Environmental Impact Assessment Scoping Opinion – Proposed Design and Construction of the East-West Arterial Extension Road

19 November 2019

Prepared by Environmental Assessment Board for the East-West Arterial Road

Sub-committee of the National Conservation Council

1. Introduction

At its meeting on 2 October 2019, the National Conservation Council (NCC) agreed to appoint an Environmental Assessment Board (EAB) comprising members of the Department of Environment (DoE), Planning Department, National Roads Authority (NRA) and Water Authority Cayman (WAC). The EAB has been appointed to guide the Environmental Impact Assessment (EIA) for the design and construction of the extension to the East-West Arterial Extension Road as shown in Figure 1. In accordance with the EIA Directive (2016), the following Scoping Opinion outlines the likely significant effects of the project which will need to be assessed.

2. Background

The Scoping Opinion for the project is partly informed by the following information provided by the NRA:

- A plan showing the proposed alignment and proposed phasing;
- Fill quantities estimate;
- A typical cross-section of the proposed road, and
- Trial pit data from 2008.

At its Special General Meeting of 26 October 2016, the NCC considered the proposed East-West Arterial Extension which was submitted for consultation under section 41 of the National Conservation Law. After reviewing the Screening Opinion prepared by the DoE on 12 October 2016, the Council took a decision to require an EIA of the proposed road extension. At this time, the proposed road connected Hirst Road to Frank Sound Road.

