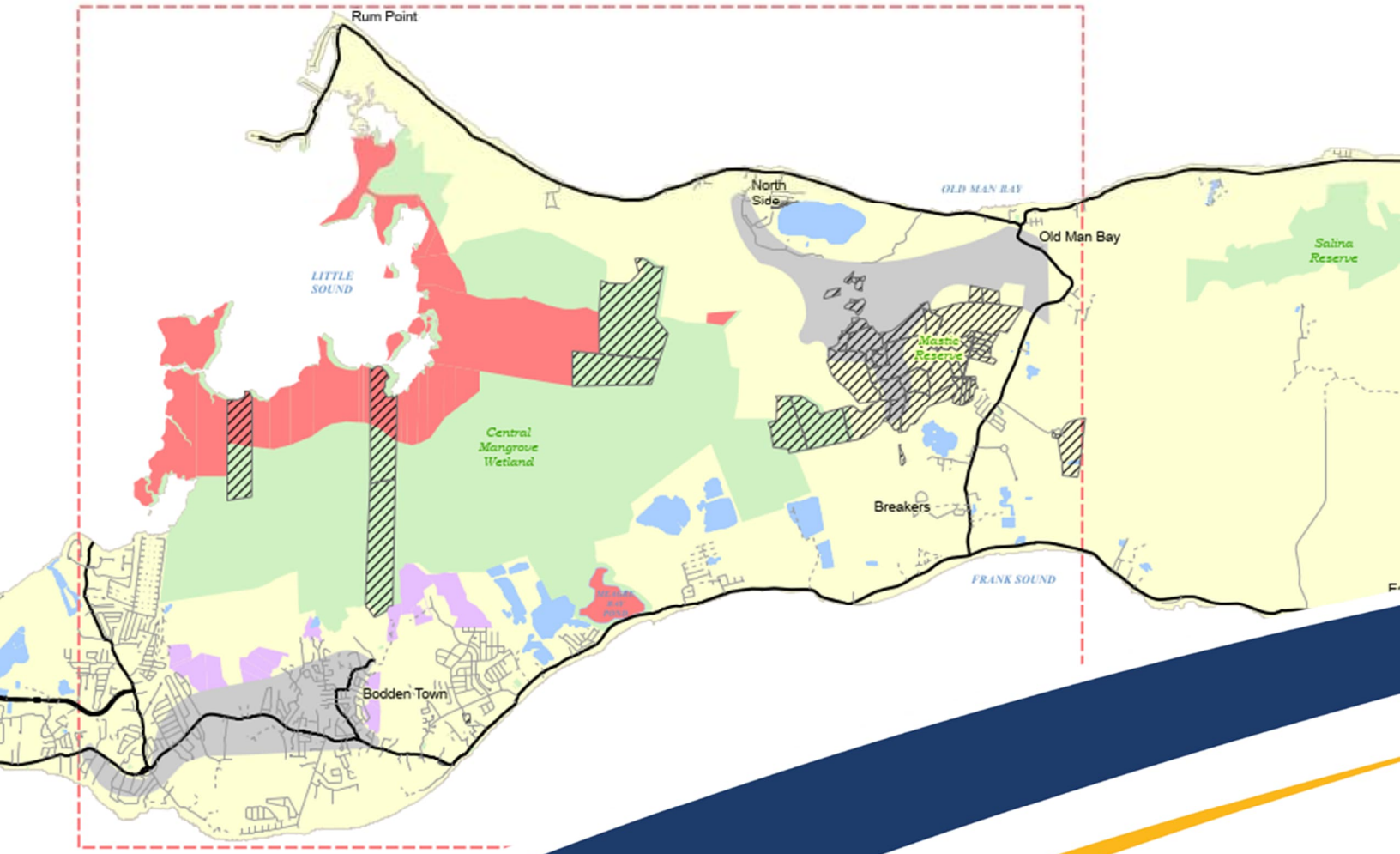
Appendix A – Longlist [Alternatives] Evaluation

Environmental Statement
East-West Arterial Extension:
Section 2 (Woodland Drive – Lookout Road)
Section 3 (Lookout Road – Frank Sound Road)



FINAL Longlist Evaluation – Environmental Impact Assessment for the East-West Arterial Extension:

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

NRA NATIONAL ROADS AUTHORITY

September 6, 2023

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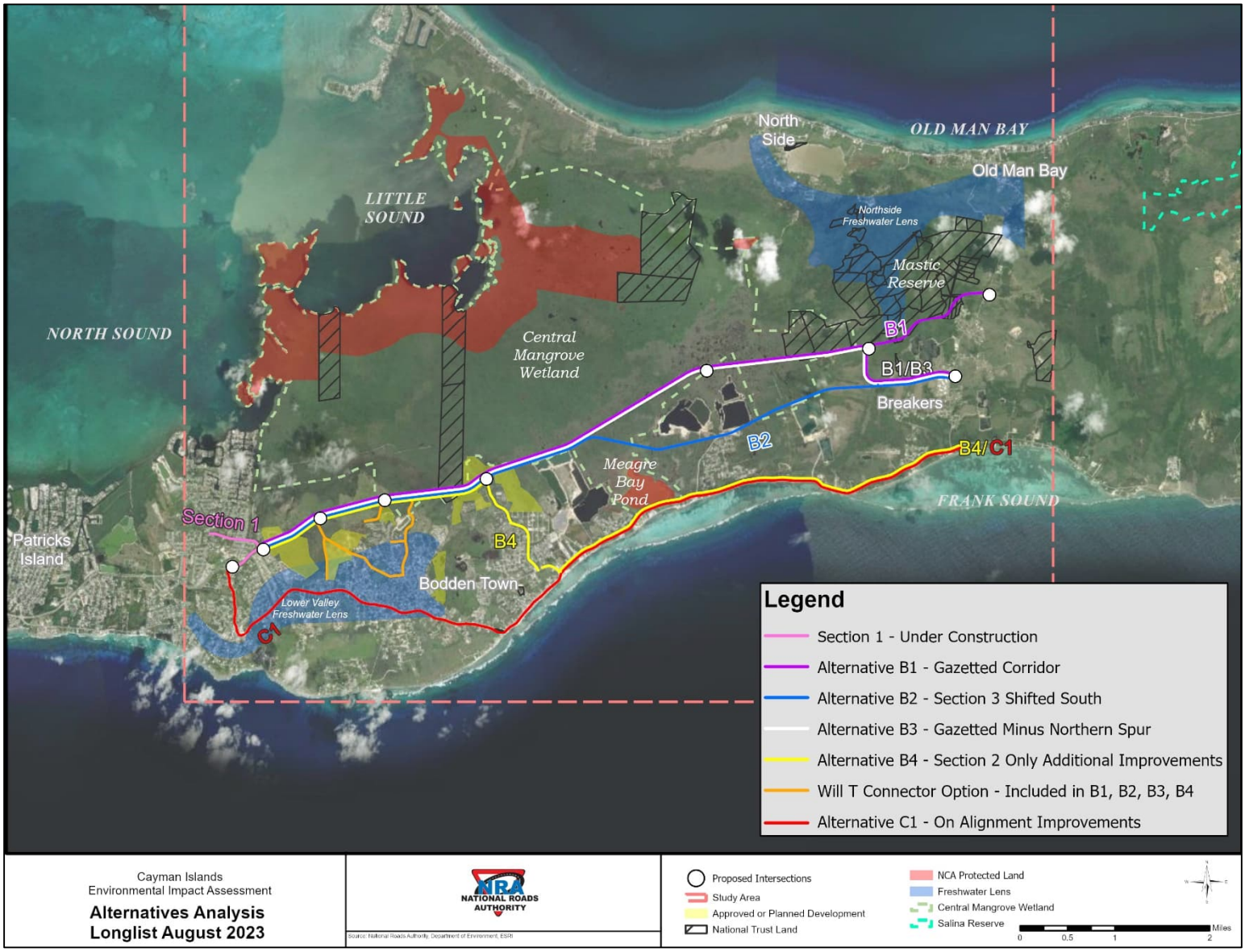
Attachments

Attachment A – Summary of Evaluation Tables

1 Longlist of Alternatives

The longlist of alternatives was confirmed by the East-West Arterial (EWA) Environmental Impact Assessment (EIA) Steering Committee on July 18, 2023, and is depicted in the figure below; each alternative is described in the text below. The longlist of alternatives was evaluated based upon geospatial data, aerial photography, and professional judgement. Each alternative was assessed qualitatively based on conceptual level design. Descriptions of each of the alternatives evaluated along with descriptions of the longlist evaluation rankings are provided as follows.

Figure 1– Longlist of Alternative Alignments



1. **Planned Future Roadway Infrastructure (No-Build) Assumptions:**
   - Included as a benchmark from which to evaluate and compare the impacts of other alternatives; the difference between No-Build and Build conditions is that the Build conditions will include the proposed project-specific alternatives.
   - Encompasses future year land use and roadway improvement assumptions within and around the project study area. Future land use reflects the growth in population, households, and employment. Roadway improvements include projects that will provide additional traffic capacity (e.g., new alignment or widening – additional travel lanes) or provide an improvement in operations (e.g., new intersection, signalization, etc.).
   - Includes planned improvements to the island roadway network independent of the Build Alternatives B1, B2, B3, B4 and C1. These planned improvements will be included as part of future year traffic evaluations and hydrologic modelling but not evaluated for environmental or social impact as the Cayman Islands Government is planning these improvements as independent projects.

2. **Alternative B1 Assumptions:**
   - Build in Gazetted Corridor for Section 2 and Section 3
   - Includes Will T Connector Option
   - Includes bridge and/or culvert structures for hydrologic connectivity

3. **Alternative B2 Assumptions:**
   - Build in Gazetted Corridor for Section 2
   - Locates new roadway closer to Meagre Bay Pond
   - Includes Will T Connector Option
   - Includes bridge and/or culvert structures for hydrologic connectivity

4. **Alternative B3 Assumptions:**
   - Build in Gazetted Corridor for Section 2 and Section 3
   - Eliminates northern spur at Frank Sound Road connection
   - Includes Will T Connector Option
   - Includes bridge and/or culvert structures for hydrologic connectivity

5. **Alternative B4 Assumptions:**
   - Build in Gazetted Corridor for Section 2
   - Includes Will T Connector Option
   - Improvements to:
     - Lookout Road
     - Bodden Town Bypass east of Lookout Road
     - Bodden Town Road between Bodden Town Bypass and Frank Sound Road
   - Improvements would include widening (i.e., additional lane(s) of roadway capacity), elevating the roadway, and adding pedestrian/bicycle facilities.
   - Includes bridge and/or culvert structures for hydrologic connectivity

6. Alternative C1 Assumptions:

- On Alignment (existing roadway network) Alternative
- Improvements to:
  - Bodden Town Road between Frank Sound Road and Shamrock Road
  - Shamrock Road between Bodden Town Road and Hirst Road
  - Hirst Road between Shamrock Road and the East-West Arterial
- Improvements would include widening (i.e., additional lane(s) of roadway capacity), elevating the roadway, and adding pedestrian/bicycle facilities.

