

The majority of the proposed channel is located within a Marine Protected Area (MPA), namely a Marine Reserve, as shown in Figure 2.

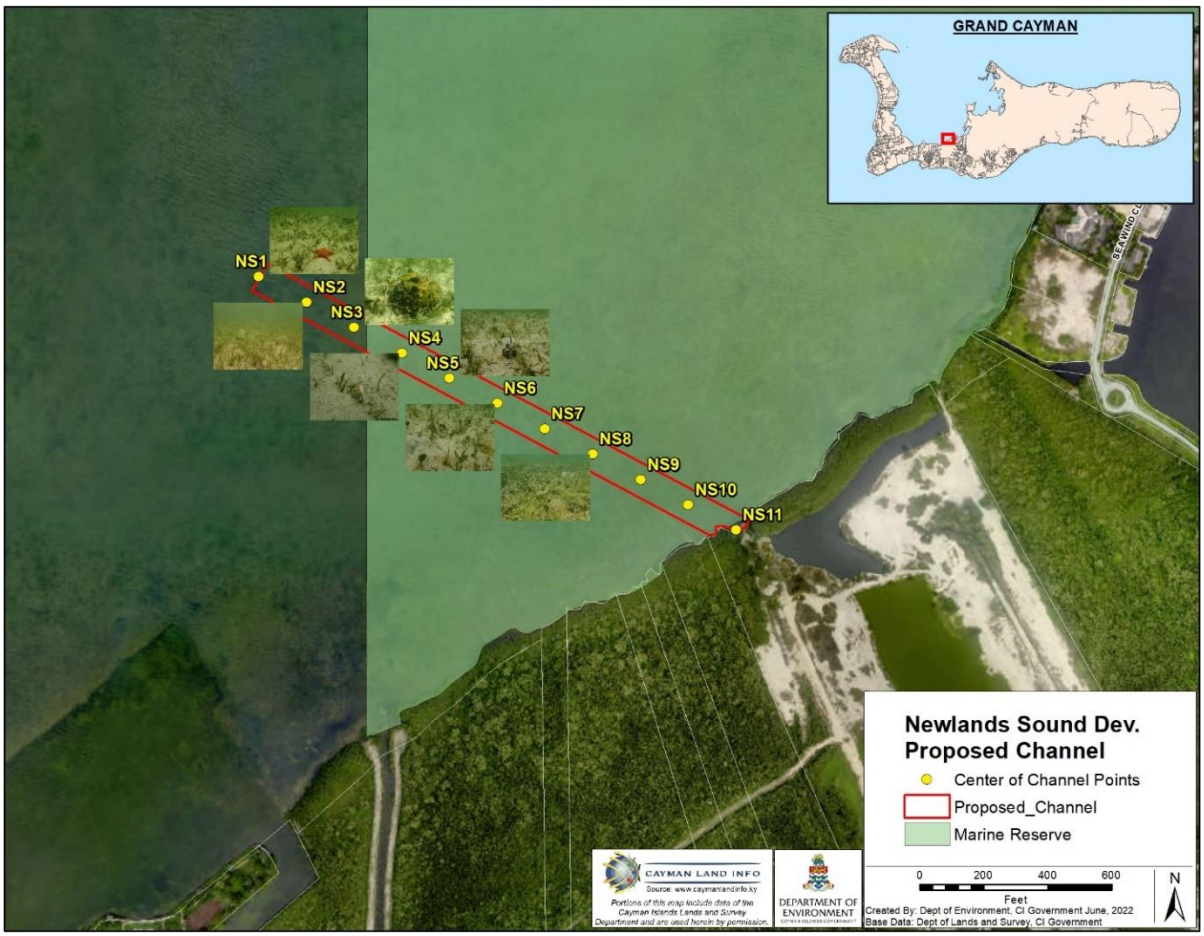

Figure 2: Lands and Survey 2018 aerial imagery with the applicant's site plan overlaid showing the proposed channel outlined in red and the Marine Reserve (MPA) in green.

