FINAL Non-Technical Summary
East-West Arterial Extension:

Section 2 (Woodland Drive – Lookout Road)
Section 3 (Lookout Road – Frank Sound Road)

NATIONAL ROADS AUTHORITY

April 29, 2025

Table of Contents

List of Tables

List of Figures

List of Terms

BCR	Benefit-Cost Ratio
CBA	Cost-Benefit Analysis
CMW	Central Mangrove Wetland
CSF	Critical Success Factor
dBA	A-weighted Decibel
DoE	Department of Environment
EAB	Environmental Assessment Board
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Statement
EWA	East-West Arterial
FHWA	Federal Highway Administration (United States)
GHG	Greenhouse gas
LTS	Level of Traffic Stress
MT	Metric Tonnes
NCA	National Conservation Act
NCC	National Conservation Council
NRA	National Roads Authority
PAHI-TD	Planning, Agriculture, Housing, Infrastructure, Transport & Development
SOAEL	Significant Observable Adverse Effect Level
ToR	Terms of Reference
WAC	Water Authority Cayman
WRA	Whitman, Requardt & Associates, LLP

1 What is the East-West Arterial Extension?

The proposed East-West Arterial (EWA) Extension is a corridor that connects the current EWA at Hirst Road in Savannah to Frank Sound Road in Breakers on Grand Cayman. The EWA Extension is a multimodal corridor, which means that different types of travel, like driving, biking, and walking, can occur within the corridor. The overall EWA Extension has three sections:

- Section 1 extends between Hirst Road and Woodland Drive/planned Agricola Drive Connector and is currently under construction.
- Section 2 will connect Woodland Drive/Agricola Drive Connector to Lookout Road.
- Section 3 will connect Lookout Road to Frank Sound Road.

The EWA Extension will improve traffic conditions between the eastern and western districts of Grand Cayman, will strengthen resiliency by adding a second travel route between districts, and will offer easier and more timely access to amenities in the western districts along with tourism destinations in the eastern districts.

1.1 What are the needs for the project?

The National Roads Authority (NRA) planned the EWA Extension mainly to provide Grand Cayman with an additional resilient travel route between the districts of North Side/East End and George Town/West Bay to reduce the traffic congestion currently experienced on the existing and heavily trafficked two-lane coastal road and Shamrock Road. This proposed travel route is important for emergency services, enhancing evacuation capability, lower user travel delay, and improve travel time reliability for employment opportunities, equity, and overall quality of life, since the existing coastal road is often compromised during storm events or traffic collisions. In addition to improvements for drivers, the EWA Extension would also provide opportunity to add important safety features for other modes of transportation, like pedestrians and bicyclists.

The needs for the project have been identified by multiple parties and been refined through the Environmental Impact Assessment (EIA) process to create the project objectives discussed in **Section 1.2.1**.

1.2 What are the project objectives and constraints?

1.2.1 Project objectives

The key objectives of the project are called Critical Success Factors (CSFs). The CSFs are the main goals that the project is designed to accomplish, and they are vital to the project's success. The CSFs were developed based on the purpose and need statements from the original 2005 Gazetting of the EWA Extension and from the elements identified in the Terms of Reference (ToR) in April 2023 for the EWA Extension EIA (**Table 1**).

Table 1: Critical Success Factors

Criteria	Target
a. **Alternative Routes:** Create an alternative travel route to the existing two-lane Bodden Town Road	Provide for an alternative roadway facility to accommodate travel in the event of a roadway closure
b. **Existing Roadway Resiliency:** Improve resiliency of the existing roadway travel route between North Side/East End and George Town/West Bay.	Improve resiliency of the travel route to flooding from sea level rise, storm surge, wave overtopping, and rainfall
c. **Future Traffic Demand:** Support current and future traffic demand.	Provide travel lanes necessary to accommodate projected trips/vehicles Provide controlled access points to enter roadway facility
d. **Commuter Travel Times:** Improve travel time between North Side/East End and George Town/West Bay	Improve projected travel time between North Side/East End and George Town/West Bay
e. **Utilities:** Accommodate utility expansion (electricity, fibre, water, central sewerage system) *	Establish area adjacent to roadway to provide for utility needs
f. **Public Transit Access:** Provide opportunity to safely accommodate and expand public transportation *	Establish public transportation facilities that include bus pull offs Improve bus travel time reliability
g. **Tourist Travel Times:** Reduce tourism travel time between North Side/East End and George Town	Reduce travel times between Owen Roberts International Airport and the North Side Reduce travel time between Grand Cayman Cruise Port (George Town Cruise Port) and Bodden Town/North Side/East End
h. **Safety:** Improve safe vehicular travel by reducing roadway conflict points	Reduce the number of Cross Street Intersections along the primary east-west corridor Reduce the number of Driveway Access Points along the primary east-west corridor
i. **Pedestrian and Bicycle Access:** Provide opportunity for enhanced and safe pedestrian and bicycle travel	Establish dedicated pedestrian and bicycle facilities adjacent to vehicular travel lanes

**These criteria are to provide opportunities to accommodate these features. It is outside of ambit of the NRA to provide public transportation or utilities*

1.2.2 Project constraints

As described above, the aim of the project is to develop a second east-west transportation corridor that best meets the CSFs while avoiding and minimizing impacts to environmental and social resources, called constraints. As part of the project, mitigation considerations that may be implemented when designing a sound and resilient corridor during the detailed design phase are offered. These will be refined and further evaluated outside of this EIA. Mitigation refers to actions that can be taken to reduce the seriousness of an impact. Three main areas of project constraints were identified:

- **Natural constraints** – the Project impact area's sensitive environmental resources, including:
  - Areas of ecologically valuable habitat
  - National Trust-owned natural properties
  - Freshwater lenses
  - Mastic Reserve
  - Meagre Bay Pond
  - Land or areas protected under the 2013 NCA
  - Central Mangrove Wetland (CMW)
- **Social constraints** – the Project impact area's sensitive social resources, including:
  - Built property
  - Historic (built) National Trust-owned properties
  - Historic overlay zones
  - Mastic Trail
  - Cultural heritage sites (Heritage register and cemeteries)
  - Community/Neighbourhood cohesion
- **Engineering constraints** – the elements necessary to construct the proposed project, including:
  - Provide for sound geometric design conditions
  - Plan for areas necessary for construction

2 What is an Environmental Impact Assessment?

An Environmental Impact Assessment (EIA) is a scientific study that evaluates the potential effects of a proposed project and validates its feasibility from environmental point of view. The EIA considers the possible effects on multiple types of resources. It also provides the process for evaluating impacts along with avoidance or minimization measures before a project occurs. An important part of the EIA is the alternatives analysis. An alternatives analysis compares what could happen under different scenarios, including what could happen if the proposed project is not constructed. The study for this project included , a comprehensive alternatives analysis which evaluated many factors to determine where the corridor should be built. See **Section 5: What is the Alternatives Analysis?** for in-depth information regarding this analysis applied to the EWA Extension EIA.

An EIA happens after the need for an infrastructure project has been identified, but before detail design and construction on the project starts. The purpose of an EIA is to find possible environmental issues associated with the project and address those issues as the project is designed and gets closer to being implemented. EIAs have many benefits, such as allowing the design of a project to be adapted to minimise environmental effects and creating mitigation and Environmental Management Plans (EMP) that can be implemented as the project progresses through detail design, construction, and operation stages.

EIAs are carried out for projects that are likely to have a significant environmental impact. Section 43 of the National Conservation Act (NCA) of 2013 states that the National Conservation Council (NCC) can require that an EIA be carried out for a project. The 2016 NCC Directive for Environmental Impact Assessments (Extraordinary No. 50/2016) details the screening criteria used to determine if an EIA is needed.

In May 2005, the proposed EWA Extension corridor was initially planned and gazetted by the NRA and published in the Cayman Islands Gazette Extraordinary Supplement Number 13/2005. In accordance with the EIA Directive, the Department of Environment (DoE) issued a Screening Opinion on October 12, 2016, for the EWA Extension. The NCC reviewed the opinion and made the decision to require an EIA for the EWA Extension. Section 1, which goes from Hirst Road to Woodland Drive, is not included in the EIA. The Ministry of Commerce, Planning, and Infrastructure, the NRA, and the NCC agreed that because Section 1 is located in a densely developed area with minimal environmental concerns and minimal opportunity for amending the design of the route, Section 1 did not need to be included in the EIA. Therefore, the EIA assesses only Section 2 and Section 3.

After the EIA is completed, the findings will be used to inform the next phases of planning, design and implementation. Key components for the next steps include the EIA’s mitigation considerations and the EMP.

The findings of an EIA are recorded in an Environmental Statement (ES). The NCC’s Directive for EIAs (Section 43, NCA) outlines the process to be taken when conducting an EIA and directs what goes into an ES.

As stated in the Directive, the EIA process includes:

- Baseline data collection
- Consideration of alternatives
- Impact prediction
- Choice of alternative
- Mitigation concepts

This Non-Technical Summary (NTS) presents the findings of the Final ES in an accessible, clear manner for a general audience. It acts as a standalone document where key findings from the Final ES are summarized.

2.1 Who is the EWA Extension Environmental Impact Assessment project team?

The EIA project team is made up of the project sponsor, the project consultant team, the project third-party consultant team, and the project steering committee:

- The **Project Sponsor** is the NRA, under the Ministry of Planning, Agriculture, Housing, Infrastructure, Transport & Development (PAHI-TD)
- The **Project Consultant Team** refers to Whitman, Requardt & Associates, LLP (WRA), a consulting firm retained by the Cayman Islands Government to undertake the environmental and engineering studies for the EWA Extension EIA, and specialised subconsultants overseen by WRA. The subconsultant team includes:
    - Resource Environmental Solutions, LLC
    - Stantec
    - EBP
    - AMR Consulting Engineers
    - Tower Marketing
- The **Project Third-Party Consultant** refers to TYLin, acting as a third-party reviewer for the NRA and acting on behalf of the NRA during the coordination process, when required, to provide for an impartial EIA process. Technical studies and analyses to support the EIA were also requested by the NRA and performed by W. F. Baird & Associates Coastal Engineers, LTD (Baird) and Remington & Vernick Engineers (RVE) in support of this EIA.
- The **Project Steering Committee** is a group that met monthly (from January 2024 at the request of Caucus) to provide a consistent coordination exchange of study information; and to discuss and provide direction on key decision points. The committee is comprised of:
    - **NRA** (project sponsor);
    - **Environmental Assessment Board (EAB)** (chaired by the Director for the DoE), who is a member of the NCC. The Deputy Director of the DoE and the Director of Planning (or representative), also NCC members, are statutory members of the EAB. For this project, other members include the Water Authority Cayman (WAC) and the Public Works Department's Major Projects Office.)

Additional Steering Committee attendees include:

- WRA (primary EIA consultant)
- TYLin (third-party reviewer for the NRA)
- Ministry of PAHI-TD
- Ministry of Sustainability & Climate Resiliency

2.2 Who oversees the Environmental Impact Assessment process?

The EAB oversees the preparation and implementation of the EIA. The EAB is a subcommittee of the NCC, in accordance with Section 3(13) of the NCA of 2013. A key role of the EAB is to oversee, review, and offer a final report on the final version of the ES, after which the NCC offers recommendations. EAB and NCC action happen before the next stages of project development move forward.

2.3 How is the public involved in the process?

2.3.1 Communications

To communicate information about the EIA with the public, the NRA created a public-facing website which can be found at http://youreia.caymanroads.com. This website includes information about the Proposed Project, the areas of study, the project team, and frequently asked questions. Information was also made available on the NRA's Facebook (http://www.facebook.com/nraroads) and Instagram (https://www.instagram.com/national_roads_authority/) social media accounts. Website updates throughout the ES process and bi-weekly social media posts gave the public more information about the project happenings.

The purpose of this communication strategy was to provide understandable and accurate education about the EIA process. The website and social media channels were also used to promote the public consultation period for the Draft ES.

2.3.2 Public Consultation

The EIA Directive requires public consultation during two parts of an EIA:

- A review and comment period for the Draft Terms of Reference (ToR)
- A review and comment period for the Draft Environmental Statement (ES)

Two public meetings were held to give the public an opportunity to review the Draft ToR and provide comments:

- Craddock Ebanks Civic Centre, 6 pm to 9 pm on Tuesday, February 7, 2023
- Cayman Islands Baptist Church, from 6 pm to 9 pm on Thursday, February 9, 2023

The public could access printed copies of the Draft ToR at different locations on the island. These locations included the NRA office, the DoE office, and various libraries and post offices.

The ToR was finalised on April 4th, 2023. This Final ToR was accepted by the EAB and published on the NRA and DoE web pages. The ToR defined the requirements for the ES.

The Draft ES was developed in compliance with the requirements specified in the ToR and was made available to the public in accordance to the requirements in the EIA Directive.

The public consultation period for the Draft ES was open for 21 days, from January 13 through February 3, 2025. Notice of the public consultation period was published in the newspaper "Cayman Compass" on two separate occasions (January 3 and January 10, 2025).

The Draft ES and the NTS reports in electronic downloadable version were made available on the DoE website and the NRA website. Social media posts were shared to alert the public to the opening, timing, and closing of the consultation period, the locations of the documents and meetings, and how to leave a comment. This information was also posted on the NRA's Facebook and Instagram social media accounts.

Printed copies of the Draft ES were available for viewing at:

- NRA Office – 370 North Sound Road, GT
- DoE Office – 580 North Sound Road, GT

Printed copies of the NTS were also made available for viewing at:

- North Side Post Office – 896 North Side Road
- Bodden Town Post Office – 189 Bodden Town Road
- Savannah Post Office – 1687 Shamrock Road
- Vernon L. Jackson Public Library and Learning Centre – 69 Bodden Town Road
- East End Public Library – 2739 Sea View Road
- George Town Public Library – 68 Edward Street

During the Draft ES public consultation period, two public meetings were held to allow the public to comment on the EWA Extension EIA Draft ES and to engage with the project team regarding questions or concerns they may have about the project.

The meetings were held on the following dates and at the following locations:

- Craddock Ebanks Civic Centre, 923 North Side Road, North Side, 6 pm to 9 pm on Tuesday, January 21, 2025, and also livestreamed on NRA's Facebook
- Church of God Chapels Hurricane Shelter, Shamrock Road, Bodden Town, 6 pm to 9 pm on Thursday, January 23, 2025, and livestreamed on NRA's Facebook

Each meeting began with an open house that included informational display boards, where attendees could interact with members of the project team, including the NRA, and the EAB. The open house was followed by a presentation by the project team and a question-and-answer (Q&A) session. Questions were asked in person, raised in writing on the comments sheets made available, as well as using the Slido application by both remote and in-person attendees during the public meetings.

Comments that were received during the public comment period were recorded and responded to. These questions/comments and the responses are included in **Appendix N** of the ES.

The main concerns raised by the public during the consultation period that resulted in updates to the ES are as follows:

- The estimated cost of the Proposed Project
- Providing additional, lower-resiliency design options

These comments were addressed by additional design options being evaluated and costed within **Chapter 6: Proposed Project – Engineering Features** and **Chapter 16: Cost-Benefit Analysis** of the ES.

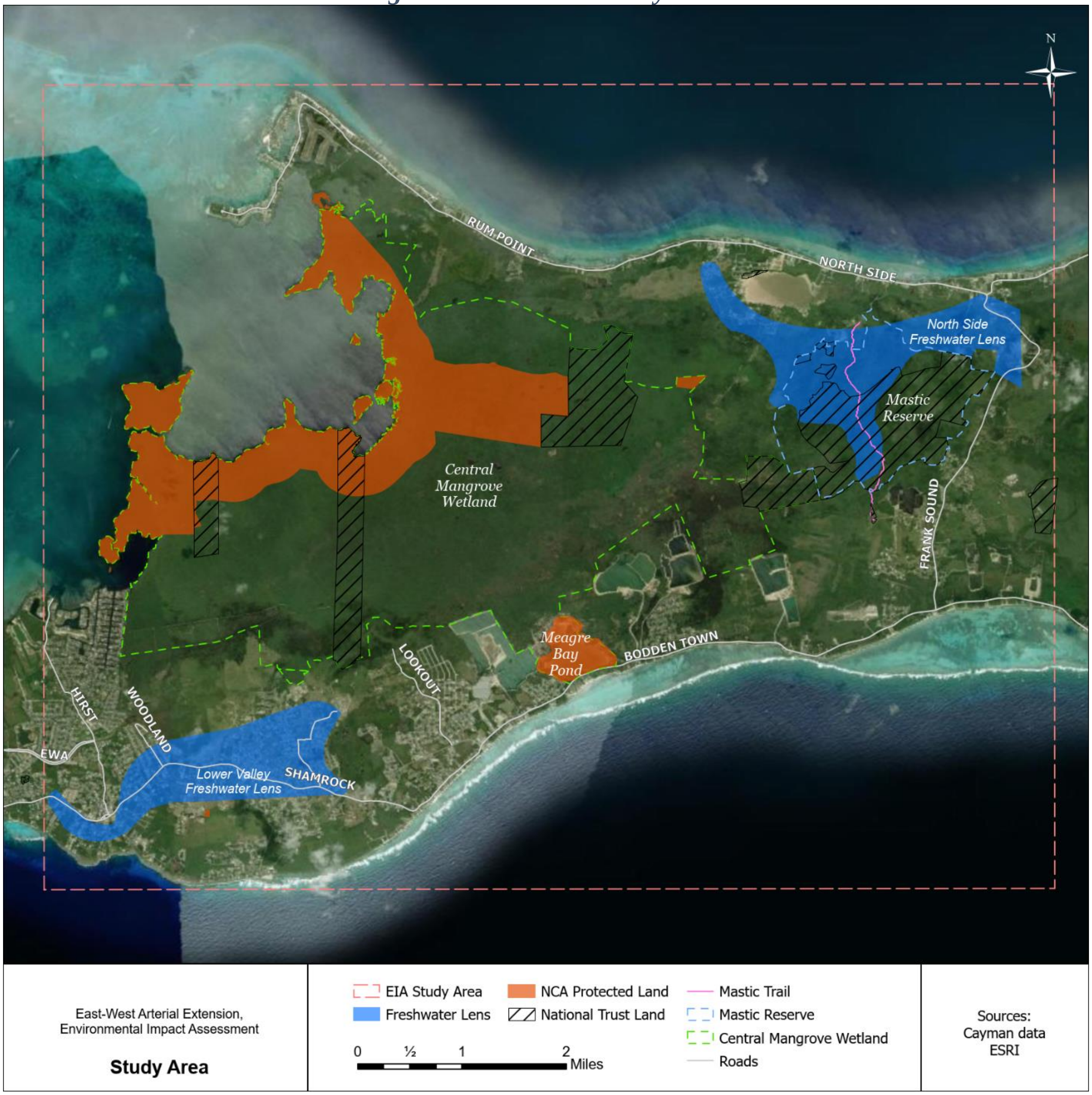
3 What is the project study area?

The EWA Extension study area for the EIA covers the middle of Grand Cayman from north to south coast (**Figure 1**). This study area is large enough to include Section 2, from Woodland Drive/planned Agricola Drive Connector to Lookout Road; and Section 3, from Lookout Road to Frank Sound Road within Bodden Town and North Side districts, northwards to North Sound and south to the coastline. This area includes the corridor initially gazetted in 2005 for the EWA Extension. The study area was established to allow for the identification of a range of alternatives to be studied.

Environmental impacts that may occur from the project within the study area were evaluated in the EIA. The environmental disciplines that were studied are discussed in **Chapter 7: Summary of Effects and Mitigation** of this document. The disciplines include:

- Socio-Economics
- Noise and Vibration
- Greenhouse Gas Emissions
- Geo-Environmental
- Hydrology and Drainage, Including Climate Resiliency
- Terrestrial Ecology
- Cultural and Natural Heritage

Figure 1: EWA EIA Study Area



4 How were data gathered?

4.1 Stakeholder Engagement

4.1.1 Land Use Charrette

As part of the EIA studies, a project-specific planning meeting, titled the Land Use Charrette, was held in July of 2023. The purpose of the Land Use Charrette was to discuss future land use possibilities and collect stakeholder thoughts on possible population growth scenarios for the year 2074. Officials from the following government departments attended:

- NRA
- DoE
- Department of Planning
- WAC
- Ministry of PAHI-TD
- Ministry of Sustainability and Climate Resiliency

Charrette attendees got information about past population growth in Grand Cayman. They also looked at future population projections. Attendees used their professional judgment to create three population growth scenarios for Grand Cayman: low, medium, and high. For each scenario, the Charrette attendees estimated where they thought development and growth will occur. This included housing development, job development, and tourism development. The three scenarios produced included:

- **Low**: 115,000 people, 10,000 new jobs, 2 hotels, 50 Airbnbs, and 23 small cruise ship visits per month
- **Medium**: 135,000 people, 25,000 new jobs, 1 hotel, 200 Airbnbs, and 23 small cruise ship visits per month
- **High**: 300,000 people, 140,000 new jobs, 8 hotels, and 9 large cruise ship visits per month (18,000 passengers)

These three growth scenarios were then used to analyse some of the possible impacts from the Proposed Project.