2 Critical Success Factors

The Critical Success Factors (CSFs) are the aspects of the project that are vital to its success. These are the main goals that the completed project would accomplish. The CSFs were developed based on the purpose and need statements from the original Gazetting of the East-West Arterial Extension to the recent Final Terms of Reference for the East-West Arterial Extension. Table 1 below provides a list of the CSFs. Details regarding ranking systems are provided below the table for each Criteria.

Table 1 - Critical Success Factors List

Criteria	Target
a. 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. 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. Support current and future traffic demand.	Provide travel lanes necessary to accommodate projected trips/vehicles Provide controlled access points to enter roadway facility
d. Improve travel time between North Side/East End and George Town/West Bay	Projected travel time between North Side/East End and George Town/West Bay
e. Accommodate utility expansion (electricity, fiber, water, central sewerage system) *	Establish area adjacent to roadway to provide for utility needs
f. Provide opportunity to safely accommodate and expand public transportation *	Establish public transportation facilities that include bus pull offs Improve bus travel time reliability
g. 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. Improve safe vehicular travel by reducing roadway conflict points	Number of Cross Street Intersections along the primary east-west corridor Number of Driveway Access Points along the primary east-west corridor
i. 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*	

a) Create an alternative travel route to the existing two-lane Bodden Town Road

The target of this criterion is to provide an alternative roadway facility that accommodates travel in the event of a road closure. The ranking for this criterion is as follows:

- Excellent Fit – Alternative consists of 100% new roadway connection between Woodland Drive and Frank Sound Road
- Good Fit – Alternative consists of approximately 75-99% new roadway connection between Woodland Drive and Frank Sound Road
- Reasonable Fit – Alternative consists of approximately 1-75% new roadway connection between Woodland Drive and Frank Sound Road
- Low Fit – Alternative provides separation by direction (i.e., median), but no new roadway connection between Woodland Drive and Frank Sound Road
- Poor Fit – Alternative provides no separation or new roadway connection between Woodland Drive and Frank Sound Road

1. Planned Future Roadway Infrastructure (No-Build): This alternative does not create an alternative travel route to the existing two-lane Bodden Town Road nor provides separation on the existing roadway. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative creates an alternative travel route with 100% new roadway connection to the existing two-lane Bodden Town Road between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
3. B2: This alternative creates an alternative travel route with 100% new roadway connection to the existing two-lane Bodden Town Road between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
4. B3: This alternative creates an alternative travel route with 100% new roadway connection to the existing two-lane Bodden Town Road between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
5. B4: This alternative creates approximately 4 miles of alternative travel route (approximately 50% new roadway connection) and maintains approximately 4.5 miles of reliance upon Bodden Town Road as the only travel route. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative does not create an alternative travel route to the existing two-lane Bodden Town Road but does provide the separation of travel lanes by direction with a median. Therefore, it is ranked as a Low Fit.

b) Improve resiliency of the existing roadway travel route between North Side/East End and George Town/West Bay.

The target of this criterion is to improve the travel route's resiliency to flooding from sea level rise, storm surge, wave overtopping, and rainfall. For this criterion all the Build alternatives would raise the roadway to 6 feet above mean sea level. This includes the new roadway constructed for Alternatives B1, B2, and B3, and the improvements to the existing roadways that are included with Alternatives B4 and C1. The ranking for this criterion is based on the preliminary Coastal Risk (Storm Surge and Wave Overtopping) and preliminary Hydrologic/Hydraulic (Rainfall Flooding) studies that are currently being

completed for the project area by Baird and Remington & Vernick Engineers, respectively. An overview of each of the resiliency factors is provided below:

- Sea Level Rise (SLR): This effect has been applied to allow ranking of alternatives based upon whether the elevation of the roadway is proposed to be greater than approximately 1.6 feet (0.5 meters) above mean sea level.
- Storm Surge: This effect has been defined through development of a finite element surge model which considered high-resolution, existing conditions bathymetry/topography for the No-Build and for each of the Build alternatives. Six (6) representative storms were selected for storm surge modelling. The modelling applied two (2) synthetic storms for each of three (3) return periods (10-year, 25-year, and 50-year) using 32.8-foot (10-meter) above mean sea level (AMSL) modelled windspeeds at the centroid of Grand Cayman Island. The storms that were selected for the model passed north of the island, creating surge in North Sound. The surge models also integrated the 1.6 feet (0.5 meters) of SLR as described above.
- Wave Overtopping: A preliminary wave overtopping analysis was completed for a portion of the southern edge of the island using an empirical approach to better define this effect. Accordingly, hydrodynamic and wave models were used to develop wave conditions and water levels for the coastal area directly adjacent to the sea.
- Rainfall Flooding: Flooding due to rainfall events was modelled for several rainfall scenarios including the 2-year, 10-year, 25-year, and 50-year return intervals, plus an additional scenario based upon rainfall recorded during Hurricane Ivan in September 2004. The analysis employed various tools to develop flooding depth and water surface elevation mapping. These tools included HEC-HMS and QGIS for development of drainage basin and subcatchment extents and characteristics including land uses, Manning's 'n' values, and areas of potential infiltration. HEC-RAS 2D was used to perform the 2-dimensional hydraulic modelling and generate rainfall flood mapping for each scenario.

The results of these studies indicate that the above-mentioned effects operate in complex, related, but also independent mechanisms that may cause high flooding in one location but low flooding in another location. To form a basis for the rankings, a flooding or inundation amount on the roadway facility of between 6 inches to 1 foot (0.2-0.3 meters) has been applied to assist in judging the relative fitness of each alternative as described below. The ranking for this criterion is as follows:

- Excellent Fit - Alternative improves resiliency of the roadway in all four of the resiliency factors (Sea Level Rise, Storm Surge, Wave Overtopping, Rainfall Flooding) based on the 2-year, 10-year, 25-year, 50-year storm and SLR.
- Good Fit - Alternative improves resiliency of the roadway in three of the four resiliency factors based on the 2-year, 10-year, 25-year, 50-year storm and/or SLR.
- Reasonable Fit - Alternative improves resiliency of the roadway in two of the four resiliency factors based on the 2-year, 10-year, 25-year, 50-year storm and/or SLR.

- Low Fit - Alternative improves resiliency of the roadway in one of the four resiliency factors based on the 2-year, 10-year, 25-year, 50-year storm and/or SLR.
- Poor Fit – Alternative does not improve resiliency of the roadway in any of the four resiliency factors based on the 2-year, 10-year, 25-year, 50-year storm and/or SLR.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does nothing to improve any of the four resiliency factors. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative is anticipated to improve the rainfall flooding resiliency factor for the 2-year, 10-year, 25-year, 50-year storm. This alternative is anticipated to improve the SLR resiliency due to higher elevation (minimum 6 feet above mean sea level). This alternative is also anticipated to improve wave overtopping due to its inland location. This alternative provides the opportunity to include additional design components such as a higher vertical elevation, bridge, and other drainages structures that would further improve the storm surge resiliency factor for most of this alternative. However, based on the conditions identified through initial topographic, geometric, and modelling efforts, the location where this alternative would connect to the currently under construction Section 1 of the East-West Arterial Extension would not satisfy the criterion for storm surge resiliency. Therefore, this alternative is anticipated to improve resiliency in three of the four factors (Sea Level Rise, Wave Overtopping, and Rainfall Flooding) and is ranked as a Good Fit.
3. B2: This alternative is anticipated to improve the rainfall flooding resiliency factor for the 2-year, 10-year, 25-year, 50-year storm. This alternative is anticipated to improve the SLR resiliency due to higher elevation (minimum 6 feet above mean sea level). This alternative is also anticipated to improve wave overtopping due to its inland location. This alternative provides the opportunity to include additional design components such as a higher vertical elevation, bridge, and other drainages structures that would further improve the storm surge resiliency factor for most of this alternative. However, based on the conditions identified through initial topographic, geometric, and modelling efforts, the location where this alternative would connect to the currently under construction Section 1 of the East-West Arterial Extension would not satisfy the criterion for storm surge resiliency. Therefore, this alternative is anticipated to improve resiliency in three of the four factors (Sea Level Rise, Wave Overtopping, and Rainfall Flooding) and is ranked as a Good Fit.
4. B3: This alternative is anticipated to improve the rainfall flooding resiliency factor for the 2-year, 10-year, 25-year, 50-year storm. This alternative is anticipated to improve the SLR resiliency due to higher elevation (minimum 6 feet above mean sea level). This alternative is also anticipated to improve wave overtopping due to its inland location. This alternative provides the opportunity to include additional design components such as a higher vertical elevation, bridge, and other drainages structures that would further improve the storm surge resiliency factor for most of this alternative. However, based on the conditions identified through initial topographic, geometric, and modelling efforts, the location where this alternative would connect to the currently under construction Section 1 of the East-West Arterial Extension would not satisfy the criterion for storm surge resiliency. Therefore, this alternative is anticipated to improve

resiliency in three of the four factors (Sea Level Rise, Wave Overtopping, and Rainfall Flooding) and is ranked as a Good Fit.

5. B4: This alternative includes a section of new roadway along with utilizing the existing roadway corridors of Lookout Road, Bodden Town Bypass, and Bodden Town Road. The new alignment portion of this corridor would allow for anticipated improvements to SLR, wave overtopping, and rainfall flooding as described for B1, B2, and B3 above. The existing roadway corridor portion of this alternative has limited space to provide resiliency improvements. Due to the existing developments, cross streets, and access points, these improvements would result in significant impacts on adjacent properties along this portion of this alternative. Therefore, this alternative is anticipated to improve resiliency in three of the four factors (Sea Level Rise, Wave Overtopping, and Rainfall Flooding) for only a portion of the corridor. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative would utilize the existing roadway corridors of Bodden Town Road, Shamrock Road, and Hirst Road. The existing roadway corridors have limited space to provide resiliency improvements. Due to the existing developments, cross streets and access points, these improvements would result in significant impacts on adjacent properties. However, this alternative is anticipated to improve resiliency to SLR. Therefore, it is ranked as a Low Fit.

c) Support current and future traffic demand.