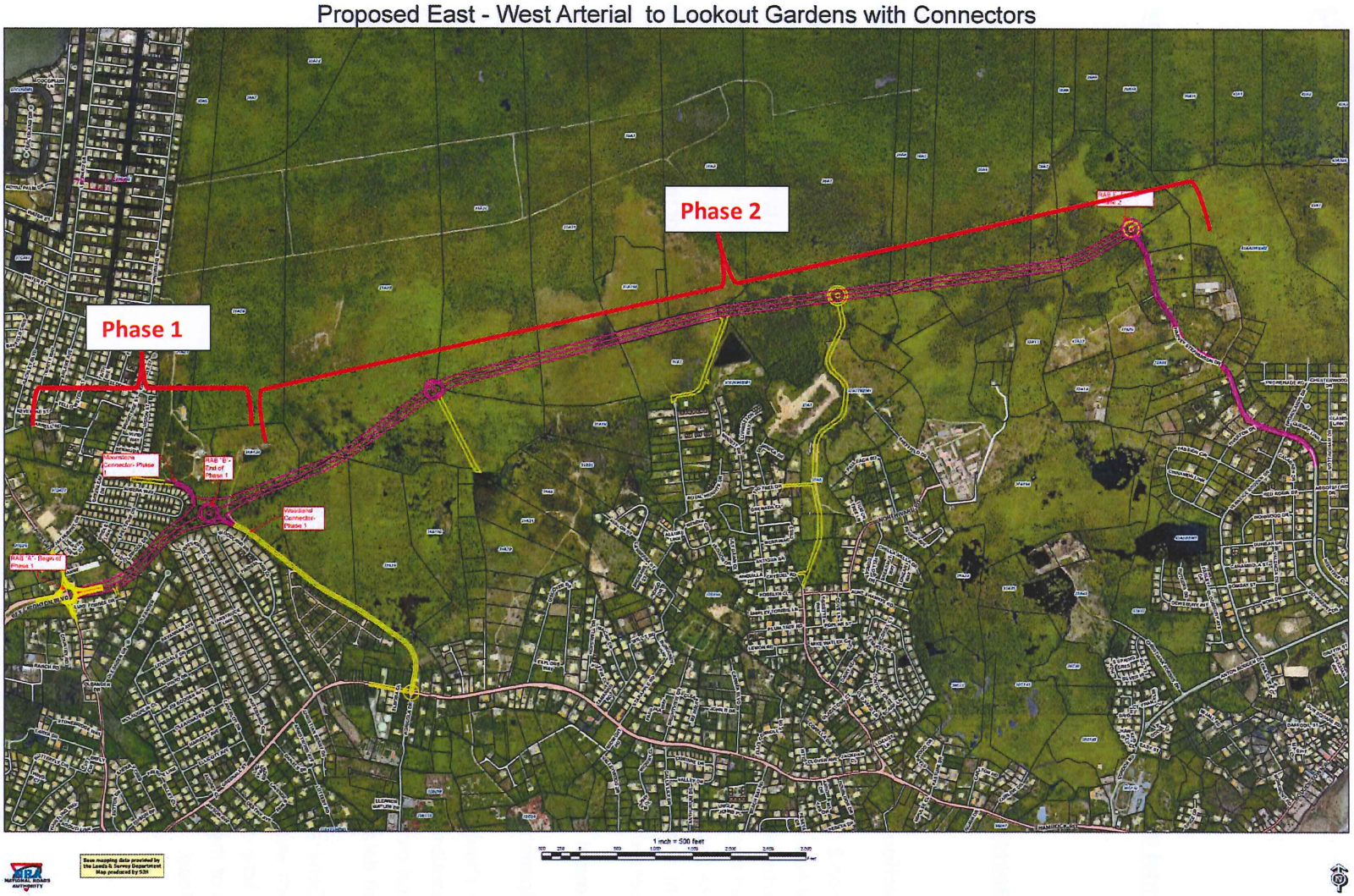

Figure 1. The proposed East-West Arterial Extension Road. Phase 1 is from RAB "A" to RAB "B" and includes connectors to Moonstone and Woodland Drives. Phase 2 is from RAB "B" to RAB"F" and includes southern connector legs.

On 24 September 2019, the Ministry of Commerce, Planning and Infrastructure (Ministry of CPI) submitted information indicating that they were currently proposing only part of the road previously considered in October 2016 and that the Ministry wished to proceed with the construction of the portion of the East-West Arterial Extension from Hirst Road to Lookout Gardens. A meeting was held on 22 October 2019 where the Premier, representatives from the Ministry of CPI, the NRA, and the Director of the DoE were present. It was agreed that Phase 1 from RAB "A" to RAB "B" could be constructed prior to the EIA being completed because it is within a densely developed area with minimal environmental concerns and minimal opportunity for amending the design of the route. This was endorsed by the NCC at its meeting on 30 October 2019.

It was also confirmed on 22 October 2019 that an EIA would be conducted for the remainder of the route from RAB "B" to RAB "F" (i.e. from Woodland Drive to Lookout Gardens).

3. Scope of the EIA

Several options have been considered by the Ministry of Infrastructure and the NRA for the proposed route, although not within a formal options review which included environmental information. The Terms of Reference shall set out what options for the corridor have been considered and which one is the preferred option, outlining the reasons the preferred option has been selected. The EIA will also present the alternatives considered during the design process, in accordance with the EIA Directive.

There are likely to be significant environmental effects in the following key areas:

- Hydrology and Drainage; and
- Terrestrial Ecology.

When rainwater falls on land to the south of the proposed road, the topography and the limited permeability of the surface rock causes surface water flow to the north during periods of heavy rain, towards the Central Mangrove Wetland. This area, including parts of Northward and Bodden Town, is at a higher elevation than the Central Mangrove Wetland. The proposed East-West Arterial Road could act as a physical barrier between the higher and lower elevations, and could act as a dam resulting in two scenarios:

- The Central Mangrove Wetland could be deprived of water and there may be ecological consequences associated with the fundamental disruption to the hydrological regime which supports this unique mangrove assemblage.
- The water which can no longer flow to the Central Mangrove Wetland could become impounded and flood the populated areas to the south of the proposed road and drown and kill mangrove areas that cannot survive excessive inundation.

By changing the balance of water movement, there could be significant adverse effects on both residential populations and the Central Mangrove Wetland, and an EIA is required to investigate those effects so that they can be appropriately avoided, minimised or mitigated.

Figure 2, below, shows the topography of the surrounding area and the stark gradient between the land to the south of the proposed road and the Central Mangrove Wetland to the north. It also shows the theoretical flow accumulation, where surface water run-off tends to move based on topography.