The rationale for designating Marine Reserves is to ensure that breeding and nursery areas for marine life (especially queen conch and spiny lobster) are protected. The excavation of an access channel can have an adverse impact on habitats such as seagrass beds and coastal mangroves, which support these breeding and nursery areas. The proposed work also encroaches into the Mangrove Buffer Zone. The sections below provide an overview of potential environmental impacts.

Loss of Benthic Habitat

The habitat cover in the footprint of the proposed area of works is mainly colonised by seagrass beds with algae, seagrasses, sponges, and occasional coral colonies (see Figures 3-6) which typically support a variety of infauna, invertebrate and fish communities. Often referred to as a 'transitional habitat', the seagrass beds in this area complement the surrounding mangroves, providing a healthy ecosystem for marine life and aiding in the protection and stabilization of the coastline. Seagrass habitat is acknowledged to be one of the most valuable and vulnerable ecosystems.[1] The dredging of this channel will directly remove healthy seagrass beds.

One of the major functions of seagrass ecosystems is the habitat they provide. Seagrass beds provide food and shelter for many marine species at different stages of their life cycles and thus function as nursery areas for commercially important fish species. The habitat function of seagrasses increases in impact and value when they are connected to adjacent mangrove or coral reef ecosystems since seagrass beds function as nurseries for the juveniles of species that spend their adult phases in the adjacent ecosystems.

Other than the habitat function, seagrasses also provide many other ecosystem benefits. Given the climate change predictions for the region, which include rising temperatures, sea-level rise and increased intensity of storm events (including storm surge), another beneficial function of seagrass beds is that they provide flood reduction and reduce erosion from wave action aiding in shore protection, particularly along beaches and shallow areas. Although often overlooked in comparison to mangroves, seagrasses are also nutrient sinks, buffering or filtering nutrient and chemical inputs to the marine environment aiding in water quality. The deposition and stabilisation of sediments provided by seagrasses assist other important adjacent marine ecosystems such as coral reefs.

It is generally scientifically accepted that the coastal ecosystems of mangroves, seagrass meadows and tidal marshes mitigate climate change by sequestering carbon dioxide (CO_2) from the atmosphere and oceans at significantly higher rates, per unit area, than terrestrial forests. Therefore, seagrass communities are also valuable because they contribute to our islands' natural capital, serving as important carbon sinks. Carbon accumulates in seagrasses over time and is stored almost entirely in the soil. This means that the direct removal of seagrass results in carbon being released back into the atmosphere. Although in-depth local studies have not been undertaken, the Blue Carbon Initiative (a global program working to mitigate climate change through the restoration and sustainable use of coastal and marine ecosystems) acknowledges that '*although seagrasses account for less than 0.2% of the world's oceans, they sequester approximately 10% of the carbon buried in ocean sediment annually (27.4Tg of carbon per*

[1] United Nations Environment Programme (2020) *The State of Nearshore Marine Habitats in the Wider Caribbean*. Available at: https://wedocs.unep.org/20.500.11822/36352 (Accessed: 30 August 2022)

year). Per hectare, seagrasses can store up to twice as much carbon than terrestrial forests*. The global seagrass ecosystem organic carbon pool could be as high as 19.9 billion metric tons*.'*[2]

Figures 3-6: DoE site visit photos from 28 July 2022 showing marine life including sea stars, brittle stars, sea urchins such as the West Indian sea egg, corals and seagrass within the approximate dredge footprint (points 3, 4 & 5 on Figure 1 map).

Loss of Coastal Mangrove Habitat

Mangroves are Schedule 1, Part 2 Protected Species under the National Conservation Act (2013) with an adopted Conservation Plan. In addition, the mangroves in this area are located within a Mangrove Buffer Zone as designated in the 1997 Development Plan. The proposed works will directly remove coastal mangroves from the Mangrove Buffer Zone. The removal of these mangroves results in a direct loss of nursery habitat for marine life and the loss of ecosystem services mangroves provide.