One target of this criterion is to provide the required number of roadway travel lanes necessary to accommodate the projected trips/vehicles. It is assumed that all the Build alternatives will provide the required number of travel lanes to meet the projected capacity target. Therefore, all the Build alternatives are ranked as an Excellent Fit when compared to the Planned Future Roadway Infrastructure (No-Build), which does not provide adequate capacity for the current traffic demand nor the anticipated future traffic demand. Based upon current travel demands and anticipated growth within this corridor, the Planned Future Roadway Infrastructure (No-Build) is ranked as a Poor Fit.

Another target of this criterion is to provide controlled access points to enter the roadway facility. The ranking for this criterion is as follows:

- Excellent Fit – Alternative allows access only at intersections (considered 100% access control).
- Good Fit – Alternative allows for at least 50% full access control and at least 25% left-in/left-out only at intersections/driveways.
- Reasonable Fit – Alternative allows for at least 75% left-in/left-out only at intersections/driveways.
- Low Fit – Alternative allows for at least 25% or less left-in/left-out only at intersections/driveways.
- Poor Fit – Alternative allows for no access control.

1. Planned Future Roadway Infrastructure (No-Build): This alternative allows for no access control. Therefore, it was ranked as a Poor Fit.

2. B1: This alternative is a new roadway corridor through an undeveloped area; therefore, it does not include numerous cross streets and driveway access points. Therefore, this alternative provides the opportunity to allow for access only at intersections and ranked as an Excellent Fit.
3. B2: This alternative is a new roadway corridor through an undeveloped area; therefore, it does not include numerous cross streets and driveway access points. Therefore, this alternative provides the opportunity to allow for access only at intersections and ranked as an Excellent Fit.
4. B3: This alternative is a new roadway corridor through an undeveloped area; therefore, it does not include numerous cross streets and driveway access points. Therefore, this alternative provides the opportunity to allow for access only at intersections and ranked as an Excellent Fit.
5. B4: This alternative includes approximately 4 miles of new corridor and approximately 4.5 miles of reliance upon existing roadway network improvements. The new corridor portion of this alternative is through an undeveloped area and could allow for access only at intersections. The existing roadway network portion of the corridor would likely allow for at least 75% left-in/left-out only as an access control method. Therefore, it was ranked as a Good Fit.
6. C1: This alternative is located along an existing roadway that currently has a high number of cross streets and driveway access points. Due to the proximity of these points needed to access the adjacent developments along with the spatial patterns of these developments, the implementation of a frontage road or alternative access path to provide access to these developments would require a significant number of relocations. Therefore, it is assumed that this alternative would only allow for up to 75% left-in/left-out only as an access control method. Therefore, it is ranked as a Low Fit.

d) Improve travel time between North Side/East End and George Town/West Bay

The target for this criterion is to provide the opportunity to improve vehicular travel time for trips between the North Side/East End and George Town/West Bay areas. The ranking for this criterion is based on modelled 2021 travel conditions for each Build alternative compared to the Planned Future Roadway Infrastructure (No-Build) conditions because the future year forecasts have not yet been completed at this point in the evaluation process. Therefore, the Planned Future Roadway Infrastructure (No-Build) scenario was modelled in the 2021 conditions as the baseline in which the Build alternatives were compared, also modelled in the 2021 conditions, for an equivalent comparison. Evaluated peak direction travel times were between North Side and the Cayman Islands Hospital, Camana Bay, and Walkers Road school area.

It should be noted that the percentage thresholds are based on preliminary modelled travel time results, which will be refined in more detail during the Shortlist Evaluation, thereby likely changing once new traffic and Census data is incorporated into the refined modelling efforts. For this high-level desktop exercise, these preliminary results offer relative order of magnitude differences in travel time between alternatives when compared to the Planned

Future Roadway Infrastructure (No-Build) scenario. The percentage thresholds were chosen to differentiate between alternatives and discern this order of magnitude to capture no improvement versus nominal improvement versus decent improvement versus better improvement.

- Excellent Fit – Alternative reduces peak direction travel time by over 25% (>25 to 100%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Good Fit – Alternative reduces peak direction travel time by 15-25% (15 to <25%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Reasonable Fit – Alternative reduces peak direction travel time by 5-15% (5 to <15%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Low / Poor Fit – Alternative reduces peak direction travel time by 0-5% (0 to <5%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.

1. Planned Future Roadway Infrastructure (No-Build): This alternative is the baseline comparison for the Build alternatives. Therefore, this criterion is Not Applicable (N/A).
2. B1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
3. B2: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
4. B3: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
5. B4: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by between 15-25% with two separate roadway facilities, particularly between Hirst Road and Lookout Gardens, as well as improvements along the existing Shamrock Road/Bodden Town Road, particularly between Lookout Gardens and Frank Sound Road. Therefore, it is ranked as a Good Fit.
6. C1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by between 15-25% with roadway capacity improvements along the existing Shamrock Road/Bodden Town Road, particularly between Hirst Road and Frank Sound Road (i.e., additional lane of roadway capacity in each direction). Therefore, it is ranked as a Good Fit.

e) Accommodate utility expansion (electricity, fiber, water, central sewerage system)

The target of this criterion is to have the ability to accommodate utility expansion needs between Woodland Drive and Frank Sound Road. This criterion is an opportunity to

provide for utility expansion within the proposed new roadway corridor. It is outside of ambit of the NRA to provide utilities. The ranking for this criterion is as follows:

- Excellent Fit – Alternative can accommodate utility expansion for approximately 100% of the primary EWA route between Woodland Drive and Frank Sound Road.
- Good Fit – Alternative can accommodate utility expansion for approximately 75-99% (75 to <100%) of the primary EWA route between Woodland Drive and Frank Sound Road.
- Reasonable Fit – Alternative can accommodate utility expansion for approximately 50-74% (50 to <75%) of the primary EWA route between Woodland Drive and Frank Sound Road.
- Low Fit – Alternative can accommodate utility expansion for approximately 25-49% (25 to <50%) of the primary EWA route between Woodland Drive and Frank Sound Road.
- Poor Fit – Alternative can accommodate utility expansion for less than 25% (0 to >25%) of the primary EWA route between Woodland Drive and Frank Sound Road

1. Planned Future Roadway Infrastructure (No-Build): This alternative does nothing to accommodate utility expansion. Due to the limited amount of adjacent land within the existing Right-of-Way (ROW) and the proximity of existing development, there is very limited space available for utility expansion. Therefore, less than 25% of the route between Woodland Drive and Frank Sound Road could reasonably accommodate utility expansion. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative is a new roadway through an undeveloped area; therefore, the land needed can be acquired to accommodate utility expansion between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
3. B2: This alternative is a new roadway through an undeveloped area; therefore, the land needed can be acquired to accommodate utility expansion between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
4. B3: This alternative is a new roadway through an undeveloped area; therefore, the land needed can be acquired to accommodate utility expansion between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
5. B4: This alternative includes approximately 4 miles of new corridor and approximately 4.5 miles of reliance upon existing roadway network improvements. The new corridor portion of this alternative is through an undeveloped area and could accommodate utility expansion. The existing roadway network portion of the corridor would have limited ability to accommodate utility expansion due to limited ROW and relocation potential. Therefore, approximately 50% of the route between Woodland Drive and Frank Sound Road could accommodate utility expansion it is ranked as a Reasonable Fit.
6. C1: Due to the limited amount of adjacent land within the existing ROW, the proximity of existing development, and requirement of land needed for roadway expansion, there is very little available adjacent land for utility expansion without a high number of relocations. Therefore, since less than 25% of the route between Woodland Drive and Frank Sound Road could reasonably accommodate utility expansion this alternative was ranked as a Poor Fit.

f) Provide opportunity to safely accommodate and expand public transportation

This evaluation/ranking focuses on the ability to accommodate safe and efficient public transportation (i.e., space requirements); it does not include the specific design of a public transportation system (i.e., stops, fares, etc.) or analysis of user behaviour. This criterion is an opportunity to provide for public transit features within the proposed new roadway corridor. It is outside of ambit of the NRA to provide public transportation.

One target for this criterion is the opportunity to accommodate public transportation facilities that include bus pull offs. The ranking for this criterion is as follows:

- Excellent Fit – Alternative can accommodate a Dedicated Bus Lane Woodland Drive and Frank Sound RoadGood Fit – Alternative can accommodate Dedicated Bus Lane 45% of the corridor & Bus Pull Offs/Queue Jumps for the remainder of the corridor
- Reasonable Fit – Alternative can accommodate Bus Pull Offs/Queue Jumps
- Low / Poor Fit – Alternative cannot accommodate any public transportation expansion.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does not accommodate any public transportation expansion. Therefore, it is ranked as a Low/Poor Fit.
2. B1: This alternative is a new roadway through an undeveloped area; therefore, ROW can be acquired to accommodate a Dedicated Bus Lane between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
3. B2: This alternative is a new roadway through an undeveloped area; therefore, ROW can be acquired to accommodate a Dedicated Bus Lane between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
4. B3: This alternative is a new roadway through an undeveloped area; therefore, ROW can be acquired to accommodate a Dedicated Bus Lane between Woodland Drive and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
5. B4: This alternative includes approximately 4 miles of new corridor and approximately 4.5 miles of reliance upon existing roadway network improvements. The new corridor portion of this alternative is through an undeveloped area and could accommodate a Dedicated Bus Lane. The existing roadway network portion of the corridor would have limited ability to accommodate a Dedicated Bus Lane due to limited ROW and relocation potential. However, Bus Pull Offs/Queue Jumps could be reasonably accommodated along the existing roadway network. Therefore, it was ranked as a Good Fit.
6. C1: Due to the limited amount of existing ROW, the proximity of existing development, and requirement of ROW for roadway expansion, there is no available ROW for Dedicated Bus Lanes without a high number of relocations. However, Bus Pull Offs/Queue Jumps could be reasonably accommodated along the existing roadway network. Therefore, it was ranked as a Reasonable Fit.

Another target for this criterion is to improve bus travel time reliability. This evaluation/ranking focuses on the ability to provide accommodations for bus travel and not on the usage/behaviour. From a transit reliability standpoint, three factors were considered:

- Delay due to stops (boardings/alightings)
- Delay due to intersections and roadway congestion
- Delay due to services interruptions (e.g., roadway maintenance/construction, flooding, incidents)

The ranking focuses on the opportunity to mitigate these three delay factors. In evaluating the current existing roadway network, if any of the existing main east/west roadways including Bodden Town Road, Shamrock Road and Hirst Road are closed due to construction or an incident, the public transit would be unable to reach its destination. The rankings are based on how many alternative routes would be available to mitigate delay due to service interruption.