4.1.2 Data Requests

Throughout the EIA study process, technical data were collected from numerous Cayman government ministries, departments, and bodies/agencies. This technical data was used in the studies for the EIA. Data was received from:

- Department of Planning
- DoE
- Economics and Statistics Office (ESO)
- Land and Survey Department
- Ministry of Education
- National Trust
- NRA
- Public Transport Unit
- WAC

4.1.3 Meetings

Throughout the EIA process, the project team had monthly status and coordination meetings. Other meetings covering a variety of topics took place with the EAB and other agencies. These additional meetings offered insight and information during the studies process.

4.2 Field Efforts

Field investigations took place in July 2023 and May 2024. The study disciplines reviewed and ground truthed conditions within the study area, guided by data received during the data requests phase. Field efforts were completed for socio-economics, noise and vibration, geo-environmental, hydrology and drainage, terrestrial ecology, and cultural and natural heritage sites.

During the July 2023 and May 2024 field evaluations, 92 terrestrial ecology field verification points were documented to determine the current condition of the habitats. These field verification points used the Uniform Mitigation Assessment Method (UMAM). The field points were used to conduct a functional assessment of the habitats within the Proposed Project and to ground truth and update the existing habitat map received from the DoE during the initial data request period.

Hydrology and drainage and geo-environmental field assessment efforts in July 2023 and May 2024 included observation and collection of information regarding existing drainage conveyance structures (pipes, inlets, manholes, etc.) within the Proposed Project study area, observations of the existing on-island bridge, field views of the natural resources and mosquito canals, and visits to four active quarries. The existing roadways and Proposed Project corridor, where possible, were viewed to assess existing conditions and observe drainage patterns. The existing inlets and drainage systems were measured, mapped, and photographed. A rainfall event was observed and photographed. Observations of the event including localised temporary flooding along Bodden Town Road. Flow patterns along the Savannah Gully were also assessed. Field views of natural resources, including the Central Mangrove Wetland, Meagre Bay Pond, and Mastic Trail were conducted. The mosquito canals were walked and periodically measured. Drainage pipes and structures were mapped, characterised, and photographed. Exposed bedrock was mapped and photographed.

Both short- and long-term noise monitoring was conducted during field investigation in July 2023. Short-term, 20-minute monitoring was conducted at a total of seven locations to evaluate the accuracy of noise modelling and to record existing ambient conditions in areas not currently affected by roadway noise. Two long-term monitoring sessions, over a 23-hour period, were completed to obtain the overall ambient conditions for a longer period.

Socio-economic and cultural resources were assessed during the July 2023 field visit. Socio-economic resources, including transit routes, public spaces, community facilities, and traffic conditions, were examined. Cultural resources, including heritage register listings, cemeteries, Meagre Bay Pond, portions of the CMW, the Mastic Trail, public parks, and places of worship were examined. Additionally, a meeting between the study team and the NT took place, which covered NT-owned parcels, updates to the Heritage Register, and historic built heritage policy recommendations.

4.3 Modelling

Modelling was conducted for several study disciplines for impact evaluation. These include:

- **Engineering**, to model the roadway and corridor sections using the Proposed Project vertical and horizonal alignments (see **Section 6.1** of this document), subsurface profile (peat, etc.), in order to estimate the amount of space needed for the project, the feasibility of design, and calculate material quantities for a cost estimate.
- **Transportation and Mobility**, to model traffic movement, traffic volume, trip duration, delays, and other considerations (see **Section 6.2** of this document)
- **Noise and Vibration**, to create a 3D model to predict sound levels (see **Section 7.2** of this document)
- **Greenhouse Gas Emissions**, to calculate the greenhouse gases that will be emitted due to the Proposed Project (see **Section 7.3** of this document)
- **Hydrology and Drainage, Including Climate Resiliency**, to model and analyse water flow and accumulation related to weather events, natural and developed areas, surface water, and groundwater (see **Section 7.5**)

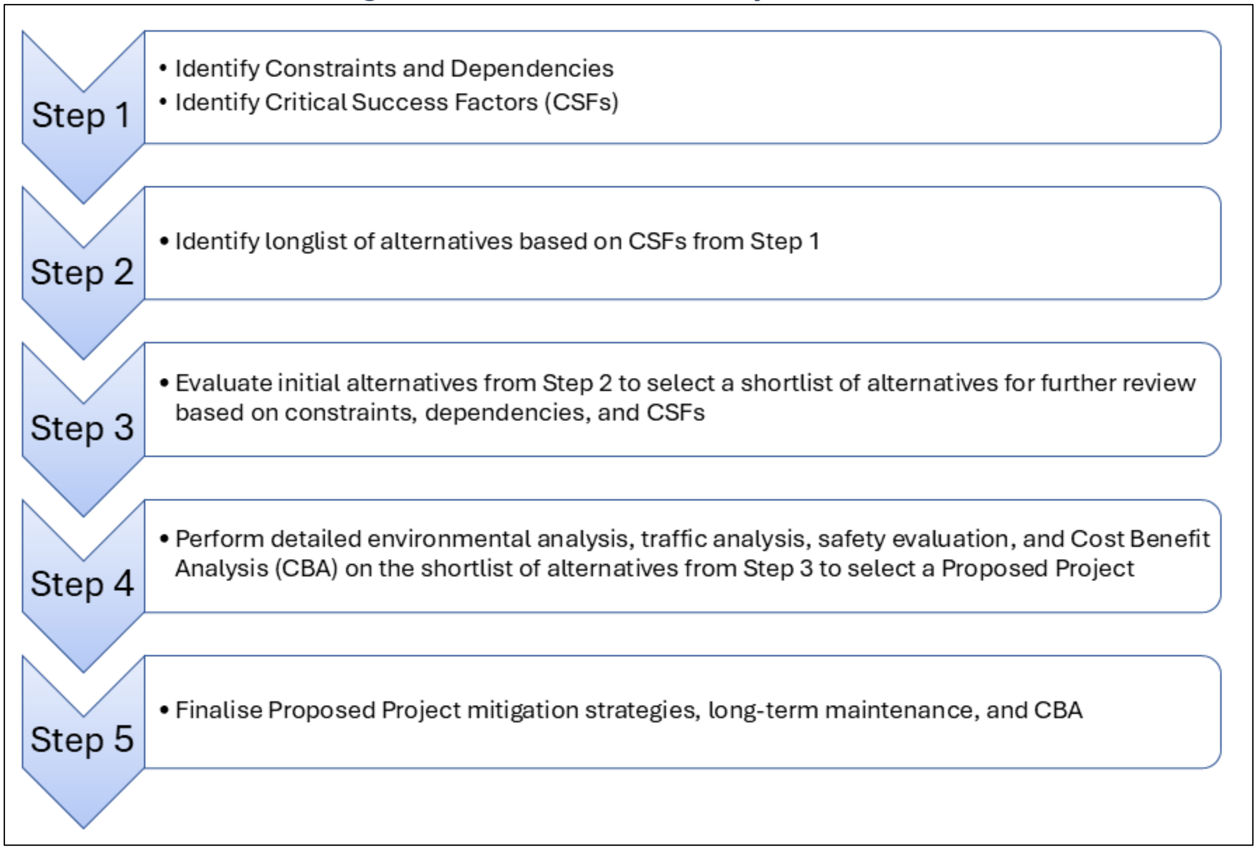
5 What is the Alternatives Analysis?

The alternatives analysis, as mentioned briefly in section 2, is an important step of the EIA process and is a way of narrowing down possible EWA Extension routes through a series of steps carefully evaluating the significant impacts of the routes proposed. The purpose of the alternatives analysis is to identify the most suitable alternative for evaluation in the ES.

Each of the initial alternatives is developed to the concept level to meet the CSFs of the project. While the alternatives are being better assessed, environmental and cultural features that need to be avoided entirely, or encroachment minimised, are identified. These alternatives are then analysed using a transportation and environmental screening process to determine which one(s) should move forward. The screening process is based on the established CSFs and constraints and dependencies (e.g., construction considerations and the evaluation of mitigation opportunities for unavoidable impacts). The alternatives that offer a route for the corridor and assume the EWA Extension to be built are called Build alternatives. The alternative that considers what might happen if the EWA Extension corridor is not built is called the No-Build scenario.

To start, several alternative alignments are identified and analysed in what is called the Longlist Alternatives Evaluation. The alternatives identified include other modes of travel including public transit and pedestrian facilities which meet the project’s needs. The ones with the least damage to the social and natural environment are carried forward to the next step of analysis, called the Shortlist Alternatives Evaluation. At the end of the process the Proposed Project is selected. **Figure 2** depicts the steps of the alternatives analysis process.

Figure 2: The Alternatives Analysis Process



5.1 Longlist of Alternatives

The Longlist Alternatives Evaluation evaluated five Build alternatives (B1, B2, B3, B4, and C1; see **Figure 3**) for CSFs (**Section 1.2.1: Project Objectives**) and constraints (**Section 1.2.2: Project Constraints**). Build Alternatives B1, B2, B3, and B4 also included a series of new or improved road connections referred to as the Will T Connector. The Will T Connector improvements are located south of Section 2, between Woodland Drive and Lookout Road. The No-Build scenario was also evaluated as a basis for comparison. As a result of this evaluation, Build Alternatives B2, B3, and B4 were recommended for further study.

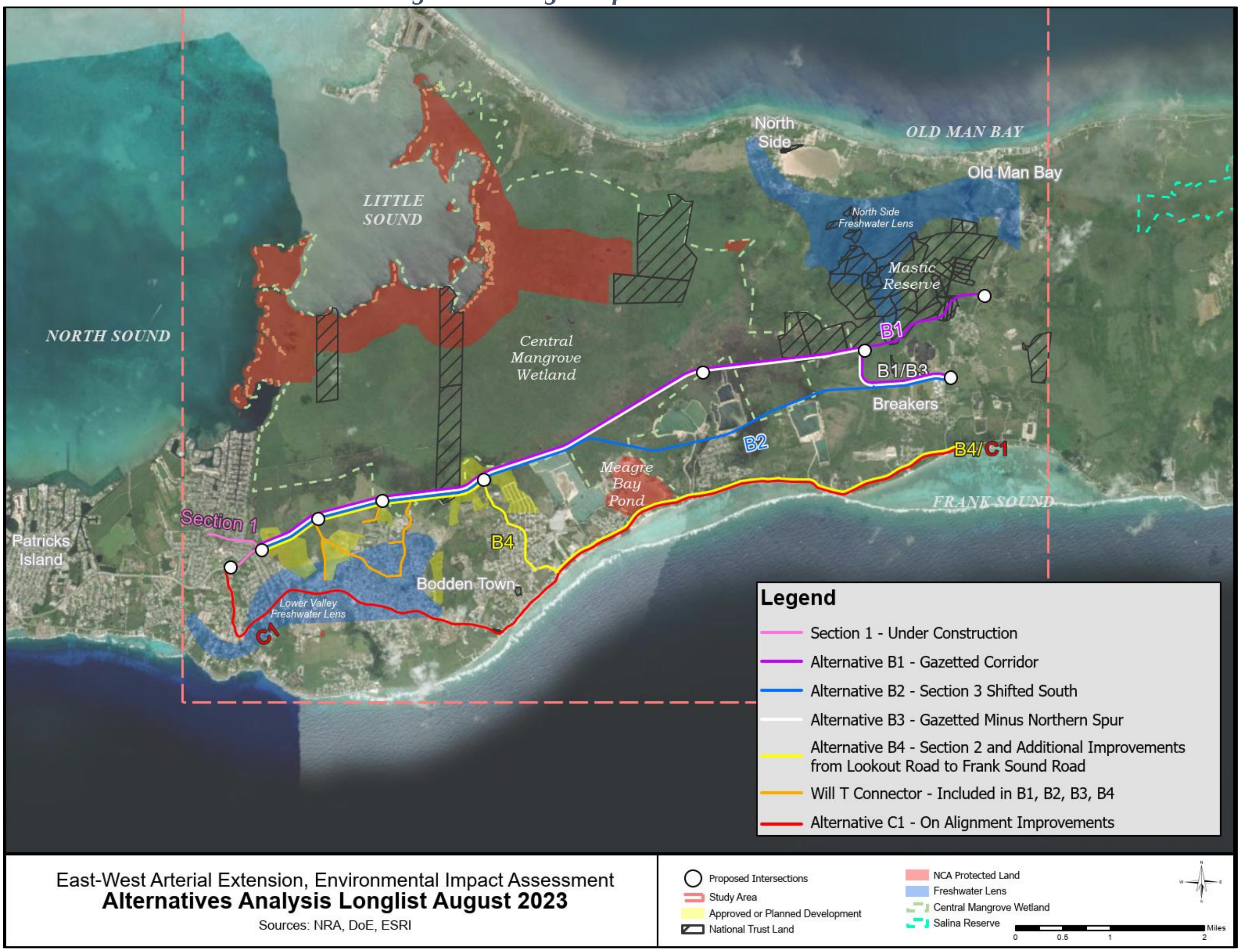
In addition, Ministry of PAHI-TD provided a directive memorandum on September 5, 2023 for inclusion of Alternative B1 within the Shortlist of Alternatives. The Ministry provided the following reasoning:

"As we all know the purpose of the EIA is to outline potential impacts of building the EWA, and identify mitigation solutions. As such the road as gazetted (option B1) must to be included in the shortlist options. Excluding B1 denies decision makers critical data on the proposed route as they will not receive a detailed analysis on the road as currently proposed. Without this critical baseline the impact of any potential reroute or diversion cannot be fully understood. For this reason, the Ministry's stance is that B1 is equally important to the "No Build Scenario", and therefore the EIA cannot be completed without it."

The final Shortlist of Alternatives included:

- No-Build scenario
- Alternative B1
- Alternative B2
- Alternative B3
- Alternative B4

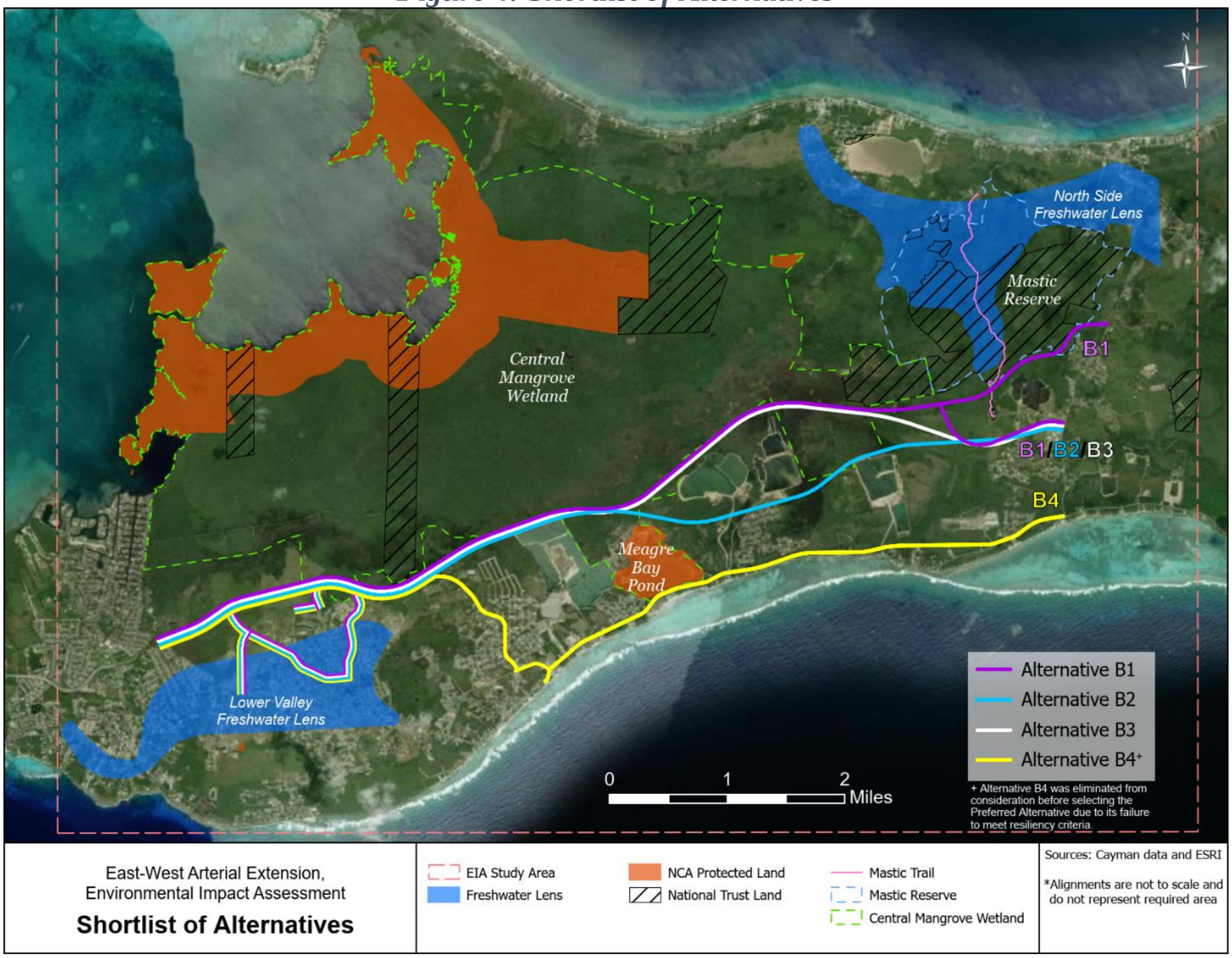
Figure 3: Longlist of Alternatives



5.2 Shortlist of Alternatives

The Shortlist Alternatives Evaluation evaluated four Build alternatives (B1, B2, B3, and B4; see **Figure 4**) for CSFs (**Section 1.2.1: Project Objectives**) and constraints (**Section 1.2.2: Project Constraints**).

Figure 4: Shortlist of Alternatives



During the analysis process, the project team determined that Alternative B4 failed to meet resiliency criteria without significant social impacts and engineering constraints. On March 14, 2024, the NRA and EAB agreed with eliminating Alternative B4 from further evaluation.

In addition, the EWA Extension EIA Steering Committee met on three separate occasions in May 2024 to discuss the Shortlist Alternatives Evaluation and agreed on the elimination of Alternative B1 based on the anticipated higher natural environment impacts and lower cost-benefit.

A high-level summary report of the EWA Extension EIA findings for Alternatives B2 and B3 was prepared and provided to the Cabinet. On June 27, 2024, Cabinet granted approval for the selection of Alternative B3 as the Proposed Project. The results of the Shortlist Alternatives Evaluation included:

- No-Build scenario: The No-Build scenario is to be carried forward through the entire EIA evaluation process as a baseline of comparison per the UK Greenbook guidance.
- Alternative B1: Alternative B1 will **not** be carried forward, as agreed by all members of the Project Steering Committee.
- Alternative B2: Alternative B2, chosen by the EAB as the least impactful option, will **not** be carried forward.
- **Alternative B3: Alternative B3 is chosen to be carried forward by Cabinet approval. This alternative from this point forward is described as the Proposed Project.**

6 What is the Proposed Project?

6.1 Proposed Project and Engineering

The Proposed Project starts at the end of Section 1 of the EWA Extension at Woodland Drive/planned Agricola Drive Connector. It travels east with the construction of a new roadway for roughly 8 miles (13 km) and ends at an intersection with Frank Sound Road. The level of design for the Proposed Project during the EIA process is an early-stage conceptual design. More data will need to be collected before a more detailed design can be completed, outside of this EIA process.

The overall EWA Extension has three sections. Section 1 extends between Hirst Road and Woodland Drive/planned Agricola Drive Connector and is currently under construction. Section 2 will connect Woodland Drive/Agricola Drive Connector to Lookout Road. Section 3 will connect Lookout Road to Frank Sound Road. Along with the main new corridor, Section 2 also includes a series of new and improved roadways described as the Will T Connector. These roadway segments will provide direct access to the Proposed Project. **Figure 5** shows the general location of each EWA Extension section.

An integrated engineering design approach was used to incorporate sustainability and future-proofing measures, by examining the Proposed Project in relation to future development and climate challenges, including rising sea levels and extreme weather events. Sea level rise was considered while the Proposed Project was being conceptually developed. During detailed design, the degree of effectiveness will be analysed and evaluated. Analysis and evaluation will use relevant hydrologic and hydraulic modelling techniques and current information on the sea level rise forecast.

For the Proposed Project, it is estimated that sea levels could rise up to 1.64 feet (0.5 meters) over the life of the corridor. The lowest areas of the roadway surface are currently designed to remain dry at the edge of the travel lanes during a 50-year storm event. While the road may still be passable at higher points during such events when accounting for sea level rise, the increasing frequency and severity of flooding could disrupt traffic flow and escalate maintenance costs. To address these issues, it is imperative to incorporate sea level rise considerations into the hydrologic and hydraulic analysis during the detailed design phase of the project. This analysis should guide the redesign of drainage systems, elevation of critical infrastructure, and selection of resilient construction materials that can withstand frequent inundation.