Coastal mangroves are structurally diverse ecosystems, which support high biodiversity. Numerous marine species, including fish and shrimp, use mangroves as nurseries during early life stages. An accumulation of bacteria and mangrove tree detritus provides a source of food for juvenile species and,

[2] The Blue Carbon Initiative (2019) *About Blue Carbon.* Available at: https://www.thebluecarboninitiative.org/about (Accessed: 30 August 2022).

hidden amongst mangrove roots, juveniles are more likely to avoid predation from larger animals. When the mangrove refuge is no longer required, these animals move out into the adjoining reefs or the open ocean. It is for this reason that mangroves are critically important in assisting with the replenishment of some of the sea's fish stock.

Mangroves act as nurseries for two widespread fish species listed on the IUCN Red List of Threatened Species - the rainbow parrotfish ('near threatened') and the overexploited goliath grouper ('critically endangered'). The goliath grouper (*Epinephelus itajara*) is a Part 1 protected species under the National Conservation Act Schedule 1 and is protected at all times. The rainbow parrotfish is the largest herbivorous fish in the Caribbean Sea and it depends on mangroves as well as coral reefs to complete its life cycle. The disappearance of adult populations from the world's coral reefs coincides with the disappearance of the world's mangrove stands. Scientists have been able to directly link offshore abundance (or lack) of adult fish with the abundance (or lack) of mangroves. Therefore it is evident that conserving mangroves will be essential to the future of both species.

Mangroves also assist with maintaining good water quality and clarity by providing a natural buffer that helps to intercept surface water runoff, filter pollutants and trap sediments originating from land. In addition, mangroves help to prevent soil erosion by binding the substrate. Together with other marine resources such as coral reefs and seagrass beds, mangroves also aid in protecting the shoreline from damage in storms by providing a wave break.

Another important function of mangrove habitats is that they are extremely effective at sequestering carbon from the atmosphere and serve as carbon sinks. The removal of the mangrove habitat reduces the island's natural carbon sequestration potential and releases captured carbon back into the atmosphere.

Figure 7: Screenshot from 2022 Google maps showing the location within Block 27B Parcel 115 from which the photos pictured in Figures 8 (red arrow) & 9 (yellow arrow) of the mangroves have been taken.

Figure 8: Healthy mangroves remain along the coast of Block 27B Parcel 115 which complement the seagrass beds in the area. The above photo, taken from inland, shows the healthy mangroves that will need to be removed to facilitate the proposed channel and subsequent canal entrance (Source: DoE site visit, 31 August 2022).

Figure 9: Photo from within Block 27B Parcel 115 looking out at the mangrove buffer. Healthy mangroves remain along the coast of Block 27B Parcel 115 which complement the seagrass beds in the area (Source: DoE site visit, 31 August 2022).

Construction Impacts

Direct environmental impacts will result from the dredging of the access channel from the physical removal of healthy seagrass habitats. Additional impacts may also result from the positioning of the portable dredging barge to carry out the works. The sand and fine silt of the seagrass beds are easily disturbed and suspended, resulting in detrimental sediment plumes which can impact surrounding seagrass communities and marine organisms that depend on good water quality. This excess turbidity in the water has the potential for triggering permanent and damaging impacts on our marine environment.

The applicant has indicated the use of silt screens in their submission. However, from the DoE's previous experience, it is **not possible** to eliminate the impacts of the sediment plumes generated during a dredging project of this scale through the use of silt screens, particularly when the sediments contain a high percentage of silty fines as is typical of the nearshore sediments in the North Sound. Figures 10, 12 and 13 show the impacts of two previous dredging projects approved by previous Cabinet administrations. Each project utilised a different form of dredging but both projects produced substantial sedimentation impacting the marine environment.

The contractor currently being proposed by the Applicant is Mr Julian Brown/Brown Dredging. Brown Dredging also conducted the Harbour House extension channel dredging using the same methodology currently being proposed, a portable dredge with a 12-inch suction cutter head. In taking a neutral position for the Harbour House channel extension, it is important to note that the DoE considered the fact that the channel was not entirely for the benefit of a private development or entity but would better serve multiple public and private sector stakeholders, including government entities. Unfortunately, although silt screens were used, the silt screens were unable to control the sedimentation resulting from the works as shown in Figure 10 below.