The ranking for this criterion is as follows:

- Excellent Fit – Alternative provides three possible bus route options, particularly between Hirst Road and Frank Sound Road, with two along the new roadway facility and one with limited opportunity along the existing roadway facility.
- Good Fit – Alternative provides two possible bus route options, particularly between Hirst Road and Frank Sound Road, with one along the new roadway facility and one with limited opportunity along the existing roadway facility.
- Reasonable Fit – Alternative provides two possible bus route options, particularly between Hirst Road and Lookout Gardens, as well as limited opportunity on the existing facility.
- Low Fit – Alternative provides limited opportunity on the existing facility.
- Poor Fit – Alternative provides no opportunity on the existing facility.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does nothing to improve bus travel time reliability. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative would provide two possible bus route options for the connection between Hirst Road and Frank Sound Road, with one along the new roadway facility and one with limited opportunity along the existing roadway facility. This alternative would also provide three possible bus route options for a limited length of the route between Hirst Road and Frank Sound Road. Based upon since the third possible route is limited, B1 is ranked as a Good Fit.
3. B2: This alternative provides two possible bus route options between Hirst Road and Frank Sound Road, with one along the new roadway facility and one with limited opportunity along the existing roadway facility. Therefore, it is ranked as a Good Fit.
4. B3: This alternative provides two possible bus route options between Hirst Road and Frank Sound Road, with one along the new roadway facility and one with limited opportunity along the existing roadway facility. Therefore, it is ranked as a Good Fit.

5. B4: This alternative provides two possible bus route options between Hirst Road and Lookout Gardens, as well as limited opportunity on the existing facility. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative provides limited opportunity on the existing facility. Therefore, it is ranked as a Low Fit.

g) Reduce tourism travel time between North Side/East End and George Town

The targets for this criterion are to reduce tourism travel time between North Side/East End and George Town. The ranking for this criterion is based on modelled 2021 travel conditions for each Build alternative compared to the Planned Future Roadway Infrastructure (No-Build) conditions. The Planned Future Roadway Infrastructure (No-Build) scenario was modelled in the 2021 conditions as the baseline to which the Build alternatives were compared (also modelled in the 2021 conditions for an equivalent comparison). Evaluated travel times were between the North Side and the Owen Roberts International Airport, and between the Grand Cayman Cruise Port and Rum Point and Botanical Gardens.

The percentage thresholds are based on preliminary modelled travel time results, which will be refined in further detail during the Shortlist Evaluation. These preliminary results offer relative order of magnitude differences in travel time between alternatives when compared to the Planned Future Roadway Infrastructure (No-Build) scenario. The percentage thresholds were chosen to differentiate between alternatives and to discern an order of magnitude of the improvements.

The ranking for the two targets within this criterion is as follows:

- Excellent Fit – Alternative reduces peak direction travel time by over 25% (>25 to 100%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Good Fit – Alternative reduces peak direction travel time by 15-25% (15 to <25%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Reasonable Fit – Alternative reduces peak direction travel time by 5-15% (5 to <15%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.
- Low / Poor Fit – Alternative reduces peak direction travel time by 0-5% (0 to <5%) as compared to the Planned Future Roadway Infrastructure (No-Build) scenario.

The first target for this criterion is to reduce travel times between the North Side and the Owen Roberts International Airport. The ranking is as follows:

1. Planned Future Roadway Infrastructure (No-Build): This alternative is the baseline comparison for the Build alternatives. Therefore, this criterion is Not Applicable (N/A).
2. B1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available,

particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.

3. B2: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
4. B3: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by over 25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as an Excellent Fit.
5. B4: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by between 15-25% with two separate roadway facilities, particularly between Hirst Road and Lookout Gardens, as well as improvements along the existing Shamrock Road/Bodden Town Road, particularly between Lookout Gardens and Frank Sound Road. Therefore, it is ranked as a Good Fit.
6. C1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce peak direction travel time by between 15-25% with improvements along the existing Shamrock Road/Bodden Town Road, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as a Good Fit.

The second target for this criterion is to reduce travel time between the Grand Cayman Cruise Port (George Town Cruise Port) and Bodden Town/North Side/East End. The ranking is as follows:

1. Planned Future Roadway Infrastructure (No-Build): This alternative is the baseline comparison for the Build alternatives. Therefore, this criterion is Not Applicable (N/A).
2. B1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce bi-directional travel time by between 15-25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as a Good Fit.
3. B2: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce bi-directional travel time by between 15-25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as a Good Fit.
4. B3: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce bi-directional travel time by between 15-25% with two separate roadway facilities available, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as a Good Fit.
5. B4: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce bi-directional travel time by between 5-15% with two separate roadway facilities, particularly between Hirst Road and Lookout Gardens, as well as improvements along the existing Shamrock Road/Bodden Town Road, particularly between Lookout Gardens and Frank Sound Road. Therefore, it is ranked as a Reasonable Fit.

6. C1: Based on 2021 modelled travel conditions, this alternative is anticipated to reduce bi-directional travel time by between 5-15% with improvements along the existing Shamrock Road/Bodden Town Road, particularly between Hirst Road and Frank Sound Road. Therefore, it is ranked as a Reasonable Fit.

h) Improve safe vehicular travel by reducing roadway conflict points

Conflict points occur when two objects (e.g., vehicle/vehicle, pedestrian/pedestrian, vehicle/pedestrian, etc.) try to occupy the same space at the same time. More access points (e.g., cross-street intersections and driveways) along a roadway create more conflict points as vehicles enter and exit the roadway. People travelling along a corridor create opportunities for crashes at these conflict points, so roadways with higher traffic volumes result in more potential for conflicts.

Overall, the new location for Alternatives B1, B2 and B3 will have less cross-street intersections or driveways than the existing Shamrock/Bodden Town Road and therefore have less conflict points. It is noted that these alternatives would not reduce the number of conflict points on the existing Shamrock Road/Bodden Town Road. However, traffic diversions to the new route will reduce the traffic volume by providing a more efficient route for through-traffic. This reduction of traffic on the existing Shamrock Road/Bodden Town Road will result in fewer potential conflicts.

One target for this criterion is to reduce the number of cross-street intersections along the **primary east-west corridor.** The primary east-west corridor is defined as the travel route most likely to be used by people traversing the study area. The ranking for this criterion is as follows:

- Excellent Fit – Alternative reduces the number of cross-street intersections along the primary east-west corridor by at least 75% (75-100%) along the primary east-west corridor.
- Good Fit – Alternative reduces the number of cross-street intersections along the primary east-west corridor by at least 50% (50 to <75%) along the primary east-west corridor.
- Reasonable Fit – Alternative reduces the number of cross-street intersections along the primary east-west corridor by at least 25% (25 to <50%) along the primary east-west corridor.
- Low Fit – Alternative reduces the number of cross-street intersections along the primary east-west corridor by at least 10% (10 to <25%) along the primary east-west corridor.
- Poor Fit – Alternative reduces the number of cross-street intersections along the primary east-west corridor by less than 10% (0 to <10%) along the primary east-west corridor.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does nothing to reduce the number of cross-street intersections along the primary east-west corridor (0% reduction). Therefore, it is ranked as a Poor Fit.

2. B1: This alternative is anticipated to reduce the number of cross-street intersections along the primary east-west corridor by between 75-100%. Therefore, it is ranked as an Excellent Fit.
3. B2: This alternative is anticipated to reduce the number of cross-street intersections along the primary east-west corridor by between 75-100%. Therefore, it is ranked as an Excellent Fit.
4. B3: This alternative is anticipated to reduce the number of cross-street intersections along the primary east-west corridor by between 75-100%. Therefore, it is ranked as an Excellent Fit.
5. B4: This alternative is anticipated to reduce the number of cross-street intersections along the primary east-west corridor by between 50-75%. Therefore, it is ranked as a Good Fit.
6. C1: This alternative is anticipated to reduce the number of cross-street intersections along the primary east-west corridor by less than 10%. Therefore, it is ranked as a Poor Fit.

The second target for this criterion is to reduce the number of driveway access points along the **primary east-west corridor.** The primary east-west corridor is defined as the travel route most likely to be used by people traversing the study area. The ranking for this criterion is as follows:

- Excellent Fit – Alternative reduces the number of driveway access points along the primary east-west corridor by at least 75% (75-100%) along the primary east-west corridor.
- Good Fit – Alternative reduces the number of driveway access points along the primary east-west corridor by at least 50% (50 to <75%) along the primary east-west corridor.
- Reasonable Fit – Alternative reduces the number of driveway access points along the primary east-west corridor by at least 25% (25 to <50%) along the primary east-west corridor.
- Low Fit – Alternative reduces the number of driveway access points along the primary east-west corridor by at least 10% (10 to <25%) along the primary east-west corridor.
- Poor Fit – Alternative reduces the number of driveway access points along the primary east-west corridor by less than 10% (0 to <10%) along the primary east-west corridor.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does nothing to reduce the number of driveway access points along the primary east-west corridor. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative is anticipated to reduce the number of driveway access points along the primary east-west corridor by at least 75%. Therefore, it is ranked as an Excellent Fit.