Three design options are examined: the Excellent Fit, the Good Fit, and the Acceptable Fit. These three options offer different costs and resiliency benefits. The initial design concept is the Excellent Fit, which is the most resilient and therefore most expensive option. The other two options lower the cost and remove some resiliency while still meeting the CSFs. More information about these design options is presented in **Section 6.1.5: Value Engineering and Future Cost Reductions**.

Figure 5: EWA Extension General Location and Sections Map

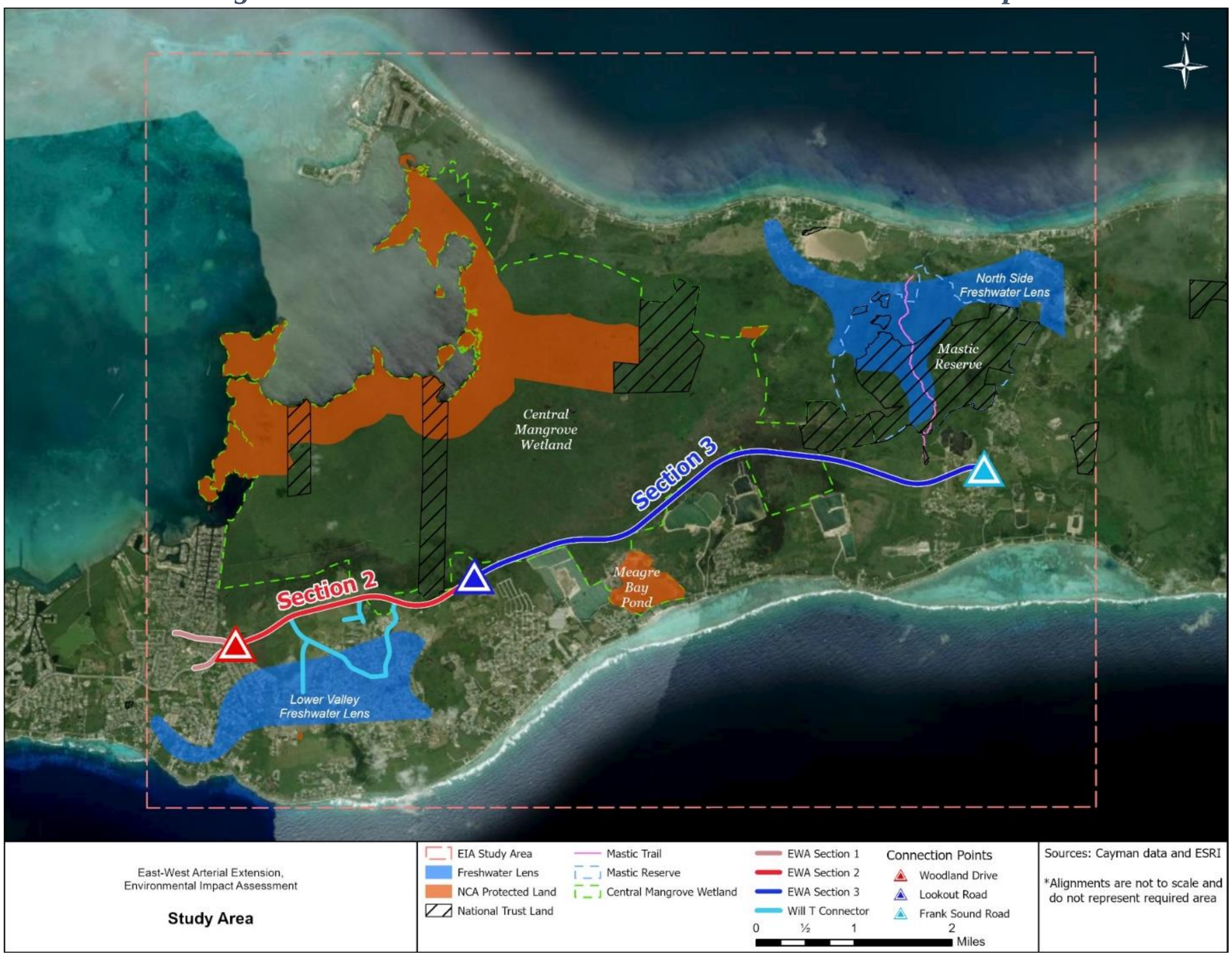


Figure 6 shows what Section 2 and Section 3 of the main corridor will look like when first constructed in the 2026 construction phase (first phase of construction).

Figure 6: Sections 2 and 3 (Woodland Drive to Frank Sound Road) Typical Section (2026)

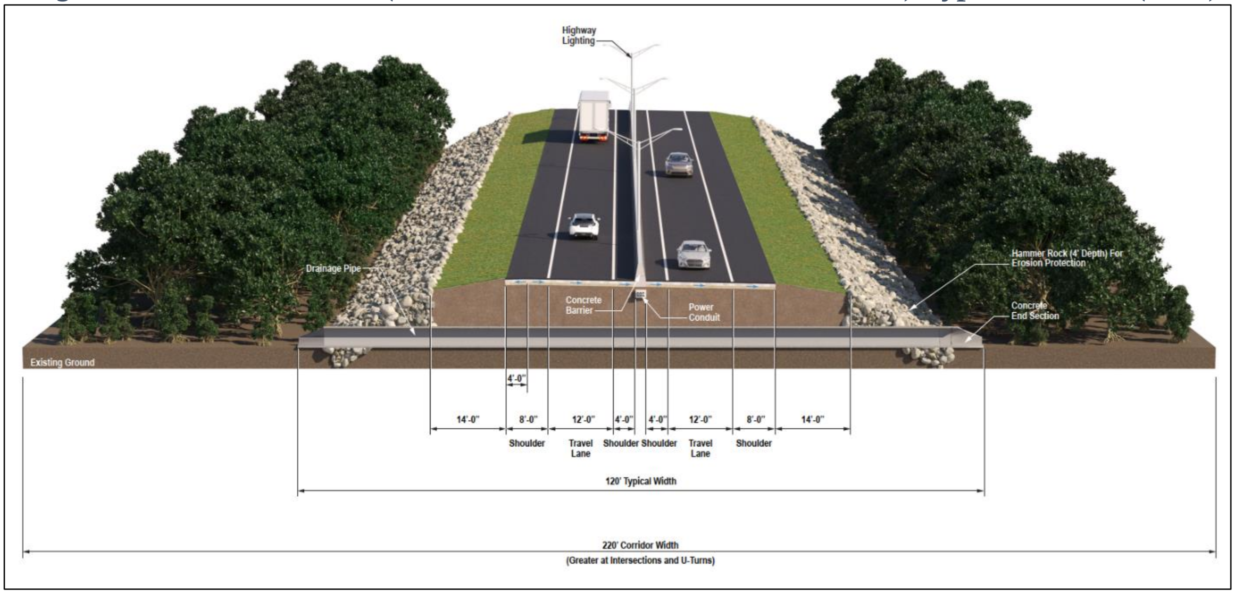


Figure 7 shows what the Will T Connector will look like in the 2026 construction phase.

Figure 7: Will T Connector Typical Section (2026)

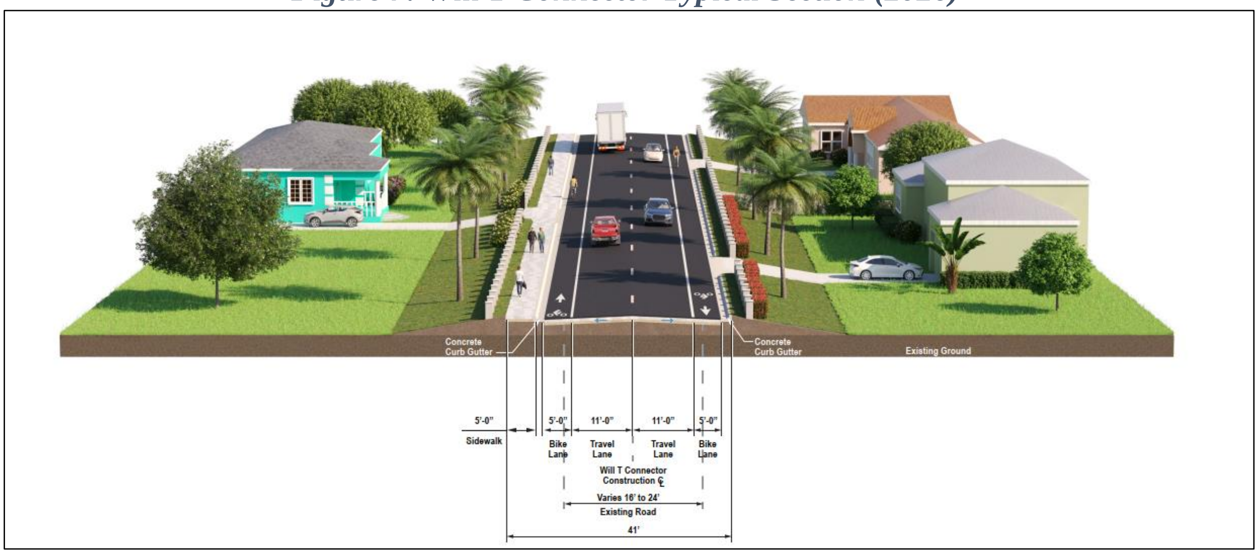
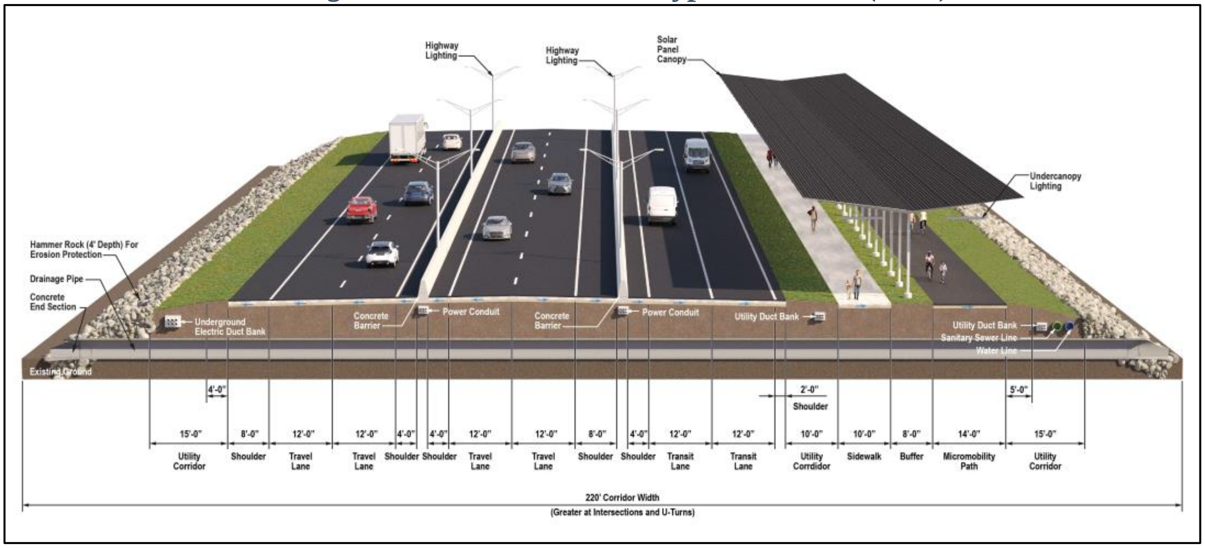


Figure 8 shows what Sections 2 and 3 of the main corridor may look like when fully built in the 2060 construction phase.

Figure 8: Sections 2 and 3 Typical Section (2060)



6.1.1 Design Features

The conceptual design of the Proposed Project has features that will provide sustainable, long-term multimodal transportation solutions for the island. Multimodal access refers to different modes of transportation other than motorised vehicles, like walking, biking, or riding a scooter. These features include:

- Multiple traffic lanes
- Separate transit lanes for public transportation*
- A micromobility path, which is for lightweight vehicles like scooters, bicycles, and other small electric powered devices
- A sidewalk
- A solar array* that also provides shade and lighting to the micromobility path and sidewalk
- Utility corridors for future infrastructure*
- Pipes and culverts to maintain water flow through adjacent habitats
- Stormwater management basins to protect ecosystems

** Note that these features are outside of the ambit of the NRA. The NRA will provide the ability for the corridor to accommodate these features.*

6.1.2 Bridges and Intersections

Including bridges or other hydrologic openings within the Proposed Project will provide several benefits such as helping to maintain natural water flow during normal conditions and severe storm events. Maintaining natural water flow will minimise impacts to the CMW, reduce flood risk to nearby properties, and makes sure the corridor can recover more quickly after a major storm event. The possible locations and sizes for bridge openings can be seen in **Figure 9**.

Figure 9: Bridge Opening Locations for Proposed Project

Including intersections along the Proposed Project will help people efficiently connect to the Proposed Project for travel. The possible intersection locations and types were identified based on projected travel and access. The proposed intersections are subject to change during the detailed design stage.

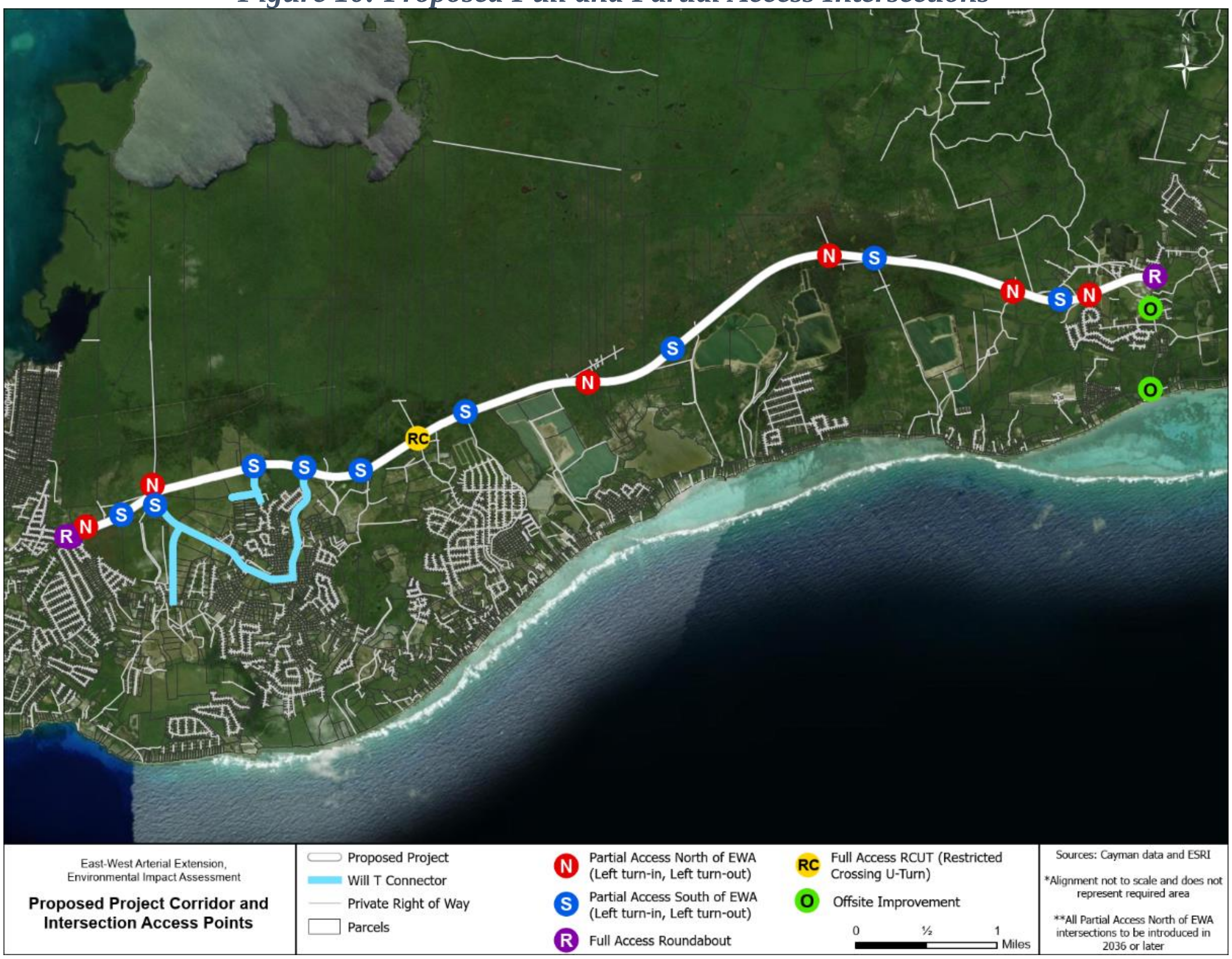
The following two intersection types are included at this stage of the project. These will serve the existing and future connector roads linking both existing and future development.

- **Full Access Intersections** – this type of intersection will allow vehicles to move in all directions. Three full access intersections are proposed.
    - Two full access intersections are proposed to be roundabouts at either end of the Proposed Project (Woodland Drive/Agricola Drive Connector and Frank Sound Road); constructed in the initial build phase (2026).
    - The third full access intersection can involve restricted U-turn movements at Lookout Road. There will not be a north access road at Lookout in the initial build in 2026.

- **Partial Access Intersections** – this type of intersection will allow vehicles to enter or exit the Proposed Project by turning left only. Vehicles will not cross traffic to use these intersections. The inclusion of U-turn connections will let people safely travel in the opposite direction to get to an intersection on the other side of the Proposed Project, if desired.

Intersections allowing access to areas south of the corridor will be introduced in 2026. Intersections allowing access to areas north of the corridor will not be introduced until future year 2036, or beyond based on access needs. The number and type of intersections are shown in **Figure 10**.

Figure 10: Proposed Full and Partial Access Intersections



6.1.3 Proposed Project Construction Phasing

The construction timeline for the Proposed Project, from 2026 to 2060, has been developed to reduce environmental harm and to place design features in the best locations to minimise impacts while meeting the identified project needs. This timeline was developed to manage the overall impacts of the corridor and to minimise impacts to the natural areas north of the Proposed Project. The proposed phases can change if future traffic needs or population projections change. However, even if the future phasing changes, the approach will still manage the impacts of the corridor and minimise impacts to the natural areas north of the Proposed Project. The proposed phasing of the design elements is shown in **Figure 11** and **Tables 2** and **3**.

The starting build year of 2026 focuses on constructing the initial two-lane roadway along the southern part of the corridor. This way, development will be concentrated away from the northern, more remote natural areas.

Highway lighting is also proposed to be installed during the phased construction. This lighting will be installed in the initial 2026 construction phase at key intersections including Woodland Drive/Agricola Drive Connector and Frank Sound Road, to enhance safety. More lighting along the corridor, including at other future intersections and along bridges, could be added as needed when new lanes, a sidewalk, and a micromobility path will be introduced.

Future build year components will be expanded from this southern initial build area of the corridor**,** progressively moving northward. The northernmost features will be implemented during the latest possible build years, with the addition of two travel lanes and a utility corridor planned for 2046 in Section 2 and for 2060 in Section 3. Lighting installations will follow this pattern, with environmentally sensitive areas, such as the CMW, receiving minimal lighting to avoid disrupting wildlife and reduce light pollution.

This phased approach to construction and development is both fiscally and environmentally prudent by not building or impacting more than necessary. It allows the project to adapt to changes in demand due to population growth or developments. It also allows for lessons learned from prior phases, new mitigation technology, or approaches for mitigation to be deployed during later phases of construction.