Figure 10: Monitoring photo from 28 April 2015 showing the sedimentation caused by the Harbour House Marina channel extension dredging project. This is the same dredging methodology currently being proposed. Note that silt screens were utilised but did not prevent the sedimentation from escaping.

The DoE also notes the Applicant is proposing to de-water the dredged sediment on Block 27B Parcel 115. On average a suction cutter dredge produces a slurry that is approximately 80% water and 20% sediment which means that de-watering areas need to be large enough in area and contain internal berms/structures designed to reduce the velocity of the pumped slurry. This allows the dredged sediment to fall out of suspension and the resulting effluent to be relatively sediment-free. It does not appear that the applicant has properly considered the design of the de-watering basin. Currently, Block 27B Parcel 115 contains 3 lakes and a small basin located behind the mangrove buffer which is connected to the North Sound Marine Reserve (Figure 11). The lakes are currently of poor water quality. However, we note from the de-watering plan (Figure 12), that the Applicant is proposing to combine the 3 lakes and the basin to form one large body of water. This is very concerning as the de-watering plan is also proposing to pump the water and excavated material from the dredging to a bermed site on Block 27B Parcel 115, then allow the effluent from the bermed site to flow into the modified lake on-site.

We note that the Applicant has proposed the use of silt screens around the outfall pipes entering the lake, however, based on the DoE's previous experience this will not be enough to mitigate the turbidity impacts resulting from the de-watering exercise, especially if the de-watering basin is sub-optimally designed. This large modified water body that will be receiving the water from the berms' outfall pipes will be connected to the North Sound Marine Reserve.

The turbidity caused by the de-watering exercise could impact the Marine Protected Area and lead to the sedimentation of the lake including eutrophication, harmful algal blooms, dead zones, and fish kills. We are unclear at this time whether there is any wildlife other than fish living in the existing ponds. If there is, the turbidity will impact any organisms living within the ponds and there could be animal welfare concerns from the public, which is outside of the remit of the DoE.

Figure 11: Lands and Survey 2018 aerial imagery showing the 3 existing lakes and basin behind the mangrove buffer within Block 27B Parcel 115.