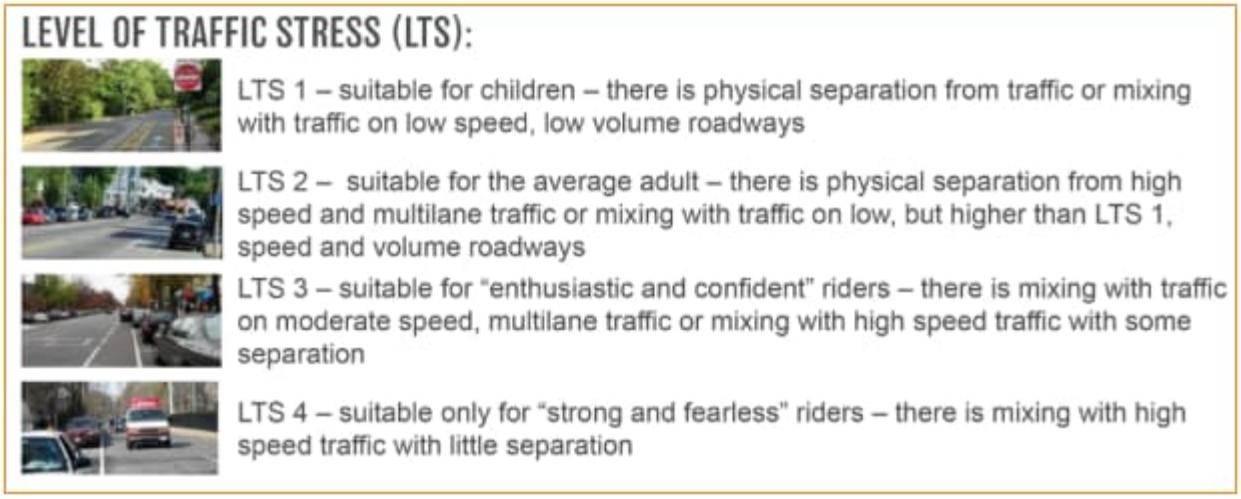
3. B2: This alternative is anticipated to reduce the number of driveway access points along the primary east-west corridor by at least 75%. Therefore, it is ranked as an Excellent Fit.
4. B3: This alternative is anticipated to reduce the number of driveway access points along the primary east-west corridor by at least 75%. Therefore, it is ranked as an Excellent Fit.
5. B4: This alternative is anticipated to reduce the number of driveway access points along the primary east-west corridor by between 25-50%. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative is anticipated to reduce the number of driveway access points along the primary east-west corridor by less than 10%. Therefore, it is ranked as a Poor Fit.

i) Provide opportunity for enhanced and safe pedestrian and bicycle travel

The target for this criterion focuses on the opportunity to accommodate safe pedestrian and bicycle travel (i.e., space requirements/amenities); it does not assess user behaviour.

Traffic volume, speeds, and safety amenities directly impact the comfort of pedestrians and cyclists using a particular facility. A commonly used performance measure to evaluate these impacts is Level of Traffic Stress (LTS), particularly for bicycles, which considers the bicycle infrastructure as well as traffic volume and number of lanes of any adjacent streets. It ranks each facility on a scale from 1 to 4, with 1 being suitable for new/young riders and 4 being suitable for use by only the most experienced/fearless riders (Figure 2). A full LTS evaluation was not completed for this criterion, however, this information is provided to demonstrate the correlation between traffic volume/amenities and comfort using a particular facility.

Figure 2– Bicycle Level of Traffic Stress (Definitions)



The new location for Alternatives B1, B2 and B3 is expected to reduce the volume of traffic using existing Shamrock Road/Bodden Town Road, thereby lowering the LTS on the

existing roadway network. As a result, more pedestrians and cyclists may feel more comfortable traveling on the existing roadway network. These alternatives would also provide a parallel multi-use path separate from vehicular traffic that can be used by cyclists, pedestrians, or emerging modes such as e-bikes or electric scooters, which enhance accessibility between the western and northern/eastern areas of the island. The existing roadway Alternatives B4 and C1 would also include accommodations for pedestrians and cyclists, however, they would not be physically separated from adjacent traffic, and they would not reduce the traffic volume on the existing roadways.

Overall, all the Build alternatives would provide accommodations for pedestrian and bicycle travel, and therefore, all are ranked as an Excellent Fit. Based upon the lack of existing pedestrian and bicycle facilities, the Planned Future Roadway Infrastructure (No-Build) is ranked as a Poor Fit. The LTS for each of the alternatives carried forward into the short list will be evaluated in more detail.

Table 2 - Critical Success Factors Evaluation

Critical Success Factors						
Evaluation Criteria	**Alignments**					
	No-Build	**B1**	**B2**	**B3**	**B4**	**C1**
Create an alternative travel route to the existing two-lane Bodden Town Road	1	5	5	5	3	2
Improve resiliency of the existing roadway travel route between North Side/East End and George Town/West Bay.	1	4	4	4	3	2
Support current and future traffic demand.	1	5	5	5	5	5
	1	5	5	5	4	2
Improve travel time between North Side/East End and George Town		5	5	5	4	4
Accommodate utility expansion (electricity, fiber, water, central sewerage system) *	1	5	5	5	3	1
Provide opportunity to safely accommodate and expand public transportation *	1	5	5	5	4	3
	1	4	4	4	3	2
Reduce tourism travel time between North Side/East End and George Town		5	5	5	4	4
		4	4	4	3	3
Improve safe vehicular travel by reducing roadway conflict points	1	5	5	5	4	1
	1	5	5	5	3	1
Provide opportunity for enhanced and safe pedestrian and bicycle travel	1	5	5	5	5	5
CSFs Total	***10 out of 50***	***62 out of 65***	***62 out of 65***	***62 out of 65***	***48 out of 65***	***35 out of 65***

Rankings: 5 represents the best possible score, 1 represents the worst possible score

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

3 Environmental Constraints - Natural

The Environmental Constraints – Natural are identified as sensitive environmental resources. The goal of the longlist evaluation is to develop alternatives that best meet the identified purpose and needs while avoiding and minimizing direct impacts to environmental constraints and to provide for mitigation measures for unavoidable environmental impacts. These identified Environmental Constraints were developed based on provided geospatial data from the Cayman Islands Department of Environment (DoE) and desktop analysis. Table 3 below lists the constraints evaluated. Details regarding ranking systems are provided below the table for each Criteria.

Table 3 - Environmental Constraints – Natural List

Criteria	Target
j. Avoid or Minimize Disturbance/Impacts to Areas of Ecologically Valuable Habitat	Amount of species habitat intersected and location within habitat (adjacent, bisecting, etc.)
k. Avoid or Minimize Disturbance/Impacts to National Trust-Owned Natural Properties	Amount of property intersected and location
l. Avoid or Minimize Disturbance/Impacts to Freshwater Lens	Amount of property intersected and location
m. Avoid or Minimize Disturbance/Impacts to Mastic Reserve	Amount of property intersected
n. Avoid or Minimize Disturbance/Impacts to Land or Areas protected under the NCA[1]	Amount of property intersected and functionality
o. Avoid or Minimize Disturbance/Impacts to the Central Mangrove Wetland	Amount of property intersected

The target of this section is to rank potential impacts to identified Environmental Constraints. The ranking for these criteria is based on the likelihood that an impact could occur and the scale of the impact if it were to occur (see Table below). To avoid scoring bias, each of the alternatives was scored independently of the other alternatives based on direct impacts to resources for that specific alternative. If there were multiple resources identified within a specific criterion, then each was considered in the evaluation, however, an overall score was provided for that single criterion. For example, under Criterion J, impacts were not weighted by individual species, rather, the impact ranking was based on total impacts to ecologically valuable habitats across all species. Direct impacts to resources were assumed if the resource is within 110 feet of the roadway centerline. Secondary impacts will be assessed as part of the next phase alternatives analysis (Shortlist Evaluation). This longlist evaluation solely focused on direct impacts.

[1] 2013 National Conservation Act (NCA)

Scale of Impact

Likelihood

	Negligible	**Minor**	**Moderate**	**Significant**	**Severe**
Very Likely	Low Impact	Medium Impact	High Impact	Very High Impact	Very High Impact
Likely	Very Low Impact	Low Impact	Medium Impact	High Impact	Very High Impact
Possible	Very Low Impact	Low Impact	Medium Impact	High Impact	High Impact
Unlikely	Very Low Impact	Low Impact	Low Impact	Medium Impact	High Impact
Very Unlikely	Very Low Impact	Very Low Impact	Low Impact	Medium Impact	Medium Impact

j) Avoid or Minimize Disturbance/Impacts to Areas of Ecologically Valuable Habitat

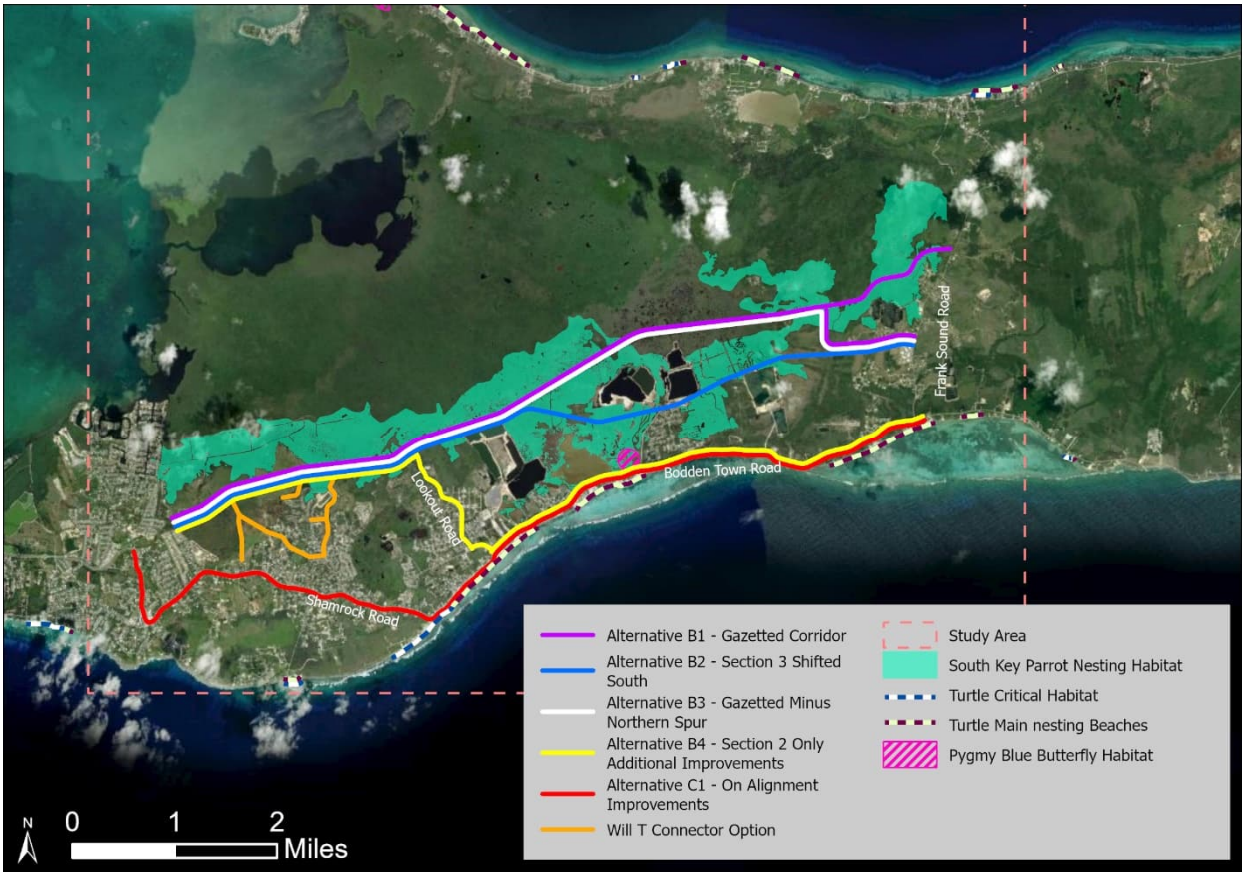
In this analysis, habitat containing one or more identified species is considered to be Ecologically Valuable Habitat. Geospatial data provided by the DoE regarding species habitat included the South Key parrot, Cuban white-shouldered bat, Cayman pygmy blue butterfly, marine turtle nesting, marine turtle critical habitat, white tailed tropicbird, *Pisonia margaratae*, and *Aegiphilia caymanensis* (Mint). Only the species habitats which were identified to be within 110 feet of an alternative are discussed below. Figure 3 is a map of the corresponding habitats.