Figure 11: Typical Section Build Year Phasing

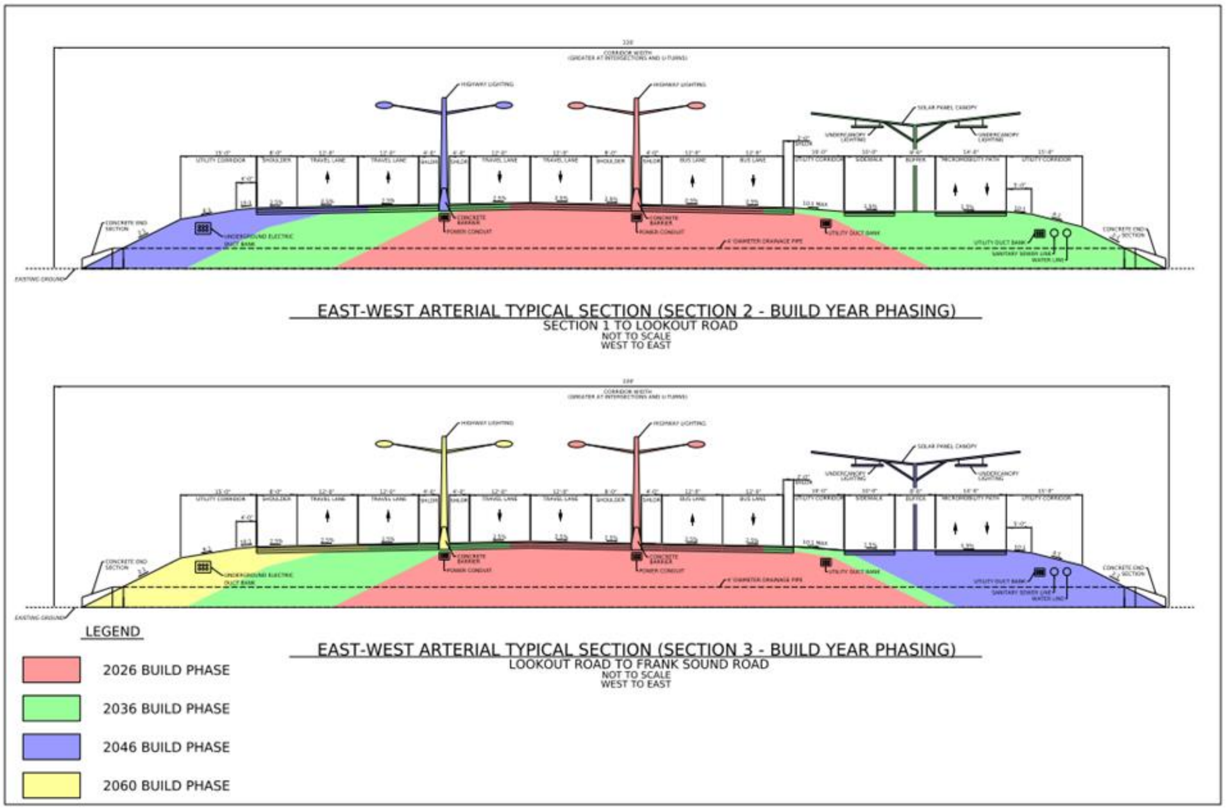


Table 2: Proposed Project – Section 2 Timeline for Components

Typical Section Components	2026	2036	2046	2060**
Number of Travel Lanes	2	2	4	4
Number of Dedicated Transit Lanes*		2	2	2
Sidewalk		✓	✓	✓
Micromobility Path		✓	✓	✓
Utilities*		✓	✓	✓
Highway Lighting*	✓	✓	✓	✓
Solar Panel Canopy *		✓	✓	✓

**Note that these features are outside of the ambit of the NRA. The NRA will provide the ability for the corridor to accommodate these features.*

***Number of travel lanes based on Medium/ "core" land use/population growth scenario described in Chapter 7: Transportation & Mobility of the ES.*

Table 3: Proposed Project – Section 3 Timeline for Components

Typical Section Components	2026	2036	2046	2060**
Number of Travel Lanes	2	2	2	4
Number of Dedicated Transit Lanes*		2	2	2
Sidewalk		Phased as Required	✓	✓
Micromobility Path		Phased as Required	✓	✓
Utilities*		✓	✓	✓
Highway Lighting*	✓	✓	✓	✓
Solar Panel Canopy*		Phased as Required	✓	✓
**Note that these features are outside of the ambit of the NRA. The NRA will provide the ability for the corridor to accommodate these features.* ***Number of travel lanes based on Medium/ "core" land use/population growth scenario described in Chapter 7: Transportation & Mobility of the ES.*				

6.1.4 Cost Estimate

The overall estimated total costs for the Proposed Project were calculated by combining the estimated construction and maintenance costs with the estimated right-of-way acquisition costs (as shown in **Table 4**). This includes potential costs for maintenance and rehabilitation through the horizon year 2074. Maintenance costs account for approximately 41% ($438,700,000 US Dollars [$366,310,000 Cayman Island Dollars]) of the costs provided in **Table 4**.

Table 4: Estimated Construction and Maintenance Costs for the Proposed Project Excellent Fit by Build-Year Phase and Section

Build Year Phase	Unit	Section 2 Total Construction and Maintenance Cost by Phase	Section 3 Total Construction and Maintenance Cost by Phase
2026	US Dollars	$142,840,000	$135,570,000
	Cayman Island Dollars	$119,980,000	$113,880,000
2036	US Dollars	$174,610,000	$121,160,000
	Cayman Island Dollars	$146,670,000	$101,770,000
2046	US Dollars	$82,210,000	$104,420,000
	Cayman Island Dollars	$69,060,000	$87,710,000
2060	US Dollars	$88,350,000	$129,870,000
	Cayman Island Dollars	$74,220,000	$109,100,000
2074	US Dollars	$33,090,000	$58,090,000
	Cayman Island Dollars	$27,800,000	$48,790,000
Section Total:	US Dollars	$521,110,000	$549,110,000
	Cayman Island Dollars	$437,730,000	$461,250,000
Total Construction and Maintenance Cost for the Proposed Project = **US $1.07 Billion** **Cayman Island $899 Million**			

^Price includes construction/maintenance of the Will T Connector
** Additional cost breakdown information for Section 2 and Section 3 is provided in **Appendix F.7** of the ES*
***Anticipated components included in each year are shown in **Tables 2** and **3**.*
**** Note that cost estimates provided are calculated in 2024 dollars, without adjustments for inflation and rounded. No inflation rates have been applied to account for future build years, and thus estimates reflect only current dollar values. US Dollars have been converted from CI Dollars at a rate of $0.84 CI = $1.00 US; $1.00 CI = $1.19 US.*
***** The costs presented reflect the concept design for the Proposed Project. The cost estimates are based on a conservative approach to the project's design and estimation process. Changes or optimizations made during detailed design stages will directly affect these costs.*
****** Yellow highlighted values indicate that the cost is solely maintenance related.*

6.1.5 Value Engineering and Future Cost Reduction Considerations

This section examines Value Engineering options under consideration during the development of the Proposed Project. Value Engineering focuses on improving project value by finding cost savings while keeping the key features and function of the project. The development of the Proposed Project involved balancing engineering standards**,** local preferences, and environmental sustainability.

Throughout the design process, the approach prioritized safety and environmental sustainability. With any large-scale engineering project there is a balance between performance and cost. For the Proposed Project, several options were explored to achieve cost savings. These options will adhere to design standards, safety requirements, and environmental protection goals, and they incorporate local preferences.

The initial design concept, referred to throughout this document, can be thought of as the "Excellent Fit". The "Excellent Fit" is the conceptual design option that optimally meets all the CSFs and offers the highest level of resiliency against storm events when compared to other Value Engineering options. However, the "Excellent Fit" has the highest anticipated cost, as the design was developed without compromising on costs and other restrictive factors. In an effort to reduce primarily the estimated cost of the Proposed Project "Excellent Fit" option, the roadway profile could be lowered, which would decrease both resiliency and cost. The following conceptual design variations could be considered:

1. **Good Fit**: This conceptual design variation is considered the next-best option for storm resiliency when compared to the "Excellent Fit". It would be designed to achieve the CSFs at a lower cost compared to the "Excellent Fit." The "Good Fit" option would not be resilient to a 50-year storm event, but would be designed to accommodate a 25-year storm event. A 25-year storm event is a more moderate storm than the 50-year storm event, but is more intense than a common storm. The "Good Fit" option also replaces the proposed bridges with large box culverts.
2. **Acceptable Fit**: This design option represents the most cost-effective solution but involves more significant trade-offs. It still meets the CSFs and is resilient to minor storm events but will be the least resilient to storms compared to the "Excellent Fit" and the "Good Fit" options. The "Acceptable Fit" option also replaces large box culverts with smaller, more frequently placed box culverts or pipes.

Each of these design options offer a balanced approach to achieving project goals / CFS within different budgetary and storm resiliency levels. The Acceptable Fit option represents the most cost-effective when compared to the Excellent Fit option, which would have the highest cost. Therefore, these two options show the upper and lower limits of the potential project's costs range.

The estimated cost for Section 2 and Section 3 of the "Acceptable Fit" option is provided in **Table 5**. These costs are shown by Build-Year Phase and estimated construction years. This table includes a breakdown of the estimated costs for both primary roadway features and optional features, such as Will T connector and other features.

Primary roadway features included new construction costs and lifecycle maintenance costs (e.g., milling and resurfacing, etc.). Maintenance costs account for approximately 43% ($247,040,000 US Dollars [$207,510,000 Cayman Island Dollars]) of the costs provided in **Table 5**. Optional features are considered such as the micromobility path, sidewalk, transit lanes and Will T Connector in Section 2.

Benefits of the "Acceptable Fit" option include:

- Lower quantities of construction materials
- Eliminating materials and labour/equipment costs for large structures (bridges or large box culverts)
- Faster construction timeline
- Could minimise the environmental disturbance area and overall impacts
- Simplifies constructability
- Lower cost

Drawbacks of the "Acceptable Fit" option include:

- Increase risk of flooding
- Higher maintenance and repair costs
- Potential for more road closures of the EWA Extension due to flooding/debris
- Potential significant construction works along the alignment or local retrofitting to implement future design modifications that consider revised stormwater management requirements

Table 5: Estimated Construction and Maintenance Costs for the Proposed Project Acceptable Fit by Build-Year and Section

Build Year Phase	Unit	Section 2 Total Construction and Maintenance Cost by Phase		Section 3 Total Construction and Maintenance Cost by Phase	
		Primary Roadway Features	**Optional Features**	**Primary Roadway Features**	**Optional Features**
2026	US Dollars	$35,850,000	$12,890,000	$62,450,000	-
	Cayman Island Dollars	$30,110,000	$10,830,000	$52,460,000	-
2036	US Dollars	$15,840,000	$38,580,000	$21,080,000	$39,760,000
	Cayman Island Dollars	$13,310,000	$32,410,000	$17,710,000	$33,400,000
2046	US Dollars	$26,770,000	$13,380,000	$32,290,000	$33,880,000
	Cayman Island Dollars	$22,490,000	$11,240,000	$27,120,000	$28,460,000
2060	US Dollars	$31,740,000	$31,260,000	$70,430,000	$21,010,000
	Cayman Island Dollars	$26,660,000	$26,260,000	$59,160,000	$17,650,000
2074	US Dollars	$17,630,000	$21,120,000	$19,330,000	$29,190,000
	Cayman Island Dollars	$14,810,000	$17,740,000	$16,240,000	$24,520,000
Section Total:	US Dollars	**$127,830,000**	**$117,230,000**	**$205,580,000**	**$123,840,000**
	Cayman Island Dollars	**$107,380,000**	**$98,480,000**	**$172,690,000**	**$104,030,000**
		Section 2 Total Construction and Maintenance Cost – US $245 Million; Cayman Island $206 Million		**Section 3 Total Construction and Maintenance Cost – US $329 Million; Cayman Island $277 Million**	
Total Construction and Maintenance Cost for the Proposed Project – US $575 Million; Cayman Island $483 Million					

** Rounded values. Note that cost estimates provided are calculated in 2024 dollars, without adjustments for inflation. No inflation rates have been applied to account for future build years, and thus estimates reflect only current dollar values. Estimated costs have been rounded where appropriate.*
*** The costs presented reflect the concept design for the proposed project. The cost estimates are based on a conservative approach to the project's design and estimation process. Changes or optimizations made during detailed design stages will directly affect these costs.*
**** Costs presented in this table include an additional contingency cost of 20% of the construction/maintenance costs as well as an additional cost for Potential Terrestrial Ecology Mitigation.*
***** Yellow highlighted values indicate that the cost is solely maintenance related.*

6.2 Transportation and Mobility

The study of transportation uses current traffic data and future population and planning projections to understand how the Proposed Project will alleviate traffic stress, improve quality of life, and enhance safety across different modes of travel. Understanding the new travel patterns that could result from the EWA Extension also informs the study of the project's environmental impacts while providing valuable data to several other study disciplines, including Socio-Economic and Noise and Vibration.

6.2.1 Baseline Data and Traffic Conditions

The study team looked at current traffic conditions on Grand Cayman. Collecting this data helped the team identify existing traffic issues and create models of future traffic conditions on the island.

Residents of North Side and East End face widespread congestion on Shamrock Road and Bodden Town Road (**Figure 12**). Currently, drivers use the existing Shamrock Road, Bodden Town Road, and Frank Sound Road to reach the eastern districts. These roads are two-lane, undivided roadways. Speed limits go as high as 50 miles per hour. These existing roads have a number of possible travel concerns including:

- Vehicles travelling at high speeds without a barrier between the lanes
- Many cross-streets, driveways, and access points
- Few pedestrian facilities, including sidewalks and crosswalks
- No dedicated bicycle lanes
- Limited transit service and dedicated transit stops

As Grand Cayman's population continues to grow, the traffic congestion issues and travel concerns along these existing roads are expected to worsen.

Figure 12: AM Westbound Congestion, Shamrock Road looking east near Will T Road (February 2023)

6.2.2 Project Impacts

Based on the comprehensive modelling and analysis conducted in this study, the Proposed Project will positively impact many of the existing transportation issues and concerns. The project was evaluated across several CSFs, demonstrating a beneficial (positive) impact on issues including travel times, multimodal access, safety, and resiliency compared to the No-Build. The CSFs are discussed in more detail in **Section 1.2.1 Project Objectives** of this document.

6.2.2.1 Traffic Demand

The Proposed Project will be able to handle more east-west travel than the existing roadway network. With the Proposed Project in place, it will also reduce traffic congestion along the existing coastal roadways of Shamrock Road and Bodden Town Road as drivers use the new corridor instead of the coastal roads. The Proposed Project will provide a safer, higher-speed, higher-capacity route option than the existing coastal roadways. More drivers will be able to travel between the east and west during peak hours than if only the coastal route was available.

By relieving traffic congestion along the coastal roads when compared with the No-Build scenario, the Proposed Project will also reduce east-west travel times. This time savings compared with the No-Build scenario will be especially beneficial during the morning and evening peak commute hours, when many people travel to and from work. The Proposed Project will also improve commute times between eastern and western districts, when compared with the No-Build scenario, expanding job opportunities for eastern district residents and accommodating longer-distance commutes to employment centres in the west.

6.2.2.2 Resiliency

Today, the only way to travel between the east and west in Grand Cayman is to drive along Shamrock Road and Bodden Town Road. These coastal roads each have one lane travelling in each direction. This lack of alternative routes means that incidents such as crashes, storms, flooding, or fallen vegetation and other objects can cause roadway closures that completely cut off east-west traffic, leaving thousands stranded for hours or even days (in situations of hurricane damage).

The Proposed Project will do the following:

- provide a second route between eastern and western districts in the event of flooding, crashes, or road closures along the coastal roads
- provide resiliency and more reliable access to emergency services, family members, or other essential resources
- redirect much of the east-west traffic to the new EWA corridor, reducing the number of crashes and incidents that will occur along the existing coastal roads

6.2.2.3 Travel Time

Grand Cayman drivers already face frustrating commute times and traffic congestion, and these issues will only worsen as Grand Cayman's population continues to grow. The Proposed Project is projected to improve travel times between eastern and western districts when compared with the No-Build scenario, allowing drivers to travel more quickly from one side of the island to the other. This travel time benefit when compared with the No-Build scenario is displayed in **Figures 13** through **16** across multiple analysis years. This will result in travel time savings for both the people using the Proposed Project (**Figures 13** and **15**) and those remaining on the coastal roads (**Figures 14** and **16**) when compared with the No-Build scenario. The Proposed Project will improve travel times along the existing coastal road when compared with the No-Build scenario by diverting traffic onto the new corridor and reducing through traffic along the coastal road.

Figure 13: AM Westbound Travel Times (minutes) from Frank Sound Road to Hirst Road via EWA

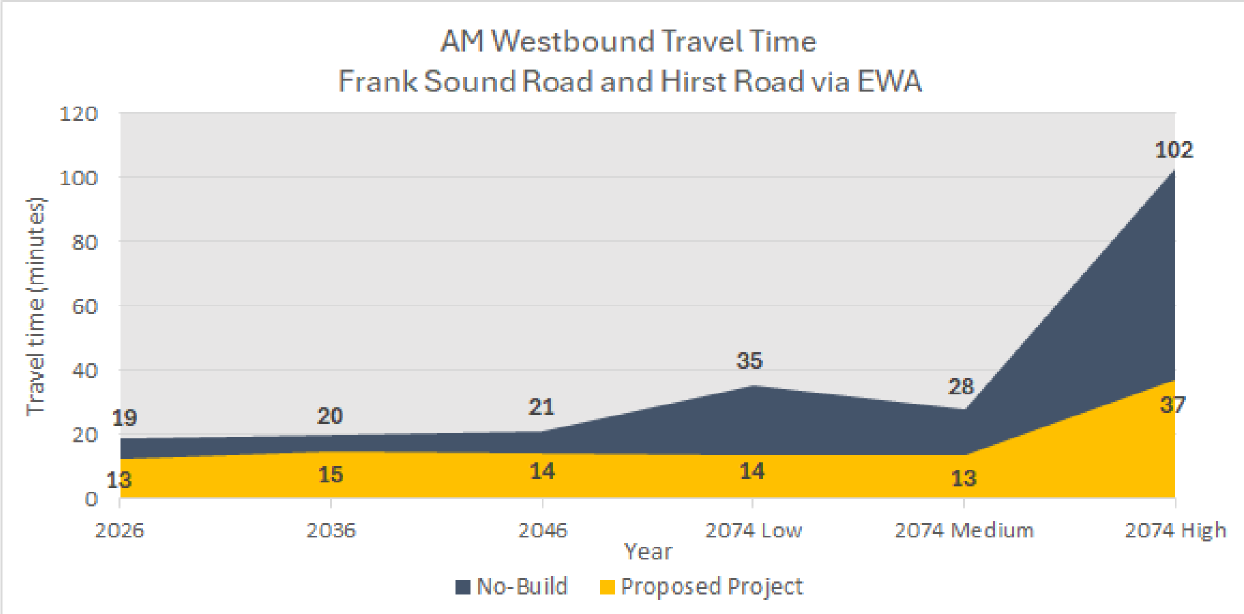


Figure note: 2074 Low Growth's anticipated travel times are greater than 2074 Medium Growth due to where employment and population growth were assumed for these scenarios (see **Section 4.1.1: Land Use Charrette**, as well as a comparison of employment and population assumptions.)

Figure 14: AM Westbound Travel Times (minutes) from Frank Sound Road to Hirst Road via Shamrock Road/Bodden Town Road

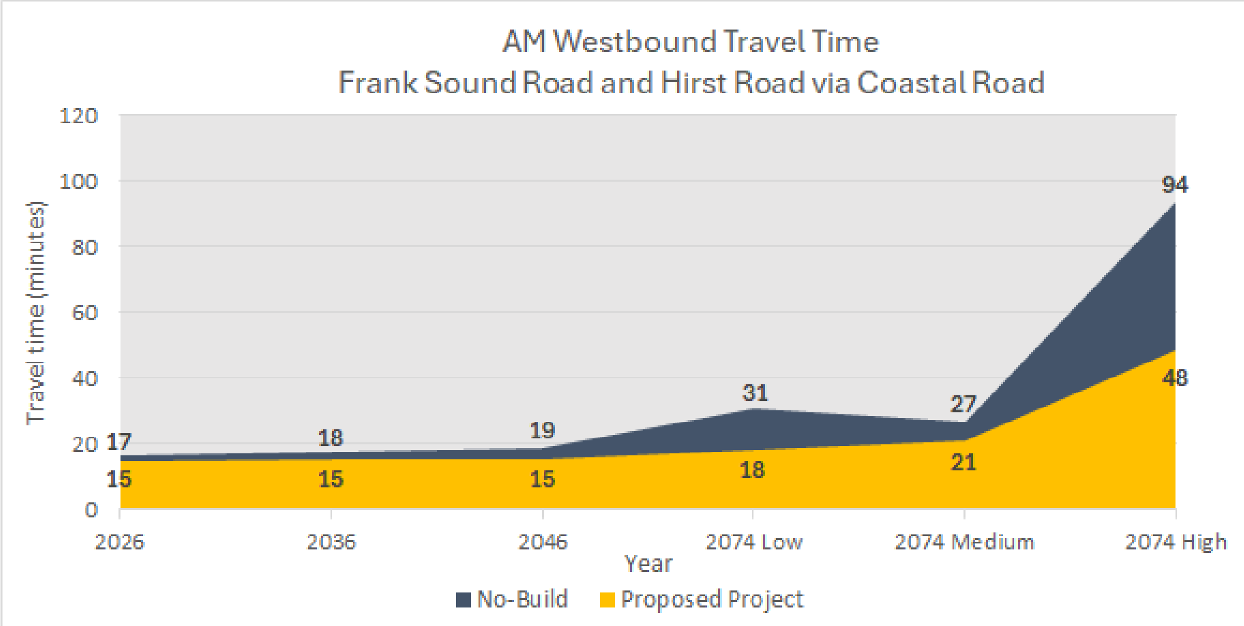


Figure note: 2074 Low Growth's anticipated travel times are greater than 2074 Medium Growth due to where employment and population growth were assumed for these scenarios (see **Section 4.1.1: Land Use Charrette**, as well as a comparison of employment and population assumptions.)