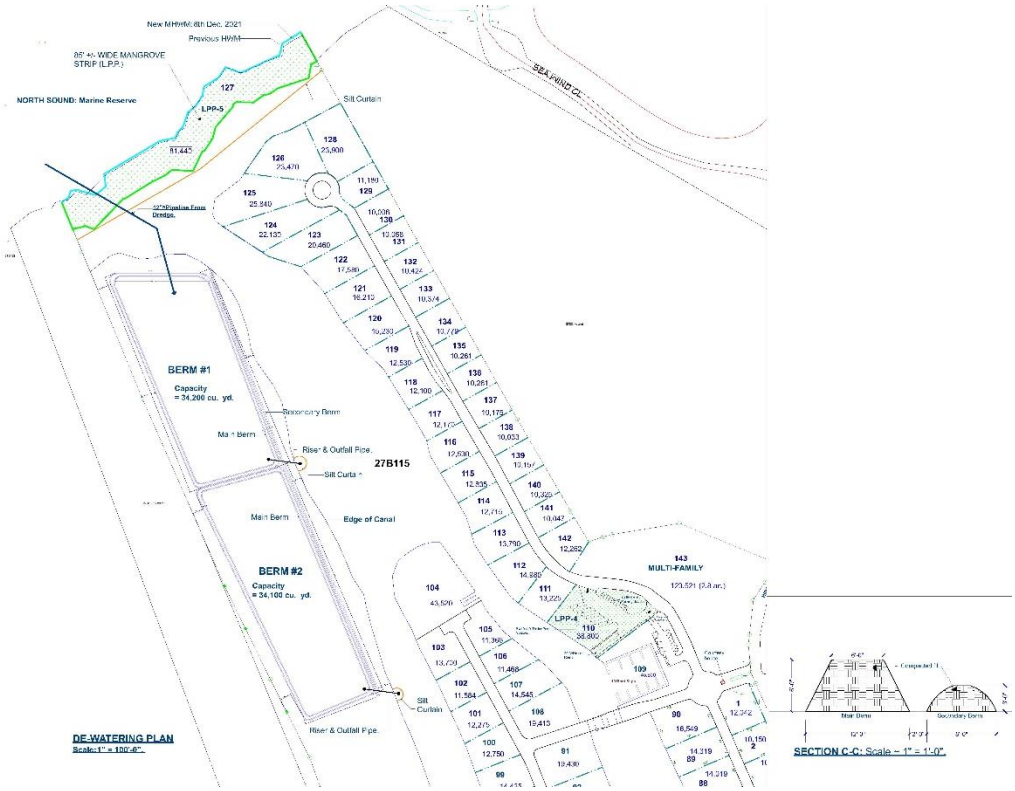

Figure 12: Extract of the Applicant's de-watering plan showing the 3 existing lakes and basin behind the mangrove buffer within Block 27B Parcel 115 combined.

More recently, silt screen failure was evidenced at the dredging site in the North Sound to the north of the Holiday Inn (Heritage Holdings coastal works application). The silt screens were deployed correctly and the permittee even used a double layer of silt screens to try to contain turbidity, however, as shown in Figures 13 and 14, this still did not prevent turbidity from escaping into the North Sound. The excavation of the Heritage Holdings channel utilised a different construction methodology to the Harbour House channel extension. In the Heritage Holdings project, a rock fill pad was created in the sea and the excavation was carried out by an excavator.

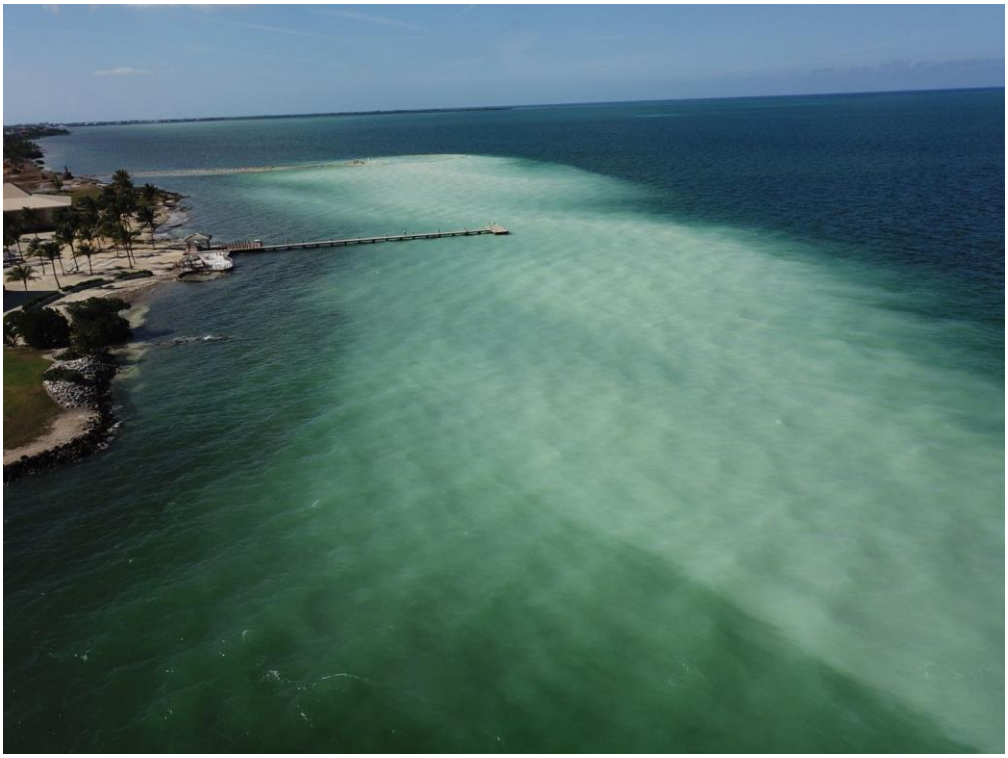

Figure 13: Drone imagery from 10 April 2018 of the Heritage Holdings access channel site sent to DoE from the public. Please note that the permittees had securely installed two layers of silt screens.