1. Planned Future Roadway Infrastructure (No-Build): Direct impact for the Planned Future Roadway Infrastructure is *Very Unlikely* and scale of direct impact would be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative would intersect a large portion of the parrot nesting habitat (DoE South Key Parrot Nesting Habitat geospatial data provided August 2023). Therefore, direct impact from B1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
3. B2: This alternative would intersect a large portion of the parrot nesting habitat (DoE South Key Parrot Nesting Habitat geospatial data provided August 2023). However, based upon EAB input, a majority of the identified habitat is already disturbed. Therefore, direct impact from B2 is *Very Likely* and scale of direct impact could be *Moderate*; therefore, it is ranked as High Impact.
4. B3: This alternative would intersect a large portion of the parrot nesting habitat (DoE South Key Parrot Nesting Habitat geospatial data provided August 2023). Therefore, direct impact from B3 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
5. B4: This alternative is located adjacent to Marine Turtle Nesting Beaches and Marine Turtle Critical Habitat (DoE Geospatial data provided November 2022, last updated 2018). Additionally, this alternative intersects southern areas of parrot nesting habitat and is adjacent to pygmy blue butterfly habitat (DoE South Key Parrot Nesting Habitat and Pygmy Blue Butterfly Habitat geospatial data provided August 2023 and November

2022 respectively). Therefore, direct impact from B4 is *Very Likely* and scale of direct impact could be *Minor*; therefore, it is ranked as Medium Impact.

6. C1: This alternative is located adjacent to Marine Turtle Nesting Beaches and Marine Turtle Critical Habitat (DoE Geospatial data provided November 2022, last updated 2018). Additionally, this alternative intersects southern areas of parrot nesting habitat and is adjacent to pygmy blue butterfly habitat (DoE South Key Parrot Nesting Habitat and Pygmy Blue Butterfly geospatial data provided November 2022). Therefore, direct impact from C1 is *Possible* and scale of direct impact could be *Minor*; therefore, it is ranked as Low Impact.

Figure 3 – Map of Alternatives and Identified Species Habitat



Credits: Turtle Habitat and Nesting Area, and Pygmy Blue Butterfly Habitat (2022) and South Key Parrot Habitat (2023) from Cayman Islands Department of Environment; basemap from Maxar (2023).

k) Avoid or Minimize Disturbance/Impacts to National Trust-Owned Natural Properties

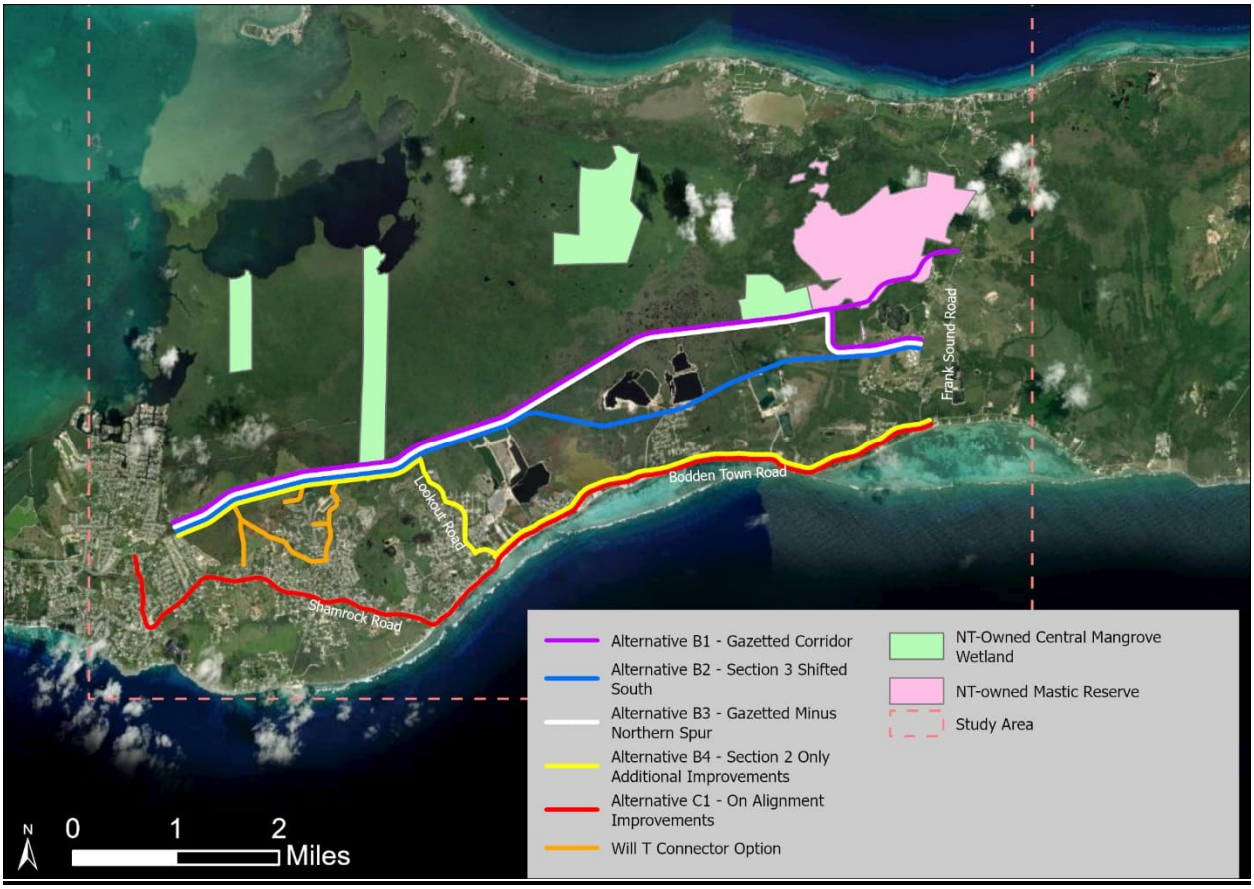
Figure 4 is a map of the National Trust-Owned Natural Properties.

1. Planned Future Roadway Infrastructure (No-Build): National Trust-Owned natural property impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative crosses the southern portion of two National Trust-owned land parcels in the Central Mangrove Reserve and southern portions of National Trust-owned

Mastic Reserve, including crossing the Mastic Trail (from July 2023 parcel ownership data provided by the National Trust for the Cayman Islands and November 2022 DoE geospatial data). Impacts for B1 are *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.

3. B2: This alternative crosses the southern portion of one parcel of National Trust-owned Central Mangrove Wetland (from July 2023 parcel ownership data provided by the National Trust for the Cayman Islands). Impacts for B2 are *Likely* and scale of direct impact could be *Moderate*; therefore, it is ranked as Medium Impact.
4. B3: This alternative crosses the southern portion of two Trust-owned Central Mangrove Wetland parcels and a small southern portion of the Mastic Reserve (July 2023 parcel excel sheet provided by the National Trust for the Cayman Islands). Due to the cumulation of multiple parcel impacts and sensitivity of the Mastic Reserve, impacts for B3 are *Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.
5. B4: This alternative crosses the southern portion of one parcel of National Trust-owned Central Mangrove Wetland (from July 2023 parcel ownership data provided by the National Trust for the Cayman Islands). Impacts for B4 are *Likely* and scale of direct impact could be *Moderate*; therefore, it is ranked as Medium Impact.
6. C1: National Trust-Owned natural property impacts for Alternative C1 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.

Figure 4 – National-Trust Owned Natural Properties



Credits: National Trust properties from Cayman Islands Department of Environment (2022); basemap from Maxar (2023)

l) Avoid or Minimize Disturbance/Impacts to Freshwater Lens

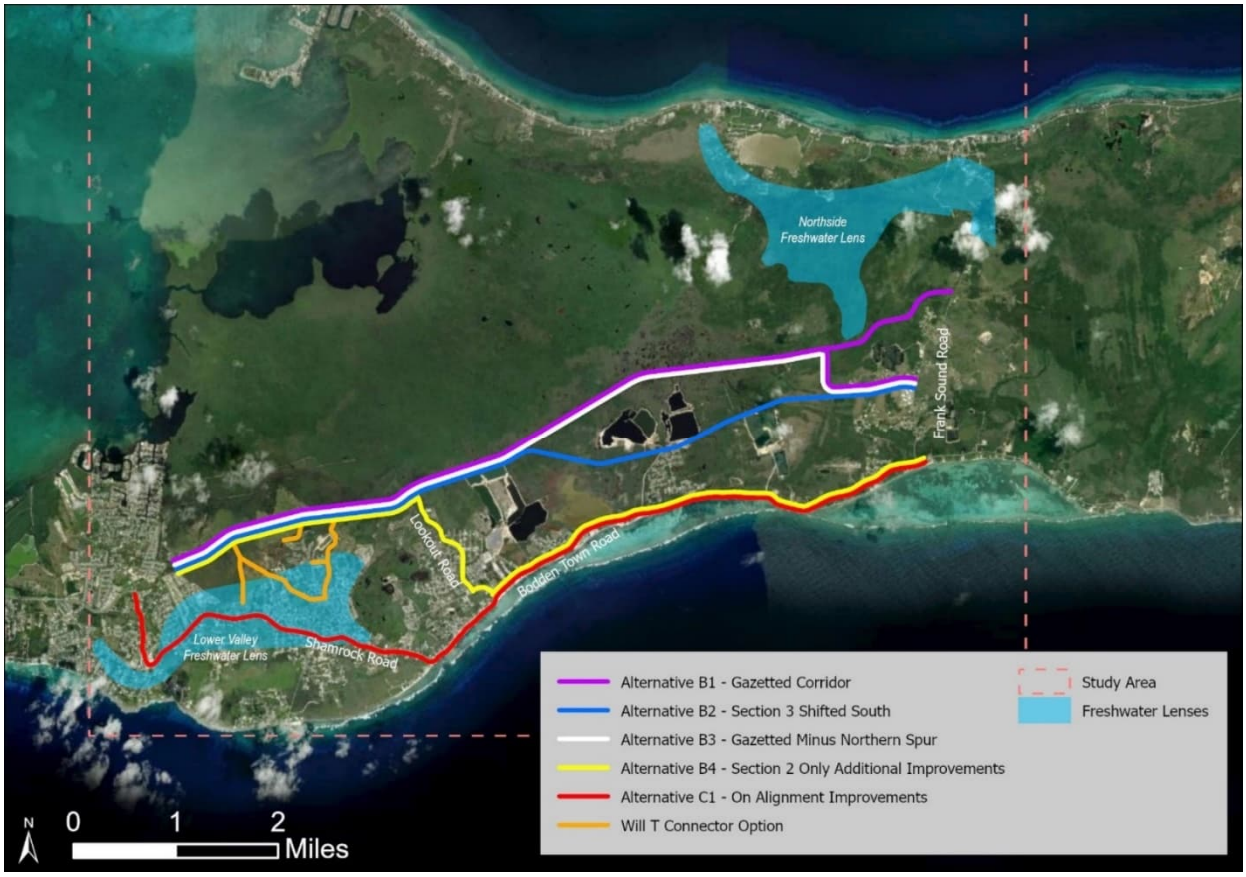
Figure 5 is a map of the Freshwater Lenses.