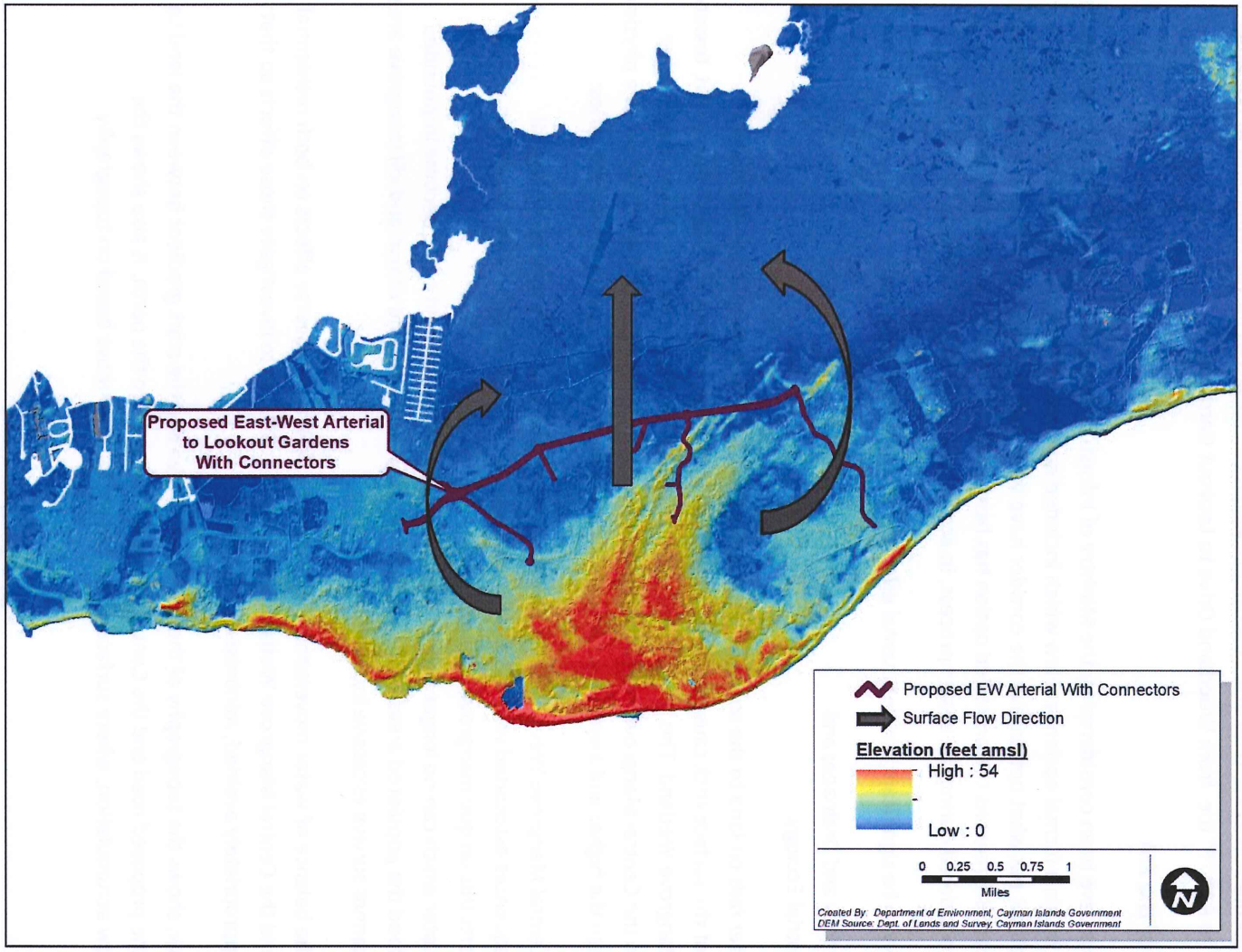

Figure 2. The elevation of the surrounding area, the flow accumulation (the tendency for surface water to move) and the proposed road.

3.1 Hydrology and Drainage

Affected Resources

There are residential populations surrounding the proposed road including areas such as properties close to Will T Drive, Newlands, Lookout Gardens and Savannah. The study area should be defined during the preparation of the Terms of Reference and will likely need to encompass the full extent of the Central Mangrove Wetland basin, which extends beyond the "Phase 2" alignment.