Figure 14: Drone imagery from 10 April 2018 of the Heritage Holdings access channel site sent to DoE from the public. Please note that the permittees had securely installed the silt screens.

Principle of Dredging in the North Sound

The DoE **does not** support dredging in MPAs or the North Sound. Section 32 of the NCA, prohibits dredging in protected areas unless specifically exempted through a permit issued under this Act. Such a permit should only be issued under truly exceptional circumstances, which do not pertain to this application. The CH2MHill study regarding dredging in North Sound, published in 2002, concluded that there had been a significant loss (more than 20 per cent) of the unique shallow transitional habitat linking mangroves with seagrass beds along the western and southern shores of North Sound and that there was ample evidence that seagrasses and associated fish and invertebrate communities had not successfully recolonised dredging pit borrow areas, even after many years. Prohibiting further major dredging projects in the North Sound for aggregate and fill acquisition was thus a primary recommendation of that report. This policy and the recommendations of CH2MHill have, in the main, been adhered to by successive governments in recent years.

Whilst the proposed dredging may not be deemed to be a 'major' dredging project by some when compared to historical borrow pit dredging for aggregate, the effects of this project should be considered as a part of a larger cumulative impact on this habitat type (and North Sound on a whole) from incremental, smaller projects proposed or approved over time and set within a degraded baseline due to previous projects. This proposal for a navigational channel will still augment the loss of this unique habitat by an additional 3.8 acres.

Furthermore, this site is located within an MPA. MPAs have been designated by Cabinet for the long-term conservation of marine resources and ecosystem services. MPAs, especially no-take MPAs such as Marine Reserves, are one of the most powerful and effective methods for protecting resources and ocean life – but only if activity which damages or degrades the environment is limited within them. The proposed dredging will directly and adversely impact part of the MPA and will indirectly adversely impact a much wider area within the MPA because the sedimentation and turbidity are very difficult to contain.

Alternatives to the Proposed Channel

The DoE **does not** support the proposed channel given the resultant loss of relatively unique and ecologically valuable benthic habitat, and the potential negative impacts on water quality and the MPA. We recommend that the Applicant explores alternatives, and some that could be considered are listed below:

1. *Marketing the development as a lakeside development with non-motorised water sports access to the ocean.*
    a. Access to the water could still be provided to non-motorised recreational uses or watercraft with shallow drafts. Subdivision residents could still enjoy North Sound access through paddle boarding, kayaking, snorkelling, or small catamarans.

    b. The proposed subdivision area (Block 27B Parcel 115) is already substantially filled. Should the Cabinet be minded to refuse the proposed channel, the applicant would likely be able to fulfil their aggregate/fill needs from other on-island sources.

c. The DoE notes the water quality of the lake is poor at this time. To pursue the lakeside subdivision development approach, the water quality within the lake should be addressed and will need to be properly managed in future. The Applicant could create a minimal flushing system to aid in the lake water quality using the old dyke road to the east shown in Figure 15.

Figure 15: Cayman Land Info 1999 aerial extract showing the old dike road to the east of the property that could potentially be used to create a minimal flushing channel.

2. *Negotiating an Easement over Neighbouring Parcels*
   Should canal access still be the most desired option, we would encourage the Applicant to explore the option of negotiating an easement across parcels to the east or west (see Figure 16). A similar approach was utilised by HH Ltd (by the Ritz canal) and resulted in greatly reduced environmental effects. In this case, pursuing an easement either to the east or west to join an existing canal or dredged area would reduce the environmental impact and potentially eliminate the need for dredging within an MPA.