Figure 15: PM Eastbound Travel Times (minutes) from Hirst Road to Frank Sound Road via EWA

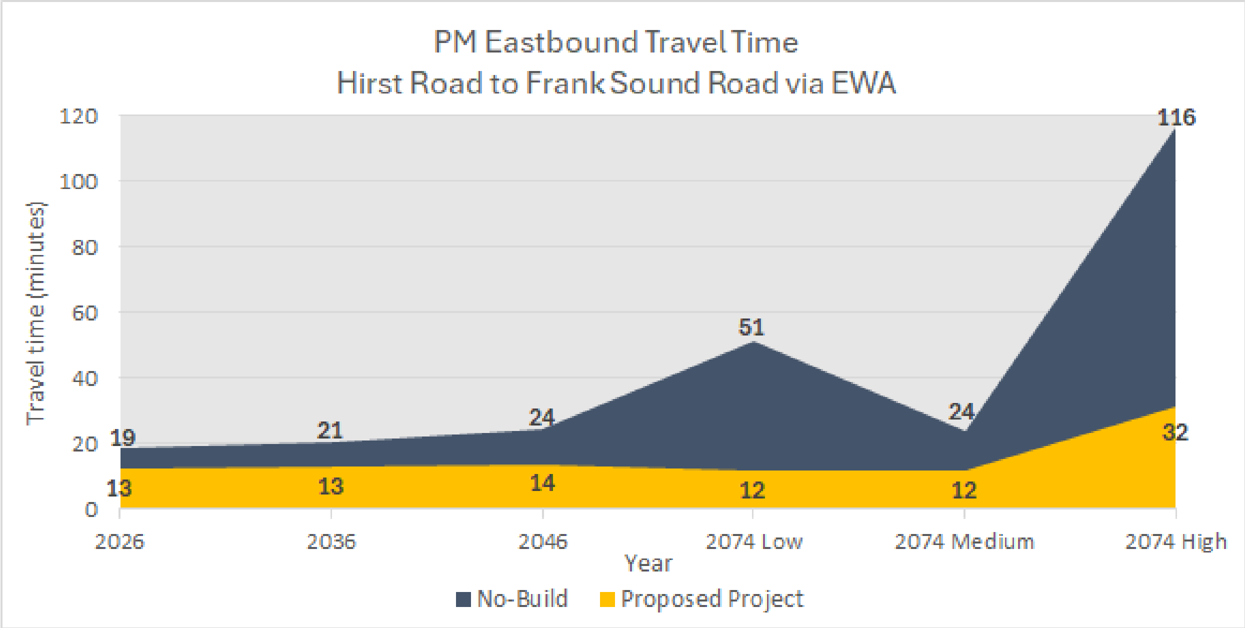


Figure note: 2074 Low Growth's anticipated travel times are greater than 2074 Medium Growth due to where employment and population growth were assumed for these scenarios (see **Section 4.1.1: Land Use Charrette**, as well as a comparison of employment and population assumptions.)

Figure 16: PM Eastbound Travel Times (minutes) from Hirst Road to Frank Sound Road via Shamrock Road/Bodden Town Road

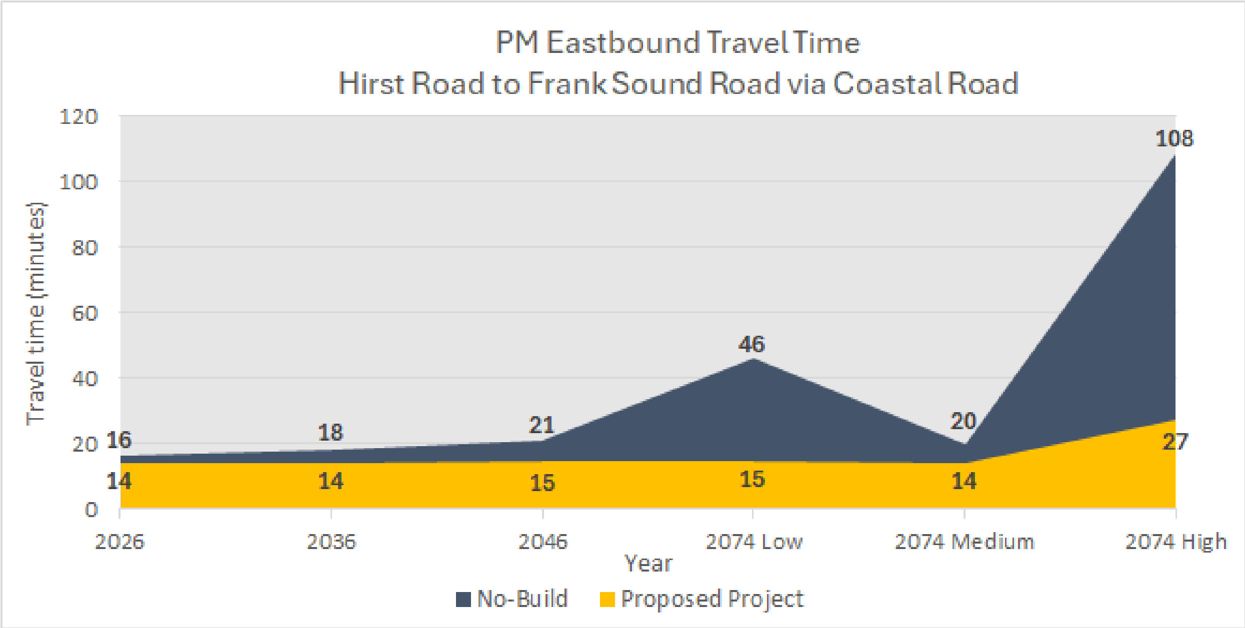


Figure note: 2074 Low Growth's anticipated travel times are greater than 2074 Medium Growth due to where employment and population growth were assumed for these scenarios (see **Section 4.1.1: Land Use Charrette**, as well as a comparison of employment and population assumptions.)

The Proposed Project is projected to provide notable travel time benefits across the analysis years when compared with the No-Build scenario. These benefits will continue to grow in significance as Grand Cayman's population increases. The Proposed Project will allow travel times to stay relatively consistent between 2026 and 2074. Specifically, the Proposed Project will improve travel times from Bodden Town, North Side, and East End to key points in George Town and West Bay such as the airport, hospital, and schools, when compared with the No-Build scenario (**Table 6**).

Table 6: North Side/East End AM/PM Average Travel Times 2026 and 2074 Medium Growth

Origin / Destination	Future No-Build	Proposed Project
2026 AM and PM average travel time (minutes)		
North Side / George Town Hospital	54	47
North Side / Walkers Road Schools	49	42
North Side / Owen Roberts Airport	53	47
East End / George Town Hospital	56	52
East End / Walkers Road Schools	50	47
East End / Owen Roberts Airport	55	51
East Bodden Town / George Town Hospital	41	38
East Bodden Town / Walkers Road Schools	35	32
East Bodden Town / Owen Roberts Airport	39	36
Average Travel Time East / West	48.5	44.1
% Reduction from Future No-Build	**-**	**-9%**
2074 Medium Growth AM and PM average travel time (minutes)		
North Side / George Town Hospital	83	61
North Side / Walkers Road Schools	85	66
North Side / Owen Roberts Airport	81	60
East End / George Town Hospital	75	64
East End / Walkers Road Schools	79	72
East End / Owen Roberts Airport	75	65
East Bodden Town / George Town Hospital	56	49
East Bodden Town / Walkers Road Schools	59	55
East Bodden Town / Owen Roberts Airport	56	49
Average Travel Time East / West	72.9	60.7
% Reduction from Future No-Build	**-**	**-17%**

Travel times for tourists looking to travel from the hotels, airport, and cruise ship terminal areas on the western side of the island to destinations such as the Botanic Park and the Mastic Trail located on the eastern side of the island will be improved when compared with the No-Build scenario (**Table 7**).

Table 7: Average Tourist Travel Times to/from Cruise Port, 2026 and 2074 Medium Growth

Origin/Destination	Future No-Build	Proposed Project
2026 AM and PM average travel time (minutes)		
Cruise Port / Rum Point & Starfish Point	51	46
Cruise Port / Bodden Town Mission House	24	23
Cruise Port / Botanic Park	35	30
Cruise Port / Mastic Trail	36	29
Cruise Port / Meagre Bay Pond	27	24
Average Travel Time Cruise Port / Destination	34	30
% Reduction from Future No-Build	-	**-11%**
2074 Medium Growth AM and PM average travel time (minutes)		
Cruise Port / Rum Point & Starfish Point	90	75
Cruise Port / Bodden Town Mission House	48	42
Cruise Port / Botanic Park	67	50
Cruise Port / Mastic Trail	75	59
Cruise Port / Meagre Bay Pond	52	45
Average Travel Time Cruise Port / Destination	67	54
% Reduction from Future No-Build	-	**-19%**

6.2.2.4 Intersection Delay

Delays at intersections can cause driver frustration and increased travel times. A grading system called “Level of Service” (LOS) was used to study the projected performance of intersections along the coastal roads and along the Proposed Project. LOS uses a letter grade system, from A (best) to F (worst). In the LOS system, intersections can have minimal delays (LOS A to D), or they can have large delays and other failing characteristics (LOS E and F).

Currently, there are a few intersections on Shamrock Road that receive failing grades (LOS E and F) during morning and evening peak travel hours. In the future, as population grows, intersection delays will deteriorate at additional intersections along Shamrock Road and Bodden Town Road. Even at low population projections (as defined in **Section 4.1.1**), by 2074 almost all intersections on Shamrock Road and Bodden Town Road will have high delay indicated by failing LOS grades.

The Proposed Project has been conceptually designed to have fewer conflict points with fewer cross-streets and intersections along the new corridor. The Proposed Project has been conceptually designed with projected population growth in mind, resulting in low delays for almost all the future population projections. Only a very large growth in population will cause failing grades for the Proposed Project intersections.

With the Proposed Project, it is projected that many drivers will choose to use the new corridor instead of existing Shamrock Road and Bodden Town Road, reducing intersection delays along the existing coastal roads as well. Along these coastal roads, existing intersection delays are projected to be improved for several decades into the future as drivers will use the Proposed Project corridor.

6.2.2.5 Safety

Today, people use the existing Shamrock Road, Bodden Town Road, and Frank Sound Road to travel east-west on Grand Cayman. Each of these roads is a two-lane, undivided road, with no median barrier and vehicle speeds up to 50 miles per hour. Vehicles travelling at higher speeds on an undivided roadway just feet apart is a less desirable situation from a safety perspective. These roads also have many cross-streets and driveways, with limited right-of-way, which introduce conflicts into the traffic flow. As the population of Grand Cayman grows, traffic congestion will get worse, which may cause drivers to become increasingly frustrated and aggressive.

The Proposed Project will be a divided roadway, so vehicles travelling at high speeds in opposite directions will be separated by a median barrier, preventing and/or eliminating head-on collisions. The Proposed Project will also be designed in phases, so that additional travel lanes can be added as population and traffic grow. According to the United States Federal Highway Administration (FHWA), dividing a roadway can reduce crashes by over 80%, and increasing the road’s capacity from two to four lanes can reduce crashes by over 60%.

There will be a limited number of cross-streets and driveways that connect with the Proposed Project. Limiting the access points will offer a smoother and less interrupted driving experience for travellers. The Proposed Project will also include a number of U-turn connections spaced on average approximately 1.25 miles (2 km) apart, along its 8-mile (13 km) length, so travellers will not have to travel for multiple miles to turn around.

Currently, the existing shoulders along the coastal roads are narrow or non-existent in some areas, and pedestrians and cyclists typically travel along the edge of the road. When a pedestrian or cyclist is using the edge of the road, vehicles typically move inward towards the centre. These practices can put pedestrians, cyclists, and drivers at risk of crashes. With the Proposed Project, sidewalks that are separated from the road will offer safer travel conditions for pedestrians. According to FHWA, the inclusion of a sidewalk can also reduce crashes by over 40%.

The Proposed Project’s intersections will also be designed for improved safety. The roundabouts that are proposed at both ends of the project will require vehicles to slow down and yield before entering the intersection safely, including mainline movements. At intersections without roundabouts, left-in/left-out intersections are proposed, requiring side-street traffic to only yield to one direction of mainline traffic. If drivers need to go in the other direction, they can travel to the nearest U-turn location. According to FHWA, roundabouts can reduce crashes from between 5 to 70%. Left-in/left-out intersections can also reduce crashes by up to 45%.

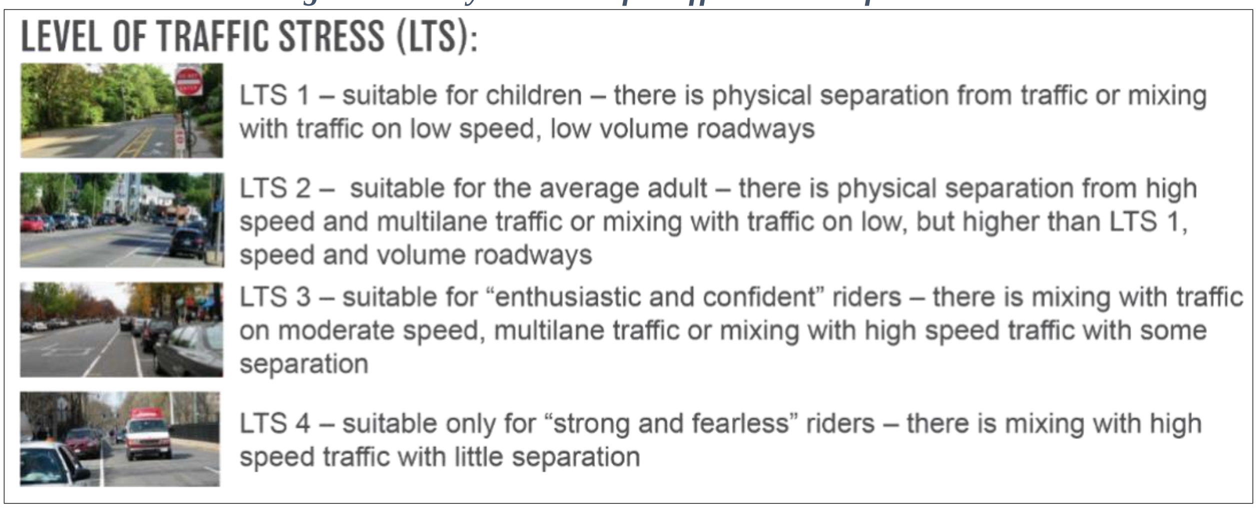
6.2.2.6 Multimodal Access

Multimodal access refers to the movements of different modes of transportation other than a vehicle, like walking, biking, or riding a scooter. The Proposed Project has been developed to accommodate multimodal amenities including a sidewalk, a micromobility path, and dedicated transit lanes. Micromobility refers to any small, low-speed, electric-powered transportation device, such as a regular bike, an electric bike or an electric scooter.

Currently, Shamrock Road and Bodden Town Road do not include consistent sidewalks or bike lanes, creating challenging conditions for walkers and bikers.

One way to look at how safe a road is perceived by non-motorised users is called Level of Traffic Stress (LTS). LTS estimates how suitable a roadway feels for someone on a bicycle by considering factors such as vehicle speeds, traffic volumes, and number of lanes. LTS uses a scale of 1 to 4, with 1 being the most suitable and 4 being the least suitable. **Figure 17** describes each LTS number.

Figure 17: Bicycle Level of Traffic Stress Definitions



Source: Furth & Putta (2016), *Visualizing and Measuring Low-Stress Bicycle Network Connectivity in Delaware, USA*

With a separated sidewalk and a micromobility path, the Proposed Project will be classified as LTS 1. Those wishing to travel by bike or scooter will have a less stressful journey experience using the Proposed Project.

Also evaluated was how many people will have access to common locations if they travelled by foot, by bike, or by micromobility. Journeys by bike or by micromobility were only counted if they could use safer LTS 1 or 2 facilities.

The Proposed Project is projected to allow significantly more people to reach common locations such as the Clifton Hunter High School, the Mastic Trail, and the Bodden Town Pharmacy without using cars, as shown in **Figures 18, 19,** and **20**.

Figure 18: Potential Non-Vehicular Access to Clifton Hunter High School

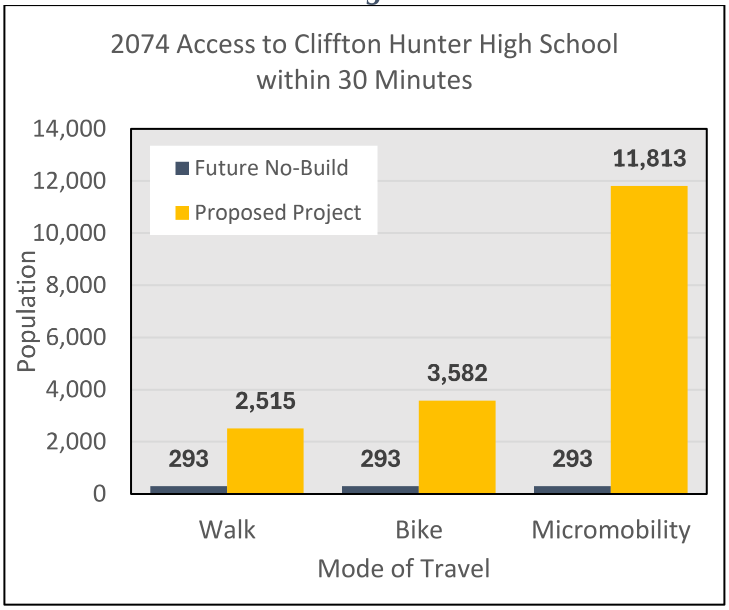


Figure 19: Potential Non-Vehicular Access to Mastic Trail

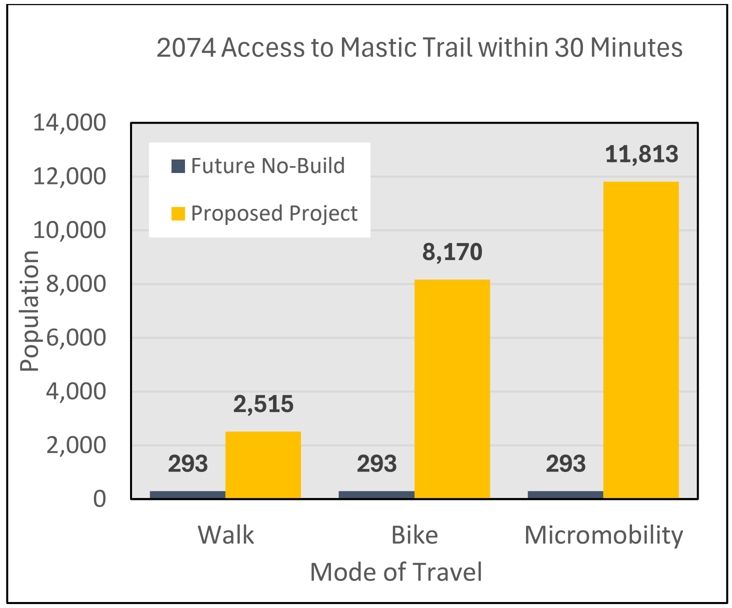
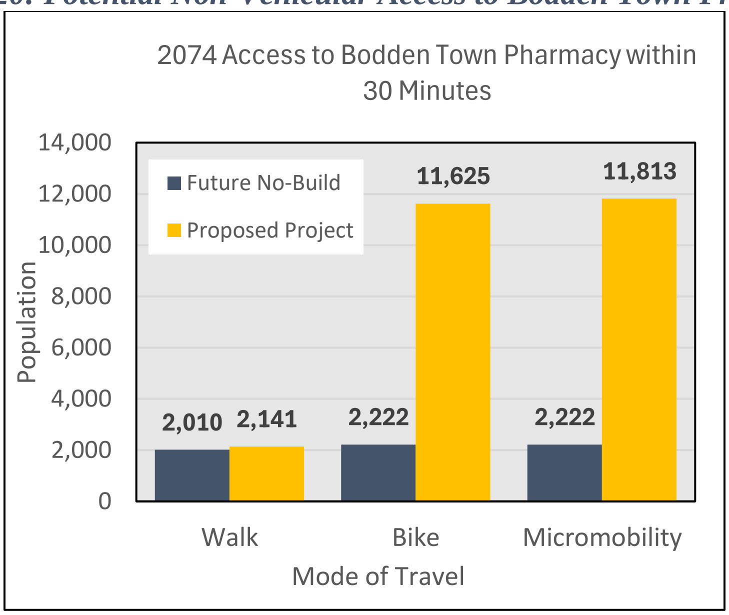