1. Planned Future Roadway Infrastructure (No-Build): Direct impact for the Planned Future Roadway Infrastructure is *Very Unlikely* and scale of direct impact would be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative is located immediately south of the North Side Lens and includes the Will T Connector Option, which overlies approximately 1 mile of the Lower Valley Lens (DoE geospatial data provided November 2022). Due to the potential for construction and operational runoff and impact to natural flow and infiltration patterns, direct impact from B1 is *Possible* and scale of direct impact could be *Moderate*; therefore, it is ranked as Medium Impact.
3. B2: This alternative is located approximately 0.25 miles from the identified freshwater lenses; therefore, construction and operational runoff are not anticipated to be impacts. However, this alternative includes the Will T Connector Option, which overlies approximately 1 mile of the Lower Valley Lens (DoE geospatial data provided

November 2022). Therefore, direct impact from B2 is *Unlikely* and scale of direct impact could be *Moderate*; therefore, it is ranked as Low Impact.

4. B3: This alternative is located south of the North Side Lens and includes the Will T Connector Option, which overlies approximately 1 mile of the Lower Valley Lens (DoE geospatial data provided November 2022). Due to the potential for construction and operational runoff and impact to natural flow and infiltration patterns, direct impact from B3 is *Possible* and scale of direct impact could be *Moderate*; therefore, it is ranked as Low Impact.
5. B4: This alternative is located approximately 0.25 miles from the identified freshwater lenses; therefore, construction and operational runoff are not anticipated to be impacts. However, this alternative includes the Will T Connector Option, which overlies approximately 1 mile of the Lower Valley Lens (DoE geospatial data provided November 2022). Therefore, direct impact from B4 is *Unlikely* and scale of direct impact could be *Moderate*; therefore, it is ranked as Low Impact.
6. C1: This alternative would overlie approximately 2.5 miles of the Lower Valley Lens (DoE geospatial data provided November 2022). Due to potential construction and operational runoff and increased impervious surface area, direct impact from C1 is *Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.

Figure 5 – Map of Alternatives and Freshwater Lenses



Credits: Freshwater lenses from Cayman Islands Department of Environment (2022); basemap from Maxar (2023)

m) Avoid or Minimize Disturbance/Impacts to Mastic Reserve

Figure 6 is a map of the Mastic Reserve.

1. Planned Future Roadway Infrastructure (No-Build): Direct impact for the Planned Future Roadway Infrastructure is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative intersects and is parallel to the entire southern edge of the Mastic Reserve based upon geospatial data provided by the DoE on July 19, 2023. Therefore, direct impact for B1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
3. B2: Direct impact for B2 is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
4. B3: This alternative intersects the southwestern corner of the Mastic Reserve based upon geospatial data provided by the DoE on July 19, 2023. Therefore, direct impact for B3 is *Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.
5. B4: Direct impact for B4 is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
6. C1: Direct impact for C1 is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.

n) Avoid or Minimize Disturbance/Impacts to Land or Areas Protected under the NCA

Figure 6 is a map of Meagre Bay Pond, which is identified as the only Land or Area Protected under the NCA that could potentially be directly impacted by any of the longlist of alternatives. Overall, it was determined that due to the location of the new roadway and the hydrologic patterns of the area that Alternatives B1, B2, and B3 may result in a direct impact on the hydrological function in the area of Meagre Bay Pond. The existing roadway Alternatives B4 and C1 would be located directly within the buffer area of Meagre Bay Pond, and therefore, would also result in a direct impact.

1. Planned Future Roadway Infrastructure (No-Build): Direct impact for the Planned Future Roadway Infrastructure on NCA land is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: Direct impact for B1 on NCA land is *Possible* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.
3. B2: Direct impact for B2 on NCA land is *Possible* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.
4. B3: Direct impact for B3 on NCA land is *Possible* and scale of direct impact could be *Significant*; therefore, it is ranked as High Impact.
5. B4: This alternative is located within the 300-foot habitat buffer for NCA-protected land Meagre Bay Pond (DoE geospatial data provided November 2022). Direct impact for B4 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
6. C1: This alternative is located within the 300-foot buffer for NCA-protected land Meagre Bay Pond (DoE geospatial data provided November 2022). Direct impact for

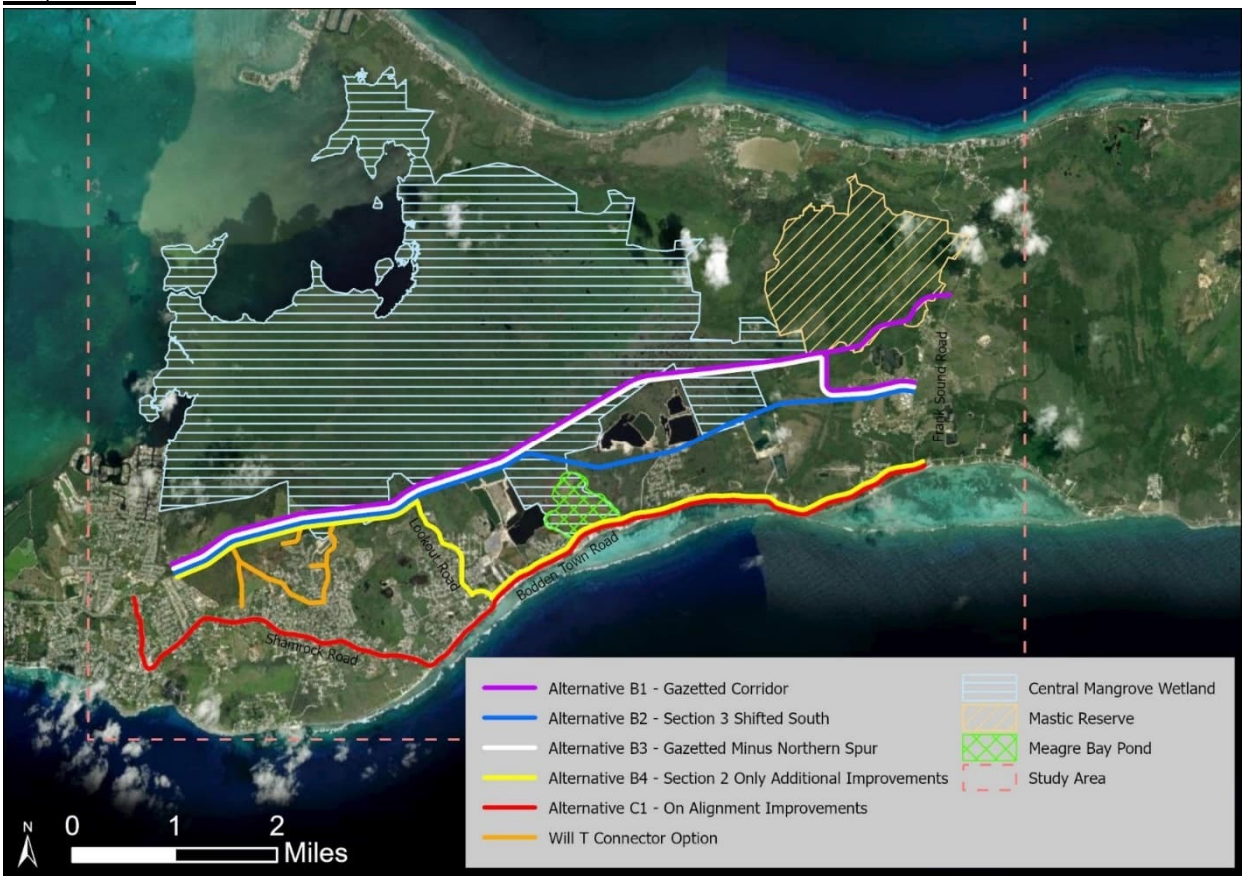
C1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, ranked as Very High Impact.

o) Avoid or Minimize Disturbance/Impacts to the Central Mangrove Wetland

Figure 6 is a map of the Central Mangrove Wetland.

1. Planned Future Roadway Infrastructure (No-Build): Direct impact for the Planned Future Roadway Infrastructure is *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: A large portion of this alternative intersects the Central Mangrove Wetland based upon geospatial data provided by the DoE on July 19, 2023. Direct impact for B1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
3. B2: A large portion of this alternative intersects the Central Mangrove Wetland based upon geospatial data provided by the DoE on July 19, 2023. Direct impact for B1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
4. B3: A large portion of this alternative intersects the Central Mangrove Wetland based upon geospatial data provided by the DoE on July 19, 2023. Direct impact for B1 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
5. B4: This alternative intersects a portion of the south-western and southern edges of the Central Mangrove Wetland based upon geospatial data provided by the DoE on July 19, 2023. Direct impact for B4 is *Very Likely* and scale of direct impact could be *Moderate*; therefore, it is ranked as High Impact.
6. C1: This alternative intersects with the southern edge of the Central Mangrove Wetland based upon geospatial data provided by the DoE on July 19, 2023. Direct impact for C1 is *Very Likely* and scale of direct impact could be *Minor*; therefore, it is ranked as Medium Impact.