The Central Mangrove Wetland is the ecological heart of Grand Cayman and is critical to many important processes which are vital to the long-term wellbeing of the residents of the Cayman Islands. It also plays a fundamental role in the water flow systems of the Cayman Islands.

Potential Impacts

The proposed road could:

- Increase the risk of flooding of the neighbouring residential communities by impeding drainage; and
- Negatively impact the hydrology and, as a result, the ecology of the Central Mangrove Wetland.

Updated projections for sea level rise as a result of climate change appear to increase when compared to earlier projections. The recent 24 September 2019 Intergovernmental Panel on Climate Change report[1] projects 0.43 m (1.4 feet) by 2100 under a low emissions scenario and 0.84 m (2.8 feet) by 2100 under a high emission scenario with the likelihood of accelerated increases after 2100 for the higher emission scenarios. The likely 2100 range for the low scenario is 0.26-0.53 m (10.2 inches to 1.7 feet) and the likely 2100 range for the high scenario is 0.61 – 1.10 m (2 ft to 3.6 ft). The EIA needs to ensure that climate change resilience is built into the road design.

The impact on the Lower Valley freshwater lens may require consideration. There may be impacts from the construction of vertical stormwater drainage wells. The standard NRA design is a 100 ft drilled well with one length of 20 ft casing. The lens is approximately 20 to 30 ft thick and has a brackish zone below that. The installation of multiple standard NRA design disposal wells has the potential to impact the lens. Reliance on deep wells would deprive the Central Mangrove Wetland of surface flow it has adapted to, so this approach may not be appropriate in this situation. The EIA needs to review the options for stormwater management so that there is no impact on the Lower Valley fresh water lens and surface water flow into the Central Mangrove Wetland is allowed to continue.

3.2 Terrestrial Ecology

Affected Resources

The Central Mangrove Wetland is one of the largest intact contiguous mangrove wetlands in the Caribbean. The entire living system of North Sound is linked to the Central Mangrove Wetland, and all that it supports (e.g.

[1] Intergovernmental Panel on Climate Change. (2019). The Ocean and Cryosphere in a Changing Climate. Retrieved from http://www.ipcc.ch/srocc/home

tourism, fisheries, leisure) would be severely impacted if the wetland were destroyed. The ecosystem services of the CMW are numerous and critical to the health of Grand Cayman and its residents.

Mangroves are vital for storm protection and they are among the world's most productive ecosystems, producing organic carbon well in excess of ecosystem requirements and contributing significantly to the global carbon cycle. The Central Mangrove Wetland is part of a large scale water flow system by filtering, conditioning and providing a flow of nutrients into North Sound, forming the base of a complex food chain. The clear seas surrounding Grand Cayman are due to the physical and biological filtration of surface water originating from higher land through the mangrove areas. North Sound provides additional area for fish nurseries and clear water for diving, supporting many livelihoods in the Cayman Islands.[2]

The Central Mangrove Wetland has been designated as an Important Bird Area under the criteria established by Birdlife International as it supports at least 1,500 individuals or 84% of the Cayman Islands' population of the West Indian Whistling-Duck (*Dendrocygna arborea*). The endemic Cayman Parrot, *Amazona leucocephala caymanesis* breeds in outer monospecific black, black/white and black/red mangrove zones of the southern Central Mangrove Wetland. In addition to the hydrological function, the Central Mangrove Wetland also provides nursery grounds and habitat for a variety of marine and terrestrial biodiversity including species on Schedule 1 Part 1 of the NCL

Potential Impacts

The proposed road could affect the ecological function and value of the natural resources in the Central Mangrove Wetland during both construction and operation. In addition to the detailed study of hydrology, the direct and indirect effects of the proposed road on ecology should be assessed. For example, the direct impact from the footprint of the road, and indirect impacts (e.g. lighting, noise etc.) should be considered.

3.3 Geo-environmental Considerations

The EIA Screening Opinion for the full length of the proposed East-West Arterial Road detailed two other topics for consideration:

- An assessment of impacts to off-site natural resources due to the excavation and/or mining to the significant quantities of aggregate required for construction of the 10 miles of road.
- An assessment of any on-site and off-site impacts associated with the de-mucking and disposal of significant quantities of peat overburden within the road corridor.