Figure 20: Potential Non-Vehicular Access to Bodden Town Pharmacy



6.2.3 Other Area Intersection Improvements

The placement of the Proposed Project could result in additional traffic travelling through certain intersections. Without any improvements to these intersections, extra delay for travellers using these intersections may occur. These intersections include:

- Bodden Town Road at Frank Sound Road
- Frank Sound Road at Clifton Hunter High School
- EWA at Agricola Drive Connector

Improvements to these intersections will be required to reduce negative effects. These improvements could include:

- Traffic signals
- Additional turn lanes
- A multilane roundabout with bypass lanes

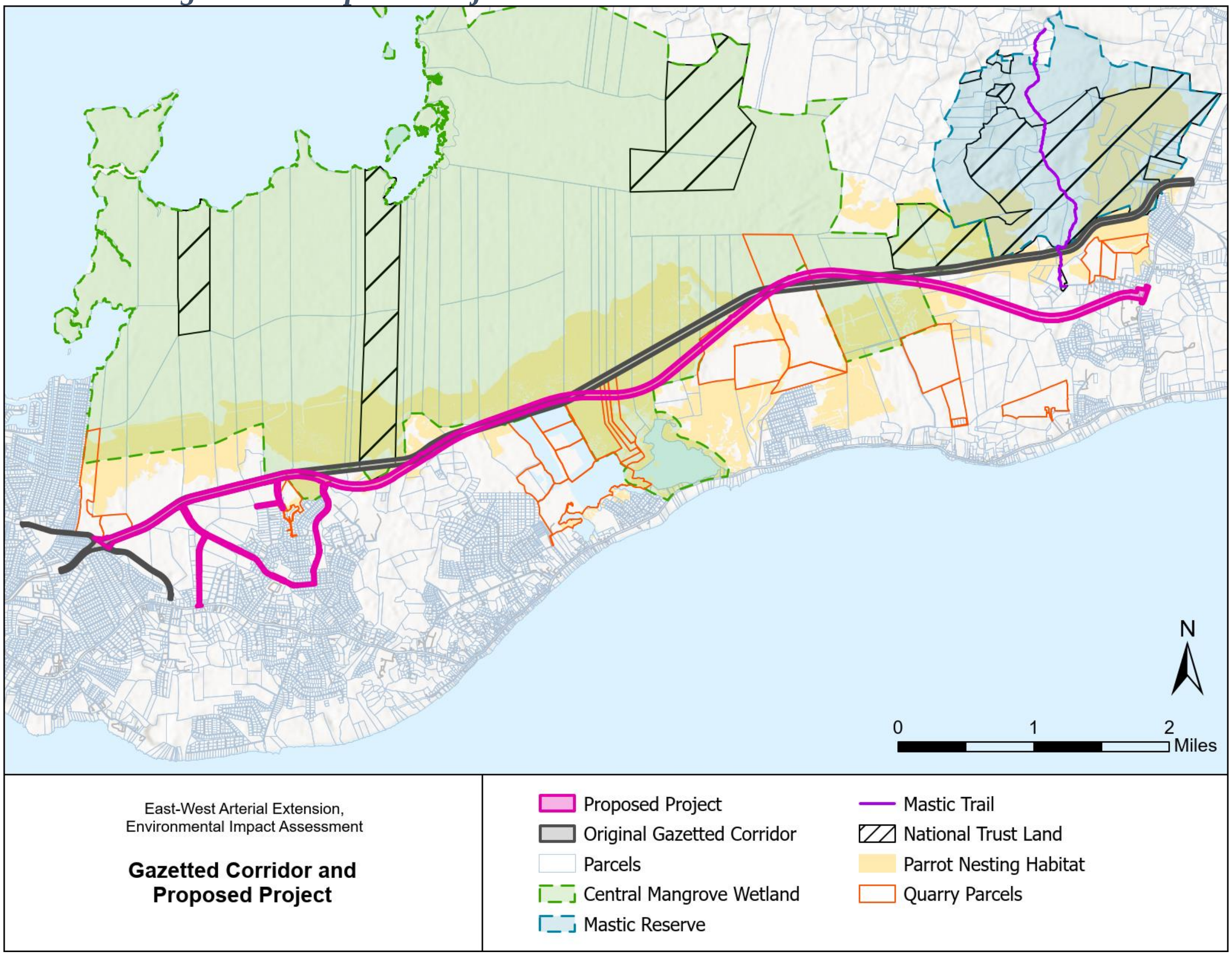
7 Summary of Effects and Mitigation

The ToR for the EWA Extension EIA concluded that the following study disciplines should be addressed in the EIA to determine impacts and mitigation for the Proposed Project:

- Socio-Economics
- Hydrology and Drainage, including Climate Resiliency
- Geo-Environmental
- Terrestrial Ecology
- Cultural and Natural Heritage
- Greenhouse Gas Emissions
- Noise and Vibration
- Cost Benefit Analysis

As part of the alternatives analysis process, design refinements were made to the study alternatives during the Shortlist and Proposed Project evaluation phases of the EIA. The goal of these refinements was to avoid or minimise impacts to sensitive areas while still meeting the needs of the project. For example, sections of the Proposed Project were shifted slightly to the south to avoid impacts to National Trust-owned CMW parcels. In other areas, the presence of quarries, established communities, and environmentally sensitive area influenced the location of the Proposed Project. **Figure 21** shows the location of the Section 26 Gazetted corridor as amended in March 2014 compared with the Proposed Project.

Figure 21: Proposed Project Corridor and Section 26 Gazetted Corridor



7.1 Socio-Economics

The purpose of the socio-economic assessment is to evaluate the ways the project might affect people's way of life, which can include access to goods and services, employment opportunities, education, and community cohesion.

7.1.1 Baseline Data and Existing Environment

Due to the nature of this subject feature, the socio-economic study area encompasses all of Grand Cayman. Data sources were reviewed to establish Baseline Conditions including:

- Economics and Statistics Office census data
- Government reports and planning documents
- Geospatial data
- Intergovernmental organization reports
- Stakeholder consultation
- Field reconnaissance

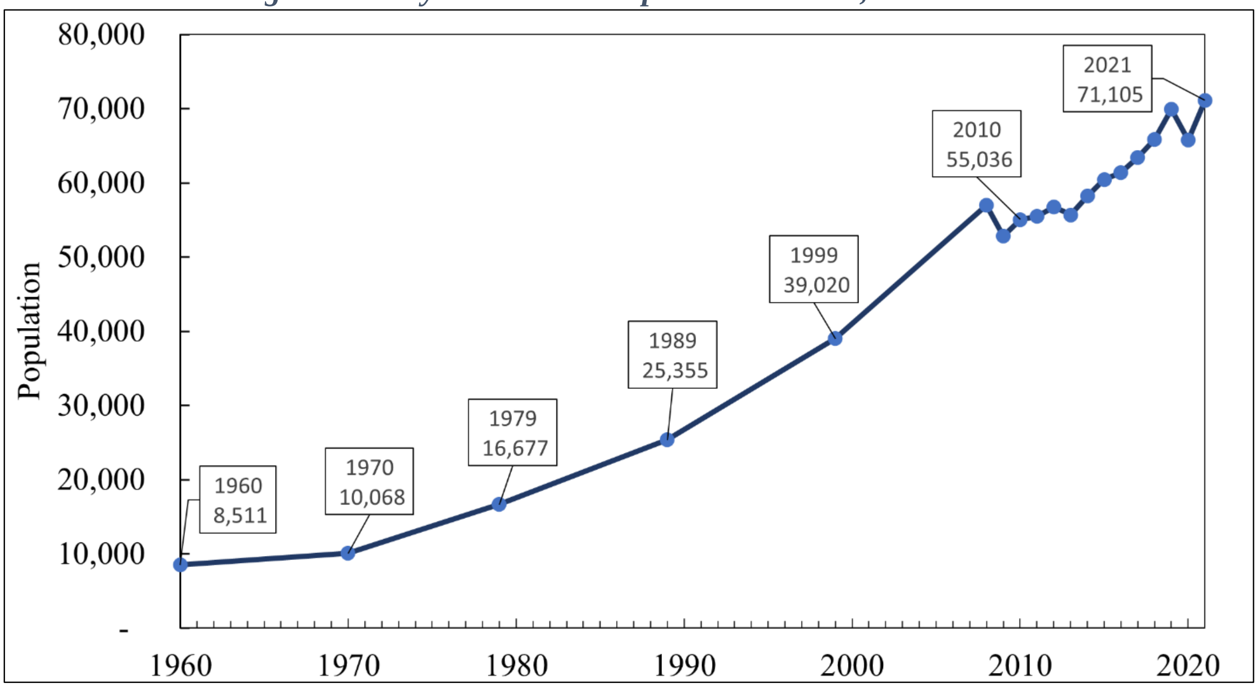
The socio-economic Baseline Conditions summary includes the following information:

- **Demographics** – including population, growth, and density; housing characteristics; and vulnerable populations
- **Employment** – including employment characteristics by district; district of employment and residence; and modes of transportation
- **Economic Characteristics** – including major industries such as financial and insurance services and tourism
- **Services** – such as transportation services; emergency services; and education

Key findings include:

- Noteworthy population growth in the last few decades (**Figure 22**);
- George Town as an employment hub; strong financial and insurance services and tourism industries; and
- George Town as the chief location for important socio-economic services like the airport, the port, and the Health Services Authority hospital.

Figure 22: Cayman Islands Population Growth, 1960-2021



Source: Data provided by the ESO

7.1.2 Impacts

7.1.2.1 Construction

Temporary positive construction impacts centre around providing job opportunities for Caymanians and economic opportunities for local businesses. Because the Proposed Project is in the conceptual design phase at the time of this writing, these benefits are not currently quantifiable.

There will also be possible temporary negative socio-economic impacts that may occur during construction, including:

- The removal and relocation of the Frank Sound Fire Station
- Quality of life construction impacts, including: temporary viewshed disturbances, construction noise and vibration, and traffic disruptions.

7.1.2.2 Operation

Key socio-economic benefits associated with operation of the Proposed Project centre around the social and economic benefits that come from transportation improvements as compared to the No-Build scenario. A second east-west corridor for Grand Cayman has the potential to increase employment opportunities for eastern district residents; free up time that would otherwise be spent driving to and from work or school; and attract more tourists to the eastern districts, which encourages tourist spending on the eastern side of the island. Those who use the Proposed Project would also experience safety benefits and reduced frustration thanks to lower volumes of traffic at intersections (see **Section 6.2: Transportation and Mobility** of this document for more information on safety and intersections).

Social and economic benefits include:

- Reduction in the amount of time spent travelling from East to West in the morning, and from West to East in the evening (**Table 6**). In 2026, the Proposed Project would offer a 9% reduction in travel time when compared with the No-Build scenario. In 2074 this would be a 17% reduction in travel time when compared with the No-Build scenario.
- Reduction in the amount of time spent travelling to and from key tourist destinations in the AM and PM (**Table 7**). In 2026, the Proposed Project would offer an 11% reduction in travel time, and in 2074 the Proposed Project would offer a 19% reduction in travel time, when compared with the No-Build scenario.
- An increased number of people able to make work trips from East to West in the AM and West to East in the PM. In 2026, the Proposed Project could accommodate 23% more trips, and in 2074 the Proposed Project could accommodate 16% more trips, when compared with the No-Build scenario.
- More jobs available to residents of North Side and East End within reasonable travel times (15 and 30 minutes). In 2026, the Proposed Project could provide access to 13% more jobs, and in 2074 the Proposed Project could provide access to 55% more jobs, when compared with the No-Build scenario.

The Proposed Project also offers a resiliency benefit providing a second transportation link between the eastern and western districts should the coastal road become unavailable. In 2026, an additional 8% of people would be able to reach emergency services in the western districts if the coastal road was unavailable, compared with the No-Build scenario. In 2074, it would be an additional 13% of people.

The Proposed Project also provides the opportunity to accommodate other types of travel, such as transit, walking or biking along with micromobility travel. Improvements to the network of roads referred to as the Will T Connector, like the inclusion of a sidewalk, would offer increased mobility options for people living in that neighbourhood. Similarly, the micromobility path would offer people the option of using safer pedestrian, bicycling, and micromobility vehicles.

The key negative socio-economic impacts during operation are related to the possibility for increased roadway noise and vibration for certain homes and businesses; the chance of viewshed impacts for a low number of residents; and the possibility of development occurring next to the corridor in natural areas that are valued for environmental aesthetics.

7.1.3 Mitigation Considerations

The use of socio-economic mitigation considerations will minimise or eliminate the possible negative impacts from the Proposed Project. Mitigation considerations for construction impacts include:

- Prioritizing a Caymanian workforce and Caymanian businesses to provide employment and supply/materials needs
- Proper communication and management for traffic disruptions
- Using noise-reduction techniques for construction equipment and operations
- Planning and constructing a new fire station

Mitigation considerations for operation impacts include:

- Updating planning and zoning policies relating to the land near the Proposed Project with potential public input
- Clearly marking pedestrian crossings in the Will T Connector neighbourhoods

7.2 Noise and Vibration

The activities associated with building and operating the Proposed Project were looked at for their potential noise and vibration impacts. The noise and vibration that comes from the construction and operation of a new road can change the environment. This may lead to effects on nearby residences, protected features or other areas that are sensitive to noise and vibration.

7.2.1 Baseline Data and Existing Environment

To establish Baseline Conditions, the study of noise and vibration looked at topographic data, planning zone data, parcel data, and aerial imagery.

Noise effects are measured in a few ways. The first way is to determine whether the decibels increase enough to be noticed by the human ear, 3 decibels (dBA) or greater. The second way is to determine whether the decibels are above a certain threshold. Noise above this threshold (called "Significant Observable Adverse Effect Level," or SOAEL) can be harmful to quality of life or health.

Noise modelling sites were added to the validated computer model to predict the loudest hourly-equivalent traffic noise levels throughout the EIA study area. Sensitive noise receptors are locations of frequent human use, where noise might interfere with activity. An example is any area where people live and other areas of outdoor activity such as parks and trails. Short-term and long-term noise monitoring sessions were conducted at seven locations within the study area. These sessions recorded existing noise conditions to validate the computer model.

Through field work and modelling, the amount of noise that reaches the receptors under Baseline Conditions was determined. After that, the modelling (which includes information from

Transportation & Mobility and Engineering) estimates how much noise and vibration could reach each receptor from building and using the Proposed Project.

7.2.2 Impacts

7.2.2.1 Construction

The predominant construction activities associated with this project will most likely be earth removal, hauling, grading, and paving. Temporary and localised construction noise impacts will likely occur as a result of these activities. The predicted effects of these impacts will be temporary speech interference for passers-by and those individuals living or working near the project.

Nine representative noise-sensitive receptors were evaluated to estimate construction noise impacts within the study area. Additional commuting vehicles, delivery vehicles, and construction vehicles were added to the No-Build scenario traffic volumes. The change in noise levels for these receptors ranged from 1dBA to 5dBA. These represent minor to moderate noise level impacts.

Construction activity can also produce noticeable vibrations. The two pieces of construction equipment estimated to produce the largest magnitude of vibration are the vibratory roller and the drill rig. The areas where these pieces of equipment will be used are unknown at this stage. However, the magnitude of vibration impact can be assessed based on the distance from these pieces of equipment. Within 16.4 feet (5 meters) of the vibratory roller, a major vibration impact can be felt; from 75.5 to 170.6 feet away (23-52 meters), the impact would be minor. Within 9.8 feet (3 meters) of the drill rig, a major vibration impact can be felt; from 42.7-95.1 feet away (13-29 meters), a minor impact can be felt.

7.2.2.2 Operation

Noise modelling was used to estimate traffic noise levels for future years (2026, 2036, 2046, and 2074). Noise levels were estimated for both the No-Build and Proposed Project by applying traffic volumes and composition to the validated computer model. No-Build noise levels were predicted without the Proposed Project improvements in place. Proposed Project noise levels were predicted by accounting for the Proposed Project improvements.

The next step in the noise analysis was to determine if future noise levels at the noise sensitive receptors would approach or exceed the SOAEL. If the criteria are met or exceeded at any receptor, noise abatement will be considered to reduce future traffic noise.

The receptors closest to the Proposed Project are projected to experience the most added noise. In 2026, 889 noise receptors are projected to experience a noticeable increase in noise level, 452 are projected to experience a noticeable decrease in noise level, and 94 receptors are projected to experience no substantial change. By 2074, a total of 963 receptors are projected to experience a noticeable increase in noise and one receptor is projected experience a noticeable decrease in noise level, while 471 receptors are projected to experience no change or a negligible change in noise level for the 2074 Medium Growth scenario compared to the 2026 No-Build scenario.

Some of the noise receptors are projected to be at or above the SOAEL threshold. In 2026, 82 noise-sensitive receptors are projected to be at or above the SOAEL threshold. By 2074, a total of

279 receptors are projected to be at or above the SOAEL threshold for the 2074 Medium Growth scenario.

Some of the receptors that are farther away from the Proposed Project will experience a noticeable decrease in noise. However, many of these receptors are along Bodden Town Road. Many of the Bodden Town Road receptors are projected to still be impacted by noise at or above the SOAEL threshold.

7.2.3 Mitigation Considerations

Mitigation considerations for noise and vibration effects include:

- Noise barrier construction along the northern side of the Proposed Project beginning at the proposed intersection of Frank Sound Road, travelling west for approximately 1,657 ft (505m) at an average height of 14.7 ft (4.5 m) will be further evaluated within the 2060 construction phase. The estimated cost of the noise barrier is included within the project cost estimate (**Section 6.1.4**) and cost-benefit analysis (**Section 7.9**).
- Time of day restrictions for construction
- Surfacing the road with quieter pavement materials
- Insulating homes against noise

7.3 Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions happen when certain molecules are released into the atmosphere (mostly carbon dioxide). These emissions contribute to climate change. Natural environments play an important role in keeping GHGs out of the atmosphere. Natural environments are able to store carbon. If those natural environments are removed, that carbon can be released into the atmosphere as a GHG.

The Proposed Project will cause GHG emissions in a few ways, including:

- Removing peat and habitats that store carbon
- Construction activities, like running heavy-duty vehicles, delivering materials to the worksite, and workers commuting to the worksite
- The carbon within construction materials (concrete, asphalt etc.) used to build the project
- Emissions from the vehicles that drive on the roadway once it is built

The solar array that is planned along the corridor will reduce the carbon emissions by providing energy that releases less carbon than the current way of burning diesel.

7.3.1 Baseline Data and Existing Environment

To understand the Baseline Conditions, policy, habitat data, and peat data were studied. Several Cayman Islands policies cover GHGs, such as the draft Climate Change Policy and the National Energy Policy 2024-2045. The goals for the Cayman Islands are to reduce the total amount of GHGs produced each year by taking steps like transitioning to renewable energy.

As part of these studies, habitat data was evaluated to estimate the amount of carbon stored and annual carbon sequestration loss. Mangroves within the study area stored the most carbon below ground. Tropical moist forests within the study area stored the most carbon above ground. Tropical moist grasslands also store carbon within the study area. The peat is most likely associated with the mangrove habitats.

7.3.2 Impacts

7.3.2.1 Construction

Impacts from constructing the Proposed Project will include:

- Construction tailpipe emissions – the vehicles used during construction will emit GHGs, including carbon dioxide, methane, and nitrous oxide. The workers commuting to and from the construction site, plus the delivery trucks for materials will also emit GHGs. The lifetime construction tailpipe emissions were estimated to emit 32,388 metric tonnes (MT) (35,702 short tons) of carbon dioxide equivalent, a metric which allows for the comparison of different GHGs.
- Habitat and peat removal – removing peat, mostly from mangrove areas, will cause GHG emissions. Removing vegetation (for example, trees) from habitats will also emit GHGs. The Proposed Project is estimated to emit 73,589 MT carbon dioxide equivalent (81,118 short tons) from habitat clearing and peat excavation.
- Bulk materials – the materials used to construct a new roadway (for example, asphalt and concrete) require carbon to be made. Overall, the Proposed Project is estimated to emit 97,953 MT (107,974 short tons). No-Build scenario emissions are expected to be 10,036 MT (11,063 short tons).

7.3.2.2 Operation

Impacts from using the Proposed Project will include:

- Traffic operations – the project team calculated the GHG emissions estimated to be released from vehicles driving within the study area. The results of the analysis indicate that emissions trend upward throughout the life of the Proposed Project. However, the Proposed Project has a lower impact when compared to the Future No-Build. These improvements gradually increase ranging from a reduction of 519.6 MT (572.7 short tons) in 2026 to 17,203.6 MT (18,249.3 short tons) for the 2074-Medium scenario.
- Annual carbon storage loss – the habitat removed during construction will have stored carbon, preventing it from entering the atmosphere. The total anticipated carbon sequestration rate for the lost habitat is 424.2 MT of carbon dioxide equivalent per year (467.6 short tons).
- Solar array – the solar array will reduce carbon emissions by providing electricity. Current electricity is made by burning diesel, which emits a lot of GHGs. Based on the preliminary solar array assessment, the anticipated total carbon dioxide (GHG) reduction equates to 566,644 MT (624,618 short tons) over the expected 30-year lifetime of the facility.