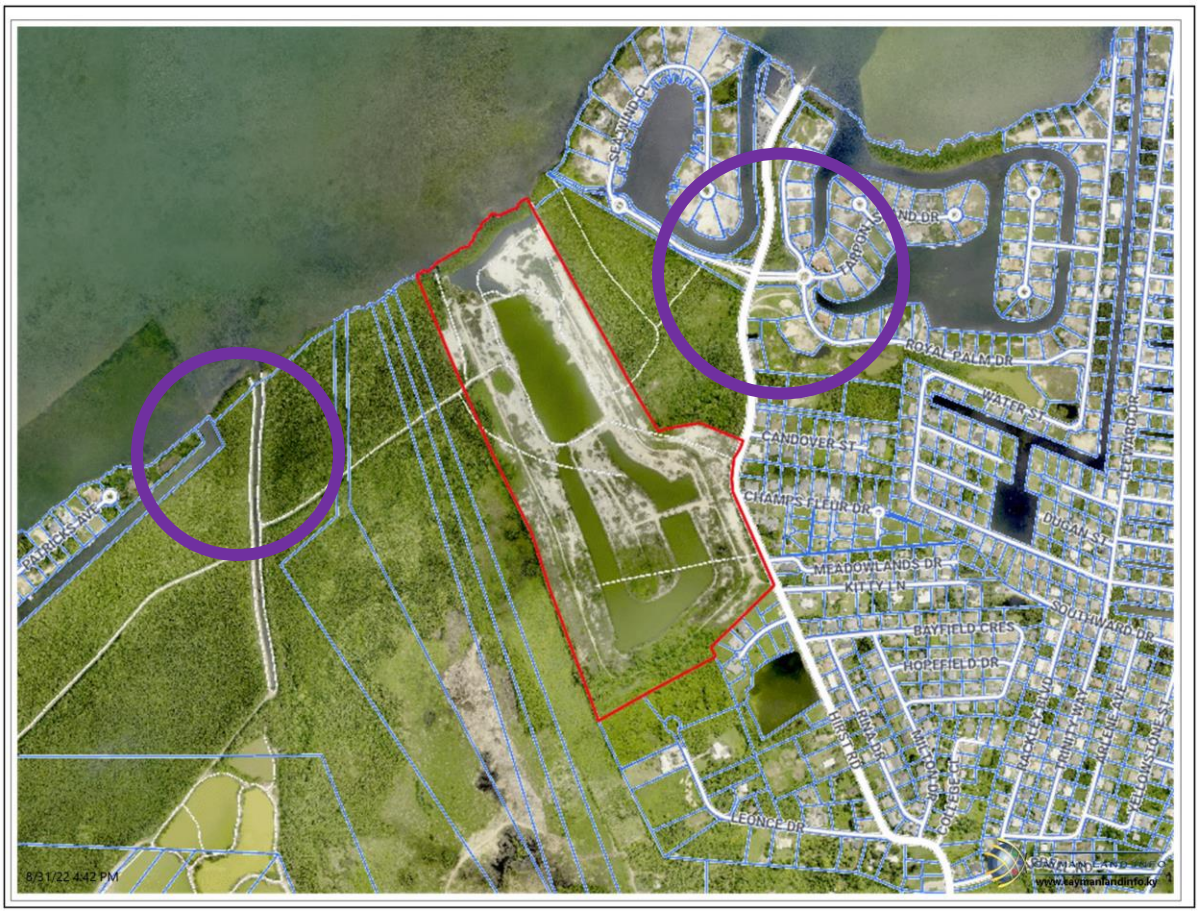

Figure 16: Cayman Land Info 2018 aerial extract showing the subject parcel outlined in red and neighbouring canals the Applicant could explore gaining access through circled in purple.

Conclusion & Recommendations

The DoE **does not** support the proposed works given:

- the potential negative impacts on the Marine Protected Area and the species within it;
- the resultant loss of relatively unique and ecologically and economically valuable benthic habitat (i.e. aiding in replenishing fish nurseries, helping to mitigate the impacts of climate change by aiding in coastal protection, retaining the island's carbon sequestration potential and natural capital) for a small private development (i.e. with limited public benefit);
- the residual effects of turbidity on water quality in the North Sound; and
- the continued proliferation of canal developments that are dependent on dredging activity to give them navigational access;

We recommend that this application is **refused** and that the Applicant is encouraged to explore alternatives to dredging the channel such as those discussed in the *Alternatives to the Proposed Channel* section of this review.

Director, Department of Environment