The required volume of aggregate to construct the road under the proposed alignment needs to be reviewed for the various construction options, e.g. excavating all peat and unsuitable material and using fill versus a geotextile membrane and fill. In 2018, an objection was made to a planning application for a new commercial quarry on the basis that there was already sufficient reserve of fill in the licenced commercial quarries and therefore a new commercial quarry was not needed. In August 2018, the Water Authority estimated the licensed reserve in commercial quarries to be in the range of 32 million cubic yards. Although the estimate of an

[2] Childs, C., MacDonald, M.A., Bradbury, R.B. (2014). Ecosystem services provided by potential protected areas in the Cayman Islands: a rapid assessment. National Trust for the Cayman Islands.

annual aggregate use of 1 million cubic yards in the 2000 CH2MHill Aggregate and Fill Study may be outdated, the commercial quarries appear to have a significant licensed reserve. The NRA has confirmed that they will source the fill from multiple local quarries in order to meet the demand. The NRA provided an estimate of the fill quantities to be a total of 174,000 cubic yards of shot rock, 27,000 cubic yards of Cayman rock, and 26,000 cubic yards of crusher run. This volume is unlikely to be a significant effect based on the estimated annual aggregate use (approximately 22% of the estimated annual aggregate use) although it will be a large volume to acquire. There will be some impact on the licensed aggregate reserve, but it will be minor and does not require assessing in the EIA.

Trial pit information was collected in 2008 within the vicinity of the proposed road. The trial pit information showed that the majority of the proposed road does not have significant peat depths, although there are areas close to Lookout Gardens with approximately 5 ft depth on average. The peat overburden will be removed and disposed of. The current proposed road is shorter than the full length of the proposed East-West Arterial Extension Road, and therefore the volume of peat will be reduced. The impacts from de-mucking and disposal of the peat overburden can be scoped out of the EIA.

3.4 Socio-economic considerations

Socio-economic considerations, including the "need" and rationale for the road, should have been taken into account by way of a strategic environmental assessment prior to the gazettal of the road corridor. Unfortunately, the utility of an assessment of the "need" for the road extension and its socio-economic impacts will be of limited value now given that the corridor has been gazetted since 2005 and development applications subsequently approved along parts of the route have, to a degree, fixed its alignment.

4. Next Steps

The next stage of the process is for the proponent to provide the EAB with details of up to three suitably qualified consultancy firms to carry out the EIA based upon the requirements outlined in the Scoping Opinion. The Consultant's proposals shall provide details of the professional team composition, including Curricula Vitae for all team members who should have at least five years professional experience of similar projects. Consultants should:

(i) Outline relevant experience in assessing Caribbean ecological systems and in particular terrestrial and mangrove environments such as, or similar to those present in the Cayman Islands;

(ii) Include a qualified hydrologist or hydrogeologist capable of assessing (and modelling, as necessary) the stormwater drainage patterns and flows between the developed areas south of the proposed road and the Central Mangrove Wetland north of the proposed road;

(iii) Outline relevant experience undertaking large-scale stormwater drainage assessments in similar geological environments

The Consultant may propose suitable Sub-Consultants in specific areas of expertise as applicable. Credentials of such Sub-Consultants should be submitted as part of the Submission. The EAB will review the submissions from each consultancy team in order to confirm that the teams have the required experience and expertise to

address the issues outlined in this Scoping Opinion. Upon completion of the EAB's vetting process, the proponent is free to select consultant(s) from those which have been deemed competent by the EAB.

Upon appointment of the EIA consultants the EAB will make itself available to meet with the proponent and its EIA consultancy team to discuss the development of the draft Terms of Reference for the EIA, based on this Scoping Opinion. Once agreed, the draft Terms of Reference will need to go out for public consultation (including discussion in at least one public meeting) for a period of 21 consecutive days and then finalised, taking into account the public's input all in accordance with the EIA Directive.

We trust that this information is of assistance. Please do not hesitate to get in touch should you have any questions.

Gina Ebanks-Petrie
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