7.3.3 Mitigation Considerations

Mitigation considerations for impacts that could occur during construction include:

- Using removed peat in construction or while restoring staging areas, borrow pits, road verges, and ecosystems
- Minimise vegetation clearing and re-plant areas that had to be cleared during construction
- Using efficient bulk materials could reduce the need to repair or replace road segments, lowering indirect GHG emissions
- Using sustainable materials (like recycled materials), lowering indirect GHG emissions
- Using construction equipment with the most up-to-date emission controls, or with retrofitted engines

Mitigation considerations for impacts that could occur during operation include:

- Vehicle fleet composition (transitioning to electric vehicles)
- Traffic movement optimisation (minimising stopped and idling traffic)

7.4 Geo-Environmental

Geo-environmental processes on Grand Cayman and within the EWA Extension EIA study area contribute to sourcing drinking water to residents. Geo-environmental processes are also important for supporting natural resources. In the Cayman Islands, the WAC manages, controls, and protects water resources, including potable water and wastewater. Cayman regulation is strict about protecting the freshwater lenses from pollution and from depletion.

7.4.1 Baseline Data and Existing Environment

Data sources looked at for the study of Geo-environmental include:

- Reports, surveys, and other data from the WAC
- Scholarly materials
- Data collected during field work

Key takeaways:

- Grand Cayman is low-lying. The rock that makes up the island may have caves or crevasses. Some of the bedrock near the Proposed Project is exposed.
- Soils on Grand Cayman tend to be thin. Based on data previously collected, the depth of rock varies from the top of the land surface to 14 feet (4.3 meters) below the surface. Soil depth is up to 1 ft (0.3 meter) thick on top of the bedrock. Peat is either on top of the soil layer or directly on the rock with thickness ranging from about 1 foot to 14 feet (0.3 to 4.3 meters).
- Peat is made up of organic remains of mangroves. It is a major part of mangrove forests. Peat is also known for storing carbon, making it helpful in slowing climate change.
- Freshwater lenses are found underground. They consist of fresh groundwater that float atop of the deeper saltwater. The freshwater is from rainwater. The study area includes two freshwater lenses: the Lower Valley Lens and the North Side Lens. Existing roads are on top of the Lower Valley Lens.

- Groundwater is found throughout the study area and is water found underground that is a mix of fresh and salt water.
- Rain is the main source of freshwater for Grand Cayman.
- There are 6 active quarries in the study area.

7.4.2 Impacts

7.4.2.1 Construction

Impacts from constructing the Proposed Project could include:

- Changes to the freshwater lenses, which could mean pollution, less rainwater getting to the freshwater lenses, changes to how they receive water, or the freshwater may become salty. It could also mean accidentally draining the freshwater lens into the permeable rock below. The Proposed Project is estimated to directly overlay 10.3 acres (4.2 hectares) of the Lower Valley Lens mapped recharge area (which is 960 acres [388 hectares] in total).
- Impacts to peat, such as compacting it with construction equipment or removing it. The peat may also become contaminated. The Proposed Project is estimated to require a maximum of 441,579 cubic yards (337,612 cubic metres) of peat removal.
- Rock from the local Cayman quarries will be needed to build the roadway, which may limit other uses of the rock. It is estimated that the Proposed Project would require a maximum of 10-15% of the available rock in local Cayman quarries.
- Chemical compounds could be released during peat removal. These compounds could have impacts on human health.

7.4.2.2 Operation

Impacts from using the Proposed Project will include:

- Rainwater could wash pollutants from the roadway. Those pollutants might make their way into the freshwater lenses. The Proposed Project is estimated to include 145 acres (59 acres) of impervious surface area.
- The Proposed Project might permanently change how water moves and drains near the freshwater lenses. These changes could prevent some water from reaching the lenses. This could mean less fresh water within the lenses.
- The peat near the Proposed Project might become contaminated from roadway pollutants.

7.4.3 Mitigation Considerations

The use of mitigation considerations will help to avoid or minimise possible impacts from construction and operation. The specific details of the way the project is designed and constructed may be able to reduce or stop many impacts to the freshwater lenses. Some of these considerations include:

- Storing equipment and materials away from freshwater lenses and peat is important in reducing impacts along with using construction practices that prevent pollution.
- Special construction equipment and mats can reduce soil compaction.
- Removed peat can be used for other purposes, such as compost.
- The design can minimise the use of rock needed from the quarries.

- Equipment can be used to protect construction workers during peat removal.
- Stormwater management can avoid or minimise the change of drainage patterns and the pollution impacts on the freshwater lenses.
- Additional measures might include drilling to determine what kind of rock is beneath the project to better guide design, replacing any lost freshwater, preparing waste management and site environment management plans, and monitoring the freshwater lenses during construction.

7.5 Hydrology and Drainage, Including Climate Resiliency

The Hydrology and Drainage, including Climate Resiliency assessment, looked at the possible impacts the Proposed Project will have on natural hydrologic processes. These processes include changes to water circulation patterns, increases to stormwater runoff volume and speed, pollution, and the impact on nearby natural resources. Two field assessments were completed to observe the hydrology and drainage processes on Grand Cayman.

7.5.1 Baseline Data and Existing Environment

Sources such as technical papers, data provided by the Cayman Islands government, and modelling were looked at to establish Baseline Conditions. The Baseline Conditions include topography, climate, tropical storms and hurricanes, and storm surge and flood risk. The hydrology related qualities of natural resources within the study area were assessed, including the CMW, Mastic Reserve, and Meagre Bay Pond (**Figure 1**). Several studies were also conducted, including:

- Rainfall
- Hydrology and Hydraulics (flooding from rainfall)
- A water budget analysis
- Storm Surge and Coastal Flooding
- Freshwater Lens (Groundwater Mounding)

Key takeaways:

- The island’s topography is relatively flat with low elevation and is vulnerable to winds and flooding caused by hurricanes and tropical storms. Flooding is typically widespread and slow moving.
- The climate is typically hot and humid throughout the year, with some cooler temperatures during dry season months. Changes to climate, such as rainfall or extreme weather, might impact hydrology features such as drainage patterns and the freshwater lenses.
- Hurricanes typically occur in September, October, and November. Since the 1980s, tropical storms and hurricanes have increased in intensity and rainfall, potentially from warming ocean temperatures and more water in the air.
- Storm surges and wave action are responsible for a lot of the damage that comes with hurricanes. Gently sloped land and dense mangrove vegetation can slow runoff and storm surge.
- The CMW has an important role in the water cycle, including rainfall generation, local freshwater hydrology, groundwater replenishment, and hurricane protection.

- The Mastic Reserve helps to regulate water flow by absorbing rainfall and gradually releasing it and by recharging groundwater.
- The Meagre Bay Pond has limited connection to groundwater under natural conditions. With the development of quarries below the groundwater table in close proximity to the pond, groundwater is currently partially in contact with the pond. Sea spray provides salt into the pond, which is cleared out during heavy rains.

7.5.2 Impacts

7.5.2.1 Studies and Modelling

Several studies and modelling efforts were performed to assess potential project impacts, including flooding from rainfall, storm surge and coastal flooding, and a water budget analysis for the CMW. In addition, a groundwater mounding analysis of the freshwater lenses was completed.

Summary of the studies are as follows:

- The flooding from rainfall and the storm surge and coastal flooding modelled the proposed roadway and the potential bridges for different storm events. The 50-year return period storm, which means a storm that has a 2% probability of occurring in any given year, was selected as the design storm for the Excellent Fit.
- The rainfall flooding results generally showed that the water is slightly deeper, and the water surface elevation is slightly higher on the south side of the roadway than the north side of the roadway. In addition, the western end of the project is more likely to block water flow than the middle or eastern end of the project. The water moves relatively slow during rainfall flooding.
- The storm surge analysis included flooding from hurricanes from both rainfall and surge. The modelling shows that the Proposed Project would mostly be affected by storm surge coming from North Sound. The roadway would not be flooded by moderate storms (25-year) but would be flooded by larger storms (100-year). In addition, after the roadway is built, the maximum flood elevation is generally slightly lower than Baseline Conditions, but it takes longer for the water to drain away. Also, the water level is higher on the south side of the roadway at the western extent of the project.
- Wave overtopping of existing coastal roads not only requires coastal road closure due to standing water on the road but also involves sediment deposition (such as sand) on the road, requiring a much longer time to clear and re-open the road.
- The water budget analysis found that the CMW pool and surface water elevation will not be significantly impacted by the Proposed Project.
- The groundwater mounding analysis found that the Proposed Project may have a minimal impact on the upper surface of both the Lower Valley and North Side freshwater lenses.
- One drainage well is located along the Proposed Project near Frank Sound Road. This well could be affected by construction activities. However, the anticipated inclusion of drainage systems as part of the detailed design results in this impact not having a significant effect.

7.5.2.2 Construction

Impacts from constructing the Proposed Project could include:

- Changes to surface water patterns that could increase local flood risk. The Proposed Project is estimated to include 145 acres (59 hectares) of impervious surface area.
- Construction equipment releasing pollution that could harm surface waters, nearby natural and development areas, and groundwater/freshwater lenses.
- Stormwater runoff may contain eroded soil that could harm surface waters and nearby natural and development areas.
- Construction equipment can pack down soil, which might add to the stormwater runoff.
- Rainfall or extreme weather could cause flooding of construction sites.
- One existing drainage well for a road may be removed.

7.5.2.3 Operation

Impacts from using the Proposed Project will include:

- Changes to surface water and drainage patterns that could change regional flood risk. A slight increase in the maximum floodwater levels and duration of flooding was estimated, however they are within acceptable tolerances for the scale of storms considered.
- Surface water pollution from vehicles on the proposed road, which could contaminate soil and harm nearby natural and developed areas.
- More and faster runoff which could add to erosion and flooding.
- Changes to water flow, water levels, and surface drainage that could harm the CMW, Mastic Reserve, and Meagre Bay Pond. The estimated length of roadway through the CMW for the Proposed Project is 2.8 miles (4.5 kilometres).
- Ecological changes that could harm natural resources
- Loss of mangroves within the project footprint. The Proposed Project is estimated to directly impact 76 acres (31 hectares) of the CMW (out of a total area of 8,655 acres [3,502 hectares]).

7.5.3 Mitigation Considerations

During construction and operation, a number of mitigation considerations will potentially avoid or minimise the impacts previously described.

For construction, these measures could include:

- Proper placement of stockpiles and construction equipment maintenance yards.
- Temporary drainage systems.
- Best management practices to prevent soil from leaving the site.
- Limiting vegetation clearing.
- Site infrastructure and staff safety will reduce the possible staff risks due to flood events.
- Special construction equipment, mats, and other methods to reduce soil compaction.
- The development of a Spill Emergency and Response Plan, a Stormwater Pollution Prevention Plan, and a Flood Hazard Management Plan.

For the operations of the Proposed Project, these measures could include:

- Bridges and culverts beneath the Proposed Project will help keep water flowing through the CMW and prevent the roadway from flooding during smaller, more frequent storms, and reduce the impact to existing flow patterns during storms.
- The roadway openings may reduce the impact to existing flow patterns.
- The pollution of stormwater runoff from the roadway could be minimised by stormwater management options, such as landscape buffers, and by stabilizing the locations with rock where the stormwater runoff leaves the Proposed Project area.

7.6 Terrestrial Ecology

The purpose of studying Terrestrial Ecology is to evaluate impacts that the Proposed Project will have on natural resources including terrestrial habitats, wildlife, and protected areas.

7.6.1 Baseline Data and Existing Environment

Protected species records, species habitat mapping, and other natural resource data were examined to establish a Baseline Condition of the Proposed Project's terrestrial environment. The area to be used for the Proposed Project is made up of a variety of landcover and habitat types. These include natural areas like mangroves, and man-modified areas such as urban or rural spaces. The Proposed Project intersects the protected CMW and areas identified as Cayman parrot habitat.

Habitat assessments were conducted near the Proposed Project to quantify habitat value and quality based on the benefits and services it provides to the surrounding ecosystem. The man-modified land uses tended to have lower habitat quality, while natural areas tended to have moderate to high habitat quality within the study area. The natural areas within the Proposed Project are mostly near the southern edge of the CMW adjacent to man-made development. Environmental stressors from the man-made development likely reduce the quality of these areas from high to moderate.

The quantified habitat values inform what level of mitigation efforts are required to offset biodiversity loss as a result of the Proposed Project.

7.6.2 Impacts

7.6.2.1 Construction

Possible impacts from constructing the Proposed Project will include:

- Loss of habitat function due to clearing of land and earthwork. The habitats affected include up to:
    - 90.08 acres (36.45 hectare) of man-modified land uses,
    - 5.34 acres (2.16 hectare) of upland habitats, and
    - 150.24 acres (60.8 hectare) of wetland habitats.
- Loss of ecosystem services due to the clearing of land and earthwork. For the purpose of this evaluation, ecosystem services were measured in functional units, which represent the current ecosystem functionality and the acreage of impact. Loss of ecosystem services due to the Proposed Project would result in between 103.66 and 189.31 functional units being lost. These functional units can be used to determine the amount of mitigation needed to offset the loss of function resulting from the Proposed Project.

- Loss of up to 80.7 acres (32.7 hectare) of habitat used by the Grand Cayman Parrot due to clearing of land and earthwork.
- Invasive species spread from construction vehicles, equipment, and materials. Invasive species are not native to Grand Cayman and have a negative impact on biodiversity. The species of concern include (but are not limited to) Brazilian pepper (*Schinus terebinthifolia*), wild tamarind (*Leucaena leucocephala*), and Australian pine (*Casuarina equisetifolia*).
- Noise and light pollution from construction may disrupt the natural behaviours of nearby wildlife.

7.6.2.2 Operation

Possible impacts from using the Proposed Project will include:

- Habitat fragmentation (splitting), with the roadway acting as a barrier that limits species from being able to move between habitat areas. The Proposed Project traverses undeveloped land in the CMW. An estimated 571.0 acres (231.1 hectare) of habitat will be fragmented, leaving 8,000 acres (3,273 hectare) of contiguous CMW (92.4%) remaining.
- Vehicle crashes with important species.
- The water flow between habitats becoming disconnected. Important natural flow paths, like the flushing of Meagre Bay Pond into the CMW and the fresh/salt water hydrologic gradients in the CMW, may be altered by the Proposed Project.
- Noise and light pollution from operation may disrupt the natural behaviours of nearby wildlife.

7.6.3 Mitigation Considerations

As previously described, several avoidance and minimisation measures have been taken during the alternatives analysis process to shift the Proposed Project away from environmentally sensitive and protected areas. During the subsequent detailed design phase, habitat loss and fragmentation (splitting) may be further minimised by shifting the corridor to avoid contiguous tracts of habitat.

The main way to mitigate for unavoidable terrestrial ecology impacts will be improving terrestrial habitats in areas outside of the Proposed Project area. This could be done by native vegetative planting and invasive species removal. The goal is to have no net loss in the function and biodiversity of terrestrial ecology after the Proposed Project is built. The estimated cost of improving terrestrial habitat areas to achieve no net loss in biodiversity was 3% of the overall construction costs and is included within the project cost estimate (**Section 6.1.4**) and cost-benefit analysis (**Section 7.9**).

Additional mitigation measures could also be implemented following construction to minimise impacts during the operation phase. These measures could include:

- Enhancing or restoring of non-impacted areas within the Proposed Project area.
- Installation of wildlife roadway crossings.
- Maintenance of culverts and waterway openings to maintain flow patterns.
- Additional vegetative plantings to screen the roadway.

- Using light fixtures that will limit habitat disturbance.

Mitigation measures will be continually evaluated during the detail design, construction, and operation phases of the project to allow for successful mitigation.

7.7 Cultural and Natural Heritage Sites

The purpose of the cultural and natural heritage assessment is to evaluate Grand Cayman's heritage resources. Heritage value is a broad idea covering parts of the built and natural environment that people value for their beauty, history, or other characteristics. Many Caymanian resources have both natural and cultural heritage value. Resources with heritage value also often have socio-economic, ecosystem service, hydrological, or resiliency values, among others.

7.7.1 Baseline Data and Existing Environment

Data was reviewed to identify the cultural and natural heritage resources within the EIA study area. The data reviewed included reports and web information from the National Trust and Department of Environment, protected lands, geospatial data, stakeholder information, and field reconnaissance. The following cultural and natural heritage resources were identified within the EIA study area:

- CMW
- Mastic Reserve
- Mastic Trail
- Meagre Bay Pond
- Cemeteries
- Other cultural resources, such as Heritage Register sites, historic overlay zones, beach access points, and traditional Caymanian architecture.

7.7.2 Impacts

7.7.2.1 Construction

Construction activities have direct and indirect impacts on the heritage value of identified resources. These impacts are summarised below.

- The Proposed Project will directly impact up to 75.7 acres (30.6 hectares) of CMW and will fragment up to 571.0 acres (231.1 hectares) of CMW as an indirect impact. That leaves 8,000 acres (3,237.4 hectares) of contiguous habitat remaining (92.4% of the resource). While the CMW will experience a negative effect from this direct loss and fragmentation, the CMW's overall integrity and heritage will remain intact for future generations given the amount of contiguous resource left.
- Additional indirect impacts from the construction phase include introducing invasive species, altering hydrology, adding construction noise, or impacting the viewshed. These potential construction impacts are described in other sections of this report, including **7.6: Terrestrial Ecology**, **7.5: Hydrology and Drainage**, and **7.2: Noise and Vibration**. These indirect impacts can degrade ecosystem quality and people's enjoyment of the resource, but the impacts will not be severe enough to compromise the heritage value of the CMW.

- Direct impacts to the Mastic Trail will not occur. However, indirect noise impacts from construction from the eastern portion of the roadway have the potential to occur.
- The other identified resources will not experience construction impacts.

7.7.2.2 Operation

The Proposed Project will impact the heritage value of identified resources. Positive impacts include:

- With improved access provided by the Proposed Project, more visits from tourists can popularise heritage resources like the Mastic Trail and Meagre Bay Pond, which further promotes the heritage resource’s overall value.
- Meagre Bay Pond is located along the existing roadway network (Bodden Town Road) and already experiences noise at a significant observable adverse effect level at the viewing platform under the 2026 No-Build scenario. The Proposed Project is anticipated to provide a noise benefit (reduction) in 2026.

Negative impacts from the operations phase will occur. Similar to the construction phase, negative impacts from the operations phase could harm these resources’ heritage values, and include:

- Noise receptors near the Mastic Trail are projected to experience an increase in roadway noise between 2026 and 2074 of more than 10 decibels. However, the Mastic Trail noise levels are projected to remain below the significant observable adverse effect level.
- The Proposed Project will fragment Meagre Bay Pond from the CMW, a connection which is currently contiguous. Because Meagre Bay Pond is considered a separate heritage resource from the CMW, this fragmentation will not adversely affect its heritage value.
- Alterations to hydrology, such as the connection between Meagre Bay Pond and the CMW, can affect ecosystem function. As a result of the Proposed Project, Meagre Bay Pond could experience a hydrologic disconnect from the CMW. With the use of the mitigation considerations identified in **Section 7.5: Hydrology and Drainage**, including the use of bridging, hydrologic flow will be maintained, which maintains the heritage value of the resource.

7.7.3 Mitigation Considerations

Mitigation considerations for resources receiving more tourists focus on proper management, including education materials, trail markers, guided tours, and informational signage. Though tourists can cause wear and tear on heritage resources, many of these places like the Mastic Trail and the viewing platform at Meagre Bay Pond are designed to be visited by tourists and can handle additional volume.

Additional mitigation considerations for potential impacts like habitat fragmentation, construction and roadway noise, invasive species, and hydrological disruptions, are described in other sections of this report, including **7.6: Terrestrial Ecology**, **7.5: Hydrology and Drainage**, and **7.2: Noise and Vibration**.

7.8 Summary of Direct, Indirect, Secondary/Induced, and Cumulative Effects

The potential impacts (also called effects) of the Proposed Project were analysed in four different categories, including:

- **Direct** – these impacts are caused by the construction or use of the Proposed Project and generally occur within the footprint of the project
- **Indirect** – these impacts are also caused by the construction or use of the Proposed Project, but generally occur within the study area, outside of the footprint of the project
- **Secondary/Induced** – these impacts are caused by other projects and developments after the project is built
- **Cumulative** – this category combines the previous three and evaluates the potential impact within the study area from past, present, and future actions

7.8.1 Direct

Potential direct impacts of the Proposed Project could include:

- Removal of habitat (such as mangroves and Cayman parrot habitat)
- Loss of the ecosystem services from the habitat removed
- Loss of CMW acreage
- Increase to impervious surface area
- Potential to affect existing drainage wells
- Lower Valley Freshwater Lens
- Removal of peat
- Relocations
- Acquiring right-of-way
- Noise sensitive receptor impacts

7.8.2 Indirect

Potential indirect impacts of the Proposed Project, related to the natural environment could include:

- Change of surface water flows and drainage patterns/flood risk
- Surface water pollution potential
- Subsurface impacts
- Habitat fragmentation
- Wildlife/roadway collisions
- Noise
- Light trespass
- Spread of invasive species

Potential indirect impacts of the Proposed Project, related to the social environment could include:

- Accessibility improvements
- Intersection delays

- Impacts to community connectivity
- Journey quality improvements
- The option for other modes of travel
- Flooding in developed areas
- Viewshed
- Noise and vibration
- Workforce
- Construction

7.8.3 Secondary/Induced

The subject matter for Secondary/Induced effects looks at the potential developments through the future year 2074. To predict the population on Grand Cayman in 2074, government ministries and departments were brought together to discuss three possible future land use growth scenarios. The prediction included a range of population from 115,000 to 300,000 in 2074. See **Section 4.1.1: Land Use Charrette** for additional information.

Overall, it was determined that the Proposed Project will improve the overall transportation access, and therefore, increases the attractiveness for development. Based on the studies completed, it was projected that the land parcels south of the Proposed Project are more likely to experience development than the land parcels north of the Proposed Project.

7.8.4 Cumulative

The Cayman Islands have changed a lot in the past 50 years with population, job, and tourism growth. This has led to more urbanization, businesses, infrastructure, transportation, and many other social amenities. This growth and development have led to negative impacts on the natural environment such as deforestation, wetland loss, and invasive species introduction. The growth and development have been both negative and positive for the social environment.

More changes will occur on the Cayman Islands through 2074. These changes will include population growth, along with the resulting urbanization, businesses, infrastructure, transportation, and many other social amenities. The land parcels south of the Proposed Project corridor are more likely to be developed compared to those north of the Proposed Project corridor. The improved accessibility resulting from the Proposed Project and land use changes are projected to increase availability in housing and create jobs. This change would be overall beneficial to the social environment.

The natural environment within the study area could also experience future land use impacts from present and future actions. Present and future developments would be subject to the NCA and the EIA Directive and any future environmental planning, zoning, or regulation. The significance of the future cumulative impacts to the natural environment would also depend on future avoidance, minimisation, and mitigation strategies.

The significance of future cumulative impacts (both natural and social) depends on future decision-making (regulation, planning, environmental law) and could vary widely from what is described within the ES.

7.9 Cost-Benefit Analysis

A Cost-Benefit Analysis (CBA) is a process that compares the estimated costs and benefits of a project. CBAs are used to assess whether the benefits of a project outweigh the costs. They can also compare possible future benefits and costs with current ones by translating them into today's dollars (called 2024 dollars). For the Proposed Project, the purpose of the CBA is to compare future costs with future benefits in today's dollar values.

The term "benefit" in the CBA refers to the impacts of the project, both positive and negative, as described in **Section 6.2** and **Sections 7.1** through **7.8**. Not all of the impacts associated with the Proposed Project can be put into a dollar value. Many impacts described in **Sections 7.1** through **7.8** cannot be translated into a dollar value, such as surface water pollution or heritage value. Furthermore, benefits such as safety benefits were not able to be quantified due to a lack of data. These benefits are still important to consider when making a decision about a project.

7.9.1 Assessment Methodology and Evaluation

This CBA has three steps:

1) List the project's costs and benefits in 2024 dollars.
2) Apply a discount rate to the future costs and benefits. A discount rate is a way to consider what things are probably going to cost in the future. The discount rate makes sure those future costs are represented correctly in current dollars. Costs are tallied without discounting first, and the discount rate is then applied.
3) Add up the costs and benefits that occur over the project's life cycle. The benefits are divided by the costs to create a "Benefit-Cost Ratio", or BCR. If this ratio is higher than one (say 1.1) then there are more benefits than costs. If this ratio is lower than one (say 0.75) then there are more costs than benefits.

7.9.1.1 Population Growth / Land Use Scenarios

The three 2074 population growth and land use scenarios show possible futures for the Cayman Islands. There are three scenarios that were developed during the Land Use Charrette:

- **2074 Low Growth** – Under this scenario, the Cayman Islands would have a small amount of population growth, job growth, and tourism growth. The scenario includes 115,000 people, 10,000 new jobs, and visits from boutique cruise ships.
- **2074 Medium Growth** – Under this scenario, the Cayman Islands would have a moderate amount of population growth, job growth, and tourism growth. The scenario includes 135,000 people, 25,000 new jobs, and visits from boutique cruise ships.
- **2074 High Growth** – Under this scenario, the Cayman Islands would have large population growth, job growth, and tourism growth. The scenario includes about 300,000 people, 140,000 new jobs, and visits from large passenger cruise ships each month.

The 2074 High Growth scenario demonstrates a big change in population and land use. Many more roadway improvements would be needed if the population grew this much. Without knowing what those improvements might be and how they would affect people's ability to use the Proposed Project, the Proposed Project cannot be assessed accurately for the CBA under the 2074 High

Growth scenario. The project team therefore assessed the 2074 Low Growth and 2074 Medium Growth scenarios.

7.9.1.2 Conceptual Design Options

The CBA considers two conceptual design options. Each option offers a different approach to balancing construction costs, storm resiliency, and the cost of long-term maintenance. These conceptual design options are referred to as "Excellent Fit" and "Acceptable Fit." Please refer to **Section 6.1.5: Value Engineering and Future Cost Reductions** for more information on the conceptual design options.

7.9.1.3 Overview of Costs

As discussed above, costs in a CBA refer to the money that gets spent on the project. The costs for the Proposed Project are related to construction, land acquisition for roadway right-of-way, and possible mitigation measures. The costs are considered over a span of many years, because construction will occur in phases (see **Section 6.1** of this document). The costs are also considered life-cycle costs, since they include assumptions regarding maintenance costs of the Proposed Project throughout its entire life-cycle. Examples of maintenance could be rehabilitating bridges or resurfacing roadways so that the facility is operable in good working order.

The costs of the two conceptual design options are compared to examine the upfront cost of construction and the long-term cost of maintenance. **Table 8** and **Table 9** outline the costs by type, design option, and year of the Proposed Project, minus the costs by type and year of the Future No-Build. The costs in **Table 8** represent the Excellent Fit design option and the costs in **Table 9** represent the Acceptable Fit option.

Table 8: Excellent Fit Difference in Road Construction and Maintenance, Mitigation, Right of Way Costs (2024 Dollars)*

	Year	New Construction Cost Subtotal	Rehab Construction Cost Subtotal	ROW Cost	Potential Terrestrial Ecology Mitigation Cost	Total Road Cost Undiscounted	Total Road Cost Discounted
Proposed Project minus Future No-Build Costs	2024	-	-	20,330,000 USD 17,090,000 CI$	-	20,330,000 USD 17,090,000 CI$	19,650,000 USD 16,510,000 CI$
	2026	262,830,000 USD 220,860,000 CI$	-18,850,000 USD -15,840,000 CI$	-	15,590,000 USD 13,100,000 CI$	259,560,000 USD 218,120,000 CI$	234,120,000 USD 196,730,000 CI$
	2036	158,050,000 USD 132,820,000 CI$	109,510,000 USD 92,030,000 CI$	-	9,350,000 USD 7,860,000 CI$	276,920,000 USD 232,700,000 CI$	177,060,000 USD 148,790,000 CI$
	2046	96,600,000 USD 81,170,000 CI$	56,060,000 USD 47,110,000 CI$	-	3,120,000 USD 2,620,000 CI$	155,770,000 USD 130,900,000 CI$	70,610,000 USD 59,330,000 CI$
	2060	71,060,000 USD 59,710,000 CI$	125,200,000 USD 105,210,000 CI$	-	3,120,000 USD 2,620,000 CI$	199,370,000 USD 167,540,000 CI$	66,790,000 USD 56,120,000 CI$
	2074	14,430,000 USD 12,130,000 CI$	57,900,000 USD 48,660,000 CI$	-	-	72,330,000 USD 60,780,000 CI$	16,020,000 USD 13,460,000 CI$
	Total	**603 million USD 507 million CI$**	**330 million USD 277 million CI$**	**20 million USD 17 million CI$**	**31 million USD 26 million CI$**	**984 million USD 827 million CI$**	**584 million USD 491 million CI$**

Table 9: Acceptable Fit Difference in Road Construction and Maintenance, Mitigation, Right of Way Costs (2024 Dollars)*

	Year	New Construction Cost Subtotal	Rehab Construction Cost Subtotal	ROW Cost	Potential Terrestrial Ecology Mitigation Cost	Total Road Cost Undiscounted	Total Road Cost Discounted
Proposed Project minus Future No-Build Costs	2024	-	-	20,330,000 USD 17,090,000 CI$	-	20,330,000 USD 17,090,000 CI$	19,650,000 USD 16,510,000 CI$
	2026	95,600,000 USD 80,340,000 CI$	-18,850,000 USD -15,840,000 CI$	-	15,590,000 USD 13,100,000 CI$	92,340,000 USD 77,600,000 CI$	83,290,000 USD 69,990,000 CI$
	2036	86,270,000 USD 72,490,000 CI$	820,000 USD 690,000 CI$	-	9,350,000 USD 7,860,000 CI$	96,430,000 USD 81,040,000 CI$	61,660,000 USD 51,820,000 CI$
	2046	46,360,000 USD 38,960,000 CI$	26,000,000 USD 21,850,000 CI$	-	3,120,000 USD 2,620,000 CI$	75,480,000 USD 63,430,000 CI$	34,210,000 USD 28,750,000 CI$
	2060	55,520,000 USD 46,650,000 CI$	76,950,000 USD 64,670,000 CI$	-	3,120,000 USD 2,620,000 CI$	135,590,000 USD 113,940,000 CI$	45,420,000 USD 38,170,000 CI$
	2074	11,590,000 USD 9,740,000 CI$	56,850,000 USD 47,770,000 CI$	-	-	68,440,000 USD 57,510,000 CI$	15,160,000 USD 12,740,00 CI$
	Total	**295 million USD 248 million CI$**	**142 million USD 119 million CI$**	**20 million USD 17 million CI$**	**31 million USD 26 million CI$**	**489 million USD 411 million CI$**	**259 million USD 218 million CI$**

**Values rounded. Full numerical values can be found within the ES appendices. US Dollars have been converted to CI Dollars at a rate of $1.00 CI = $1.19 US; $0.84 CI = $1.00 US*

**Negative values represent the No-Build scenario costs being higher than the Proposed Project for the given category*

7.9.1.4 Overview of Benefits

As discussed above, benefits in a CBA refer to the impacts or results of the project and can be positive or negative. The benefits are calculated in dollar values. Note that negative impacts are calculated as a dollar value loss. The monetary results are discussed in **Section 7.9.2: Results**. This section summarises the benefits, which were assumed as equal for both the Excellent Fit and Acceptable Fit option. The benefits associated with the Proposed Project are:

- **Traffic –** Positive benefits from transportation efficiency accrued in each year from 2026-2074. Benefits primarily stem from travel time savings enabled by the improvements planned in 2026, 2036, 2046, and 2060.
- **Noise –** Positive and/or negative benefits are associated with the shift in the amount of noise per the number of households affected. This is based on research of health impacts of these changes. See **Section 7.3** of this document for more information on noise levels.
- **Carbon emissions** – Emissions associated with construction, traffic, and solar were monetised. If the emissions increased when compared with the No-Build scenario, this was recorded as a negative value. If the emissions decreased when compared with the No-Build scenario, this was recorded as a positive value.
- **Carbon sequestration loss –** The Terrestrial Ecology studies (see **Section 7.6** of this document) calculated the annual loss of ecosystem services from 2026-2074 (carbon sequestration) that was estimated to occur under the Proposed Project compared to the No-Build scenario.
- **Bulk material, construction tailpipe emissions, and commuter/delivery tailpipe emissions –** The project team calculated the annual carbon emissions estimated to occur from project worker commutes and delivery vehicle tailpipes, construction equipment tailpipes, and from handling bulk material. See **Section 7.3** of this document for more information.
- **Non-carbon emissions –** Traffic-related non-carbon (NOx, SO2, VOC, and PM2.5) emissions were estimated in each year from 2026-2074.
- **Amenity value loss –** The Terrestrial Ecology studies (see **Section 7.6** of this document) calculated the one-time loss in amenity value from clearing mangroves.

7.9.2 Results

To complete the analysis, the benefits are added together and divided by the costs to create a "Benefit-Cost Ratio", or BCR. A BCR over 1.0 shows that the estimated benefits over time are greater than the estimated costs. Remember that benefits can be positive or negative, and that negative benefits will make the dollar value of the overall benefits decrease, whereas positive benefits will make the dollar value of the overall benefits increase. The project costs remain the same under each growth scenario, but vary between the Excellent Fit and Acceptable Fit design option. Several project benefit values also remain the same under each growth scenario, including: solar array electricity and emissions savings, amenity value loss, bulk material and tailpipe emissions from construction activities, other one-time construction emissions, and carbon sequestration impact. Travel benefits, emissions from traffic, and noise benefits change according to the level of anticipated travel under each growth scenario. Benefits were assumed equal for both the Excellent Fit and Acceptable Fit option.

Table 10 and **Table 11** summarise the results of the analysis with inclusion of the solar array. All scenarios have a BCR over 1.0, indicating that they would be more beneficial than costly over time. Due to the Acceptable Fit having lower costs and equal benefits compared to the Excellent Fit, the BCRs are higher. For the Acceptable Fit design option, the anticipated benefits are more than three times greater than costs.

Additionally, many benefits that were assessed as part of the study were not able to be monetised because of a lack of data (such as safety benefits, public transportation benefits, pedestrian/bicycle amenities, and transportation system resiliency).

The CBA results are based on conceptual design and may be refined during the detailed design phase of the project, which occurs outside of the EIA. The overall BCR values may change as a result.

*Table 10: Proposed Project minus No-Build CBA Results Summary (2024 US Dollars)**

Scenario	Present Value Costs	Present Value Benefits	NPV (Benefit – Cost)	BCR**
Excellent Fit Low Growth	620 million	904 million	284 million	1.5
Excellent Fit Medium Growth	620 million	1,091 million	471 million	1.8
Acceptable Fit Low Growth	295 million	904 million	609 million	3.1
Acceptable Fit Medium Growth	295 million	1,091 million	795 million	3.7

** Values rounded. Full numerical values can be found within the ES appendices. US Dollars have been converted from CI Dollars at a rate of $0.84 CI = $1.00 US; $1.00 CI = $1.19 US.*
***A BCR above 1.0 represents the anticipated benefits being greater than the anticipated costs*

*Table 11: Proposed Project minus No-Build CBA Results Summary (2024 Cayman Island Dollars)**

Scenario	Present Value Costs	Present Value Benefits	NPV (Benefit – Cost)	BCR**
Excellent Fit Low Growth	521 million	760 million	239 million	1.5
Excellent Fit Medium Growth	521 million	917 million	395 million	1.8
Acceptable Fit Low Growth	248 million	760 million	512 million	3.1
Acceptable Fit Medium Growth	248 million	917 million	668 million	3.7

** Values rounded. Full numerical values can be found within the ES appendices. US Dollars have been converted from CI Dollars at a rate of $0.84 CI = $1.00 US; $1.00 CI = $1.19 US*
***A BCR above 1.0 represents the anticipated benefits being greater than the anticipated costs*

8 What happens next?

8.1 Achievement of CSFs

The Proposed Project has been conceptually designed to meet the project objectives – Critical Success Factors (CSFs), while avoiding and minimising impacts to the project constraints (natural environment resources, social environment resources, and engineering constraints). Potential mitigation measures have been identified for unavoidable impacts to the natural or social environment, with further details to be included within the separate EMP.

A summary of the CSFs, their status and the degree to which the Proposed Project is expected to achieve them, are shown in **Table 12**. The degree of CSF achievement ranges on a scale of neutral, minor, moderate, and large, if applicable. Both the Excellent Fit and Acceptable Fit design options were evaluated.

Table 12: Achievement of CSFs

Criteria	Target	Degree of CSF Achievement – Excellent Fit	Degree of CSF Achievement – Acceptable Fit
a. **Alternate Routes:** Create an alternative travel route to the existing two-lane Bodden Town Road	Provide an alternative roadway facility to accommodate travel in the event of a roadway closure (**Section 6.1: Proposed Project and Engineering**)	**Achieved -** Large Beneficial	**Achieved** – Large Beneficial
b. **Existing Roadway Resiliency:** Improve resiliency of the existing roadway travel route between North Side/East End and George Town/West Bay.	Improve resiliency of the travel route to flooding from sea level rise, storm surge, wave overtopping, and rainfall (**Section 6.1: Proposed Project and Engineering**)	**Achieved -** Large Beneficial	**Achieved** – Slight / Moderate Beneficial
c. **Future Traffic Demand:** Support current and future traffic demand.	Provide travel lanes necessary to accommodate projected trips/vehicles (**Section 6.2: Transportation and Mobility**) Provide controlled access points to enter roadway facility (**Section 6.1: Proposed Project and Engineering** and **Section 6.2: Transportation and Mobility**)	**Achieved -** Large Beneficial	**Achieved** – Large Beneficial
d. **Commuter Travel Times:** Improve travel time between North Side/East End and George Town/West Bay	Improve projected travel time between North Side/East End and George Town/West Bay (**Section 6.2: Transportation and Mobility**)	**Achieved -** Moderate / Large Beneficial	**Achieved** – Moderate / Large Beneficial
e. Utilities: Accommodate utility expansion (electricity, fibre, water, central sewage system) *	Establish area adjacent to roadway to provide for utility needs (**Section: 6.1: Proposed Project and Engineering**)	**Achieved****	**Achieved****
f. Public Transit Access: Provide opportunity to safely accommodate and expand public transportation *	Establish public transportation facilities and improve bus travel time reliability (**Section 6.1: Proposed Project and Engineering** and **Section 7.1: Socio-Economics**)	**Achieved****	**Achieved****

Criteria	Target	Degree of CSF Achievement – Excellent Fit	Degree of CSF Achievement – Acceptable Fit
g. Tourist Travel Times: Reduce tourism travel time between North Side/East End and George Town	Reduce travel times between Owen Roberts International Airport and the North Side (**Section 6.2: Transportation and Mobility**) Reduce travel time between Grand Cayman Cruise Port (George Town Cruise Port) and Bodden Town/North Side/East End (**Section 6.2: Transportation and Mobility**)	**Achieved -** Large Beneficial	**Achieved** – Large Beneficial
h. Safety: Improve safe vehicular travel by reducing roadway conflict points	Reduce the number of Cross Street Intersections along the primary east-west corridor (**Section 6.1: Proposed Project and Engineering** and **Section 6.2: Transportation and Mobility**) Reduce the number of Driveway Access Points along the primary east-west corridor (**Section 6.1: Proposed Project and Engineering** and **Section 6.2: Transportation and Mobility**)	**Achieved -** Large Beneficial	**Achieved** – Large Beneficial
i. Pedestrian and Bicycle Access: Provide opportunity for enhanced and safe pedestrian and bicycle travel	Establish dedicated pedestrian and bicycle facilities adjacent to vehicular travel lanes (**Section 6.1: Proposed Project and Engineering** and **Section 6.2: Transportation and Mobility**)	**Achieved -** Large Beneficial	**Achieved** – Large Beneficial

**These criteria are to provide opportunities to accommodate these features. It is outside the ambit of the NRA to provide utilities or public transportation.*
***Degree of achievement is not applicable*

8.2 ES Compliance

This document has been compiled as Step 5(ii) of the EIA Directive, Final ES. The Final ES was completed in compliance with the April 4, 2023, ToR for the EWA Extension, and input from the Project Steering Committee (**Section 2.2**).

8.3 Future Steps

The outcomes of the Final ES are used to develop an EMP [Step 5(iii)], which outlines the environmental monitoring and mitigation to be incorporated during project implementation. Based on the Final ES and EMP, the EAB will recommend to the NCC whether to approve or deny the application [Step 5(iv)]. The NCC then determines their recommendation to the NRA.

The steps above do not determine whether the Proposed Project will be implemented but provide information for informed decision making. The decision (Step 6) of the EIA process is "*made by the Central Planning Authority, Development Control Board, or Cabinet or other authorizing entity; while taking into account the Council's [NCC's] recommendations*" (2016 NCC Directive for Environmental Impact Assessments (Extraordinary No. 50/2016)).

In this case, the authorizing entity is Cabinet. After a decision is made by Cabinet, the NRA will carry out the project in accordance with the EMP (Step 7). Step 7 concludes the EIA process.

If the project is moved forward by the NRA, the next steps are to:

- Appropriate funding for detailed design and construction
- Inform detailed design with further data collection and analysis
- Complete detailed design of the corridor and mitigation commitments
- Acquire land/properties
- Relocate existing utilities where present
- Clear area for initial phase of the construction
- Construct project including mitigation commitments
- Open the project to traffic