Figure 6 – Map of Alternatives, Central Mangrove Wetland, Mastic Reserve, and Meagre Bay Pond



Credits: Central Mangrove Wetland, Mastic Reserve, and Meagre Bay Pond from Cayman Islands Department of Environment (2022); basemap from Maxar (2023)

Table 4 - Environmental Constraints – Natural Evaluation

Evaluation Criteria	Alignments					
	No-Build	**B1**	**B2**	**B3**	**B4**	**C1**
Avoid or Minimize Disturbance/Impacts to Areas of Ecologically Valuable Habitat	*5*	*1*	*2*	*1*	*3*	*4*
Avoid or Minimize Disturbance/Impacts to National Trust-Owned Natural Properties	*5*	*1*	*3*	*2*	*3*	*5*
Avoid or Minimize Disturbance/Impacts to Freshwater Lens	*5*	*3*	*4*	*4*	*4*	*2*
Avoid or Minimize Disturbance/Impacts to Mastic Reserve	*5*	*1*	*5*	*2*	*5*	*5*
Avoid or Minimize Disturbance/Impacts to Land or Areas protected under the NCA	*5*	*2*	*2*	*2*	*1*	*1*
Avoid or Minimize Disturbance/Impacts to the Central Mangrove Wetland	*5*	*1*	*1*	*1*	*2*	*3*
Sub-Total: Natural	***30 out of 30***	***9 out of 30***	***17 out of 30***	***12 out of 30***	***18 out of 30***	***20 out of 30***

Rankings: 5 represents the best possible score, 1 represents the worst possible score

4 Environmental Constraints - Social

The Environmental Constraints – Social are identified sensitive social resources. These identified Environmental Constraints below were developed based on provided geospatial data, agency coordination, and desktop analysis. The constraints below do not represent all social environmental constraints, but instead focus on the most sensitive resources identified to date.

Details regarding ranking systems are provided below the table for each Criteria.

Table 5 - Environmental Constraints – Social Evaluation

Criteria	Target
p. Avoid or Minimize Built Property Relocations	Number of Residential relocations Number of Commercial relocations Number of Community Facility relocations
q. Avoid or Minimize Disturbance/Impacts to Historic (Built) National Trust-Owned Properties	Number of sites affected and functionality
r. Avoid or Minimize Disturbance/Impacts to Historic Overlay Zones	Amount of property affected
s. Avoid or Minimize Disturbance/Impacts to the Mastic Trail	Amount of potential effect
t. Avoid or Minimize Disturbance/Impacts to built Cultural Heritage Sites (Heritage Register and Cemeteries)	Number of sites affected and functionality
u. Avoid or Minimize Impacts to Community/Neighbourhood Cohesion	Number of residential neighbourhoods bisected

The target of this section is to rank potential impacts to identified Environmental Constraints. The ranking for each criterion is based on the likelihood that an impact would occur and the scale of the impact if it were to occur (see Table below). Direct impacts to resources were assumed if the resource is within 110 feet of the alignment centerline.

Scale of Impact →

Likelihood ↑

	Negligible	**Minor**	**Moderate**	**Significant**	**Severe**
Very Likely	Low Impact	Medium Impact	High Impact	Very High Impact	Very High Impact
Likely	Very Low Impact	Low Impact	Medium Impact	High Impact	Very High Impact
Possible	Very Low Impact	Low Impact	Medium Impact	High Impact	High Impact
Unlikely	Very Low Impact	Low Impact	Low Impact	Medium Impact	High Impact
Very Unlikely	Very Low Impact	Very Low Impact	Low Impact	Medium Impact	Medium Impact

p) Avoid or Minimize Built Property Relocations

1. Planned Future Roadway Infrastructure (No-Build): Property relocations for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative is primarily located through undeveloped area. It has the potential for limited isolated property impacts near the Frank Sound southern terminus and from the Will T Connector Option. Property relocation for B1 is *Possible* and scale of direct impact could be *Minor*; therefore, it is ranked as Low Impact.
3. B2: This alternative is primarily located through undeveloped area. It has the potential for limited isolated property impacts near Midland Acres, Clifton Hunter High School, and from the Will T Connector Option. Property relocation for B2 is *Possible* and scale of direct impact could be *Minor*; therefore, it is ranked as Low Impact.
4. B3: This alternative is primarily located through undeveloped area. It has the potential for limited isolated property impacts near the Frank Sound terminus and from the Will T Connector Option. Property relocation for B3 is *Possible* and scale of direct impact could be *Minor*; therefore, it is ranked as Low Impact.
5. B4: This alternative could require numerous relocations of both residential and commercial properties to widen/elevate the existing roadway network. Property relocation for B4 is *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
6. C1: This alternative could require numerous relocations of both residential and commercial properties to widen/elevate the existing roadway network. Property relocation for C1 is *Very Likely* and scale of direct impact could be *Severe*; therefore, it is ranked as Very High Impact.

q) Avoid or Minimize Disturbance/Impacts to Historic (Built) National Trust owned Historic/Cultural properties

1. Planned Future Roadway Infrastructure (No-Build): Cultural site National Trust impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: Cultural site National Trust impacts for the B1 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
3. B2: Cultural site National Trust impacts for the B2 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
4. B3: Cultural site National Trust impacts for the B3 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
5. B4: Cultural site National Trust impacts for the B4 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
6. C1: This alternative is adjacent to and could likely impact parcel 300 in Block 44B, which is National Trust-owned. This parcel contains the Bodden Town Guard House (from July 2023 parcel ownership data provided by the National Trust for the Cayman Islands). Alternative C1 is likely to have a significant impact on the functionality of the Guard House due to the limited size of the resource and proposed roadway

widening/elevating. Impacts for C1 are *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.

r) Avoid or Minimize Disturbance/Impacts to Historic Overlay Zones

1. Planned Future Roadway Infrastructure (No-Build): Historic Overlay Zone impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: Historic Overlay Zone impacts for the B1 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
3. B2: Historic Overlay Zone impacts for the B2 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
4. B3: Historic Overlay Zone impacts for the B3 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
5. B4: Historic Overlay Zone impacts for the B4 Alternative are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
6. C1: Alternative C1 is located with the Historic Overlay Zone on Bodden Town Road (Development Plan 1997 for the Cayman Islands). Impacts for C1 are *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.

s) Avoid or Minimize Disturbance/Impacts to the Mastic Trail

1. Planned Future Roadway Infrastructure (No-Build): Mastic Trail impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative crosses the Mastic Trail. Impacts for B1 are *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.
3. B2: Mastic Trail impacts for B2 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
4. B3: Mastic Trail impacts for B3 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
5. B4: Mastic Trail impacts for B4 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
6. C1: Mastic Trail impacts for C1 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.

t) Avoid or Minimize Disturbance/Impacts to built Cultural Heritage Sites (Heritage Register and Cemeteries)

1. Planned Future Roadway Infrastructure (No-Build): Cultural heritage site impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: Cultural heritage site impacts for B1 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
3. B2: Cultural heritage site impacts for B2 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.

4. B3: Cultural heritage site impacts for B3 are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
5. B4: Alternative B4 is adjacent to three parcels containing cemeteries; these parcels sit adjacent to the alternative and could likely be impacted by any required widening/elevating (data provided by NRA on July 31, 2023). Impacts for B4 are *Very Likely* and scale of direct impact could be *Moderate*; therefore, it is ranked as High Impact.
6. C1: Alternative C1 is adjacent to four known Heritage Register properties and several other properties of cultural significance; these parcels sit adjacent to alternative C1 and could likely be impacted by any required widening/elevating (National Trust Heritage Register Website, retrieved 20 July 2023). Additionally, seven parcels containing cemeteries are located adjacent to the C1 alternative (Data provided by NRA on July 31, 2023). Impacts for C1 are *Very Likely* and scale of direct impact could be *Significant*; therefore, it is ranked as Very High Impact.

u) Avoid or Minimize Impacts to Community/Neighbourhood Cohesion

1. Planned Future Roadway Infrastructure (No-Build): Community Cohesion impacts for the Planned Future Roadway Infrastructure are *Very Unlikely* and scale of direct impact could be *Negligible*; therefore, it is ranked as Very Low Impact.
2. B1: This alternative is primarily through undeveloped area with no existing communities or neighbourhoods. Potential isolated community impacts near the Frank Sound terminus and from the Will T Connector Option exist. Impacts for B1 are *Possible* and scale of impact could be *Minor*; therefore, it is ranked as Low Impact.
3. B2: This alternative is primarily through undeveloped area with no existing communities or neighbourhoods. Potential isolated community impacts near Midland Acres, Clifton Hunter High School, and from the Will T Connector Option exist. Impacts for B3 are *Possible* and scale of impact could be *Minor*; therefore, it is ranked as Low Impact.
4. B3: This alternative is primarily through undeveloped area with no existing communities or neighbourhoods. Potential isolated community impacts near the Frank Sound terminus and from the Will T Connector Option exist. Impacts for B2 are *Possible* and scale of impact could be *Minor*; therefore, it is ranked as Low Impact.
5. B4: This alternative could require numerous relocations of both residential and commercial properties to widen/elevate the existing roadway section. This alternative would also create a wider roadway, which could require proper pedestrian crossing areas to maintain community connectivity. This alternative could disjoin numerous communities and neighbourhoods. Temporary traffic impacts during construction due to detours may restrict or delay access to schools and government Buildings. Impacts for B4 are *Very Likely* and scale of impact could be *Significant*; therefore, it is ranked as Very High Impact.
6. C1: This alternative could require a significant number of relocations of both residential and commercial properties to widen/elevate the existing roadway. This alternative would also create a wider roadway, which could require proper pedestrian crossing areas

to maintain community connectivity. This alternative could disjoin numerous dense communities and neighbourhoods. Temporary traffic impacts during construction due to detours may restrict or delay access to schools and government Buildings. Therefore, impacts for C1 are *Very Likely* and scale of impact could be *Significant*; therefore, it is ranked as Very High Impact.

Table 6 - Environmental Constraints – Social Evaluation

Evaluation Criteria	Alignments					
	No-Build	B1	B2	B3	B4	C1
Avoid or Minimize Built Property Relocations	*5*	*4*	*4*	*4*	*1*	*1*
Avoid or Minimize Disturbance/Impacts to Historic (Built) National Trust-Owned Properties	*5*	*5*	*5*	*5*	*5*	*1*
Avoid or Minimize Disturbance/Impacts to Historic Overlay Zones	*5*	*5*	*5*	*5*	*5*	*1*
Avoid or Minimize Disturbance/Impacts to the Mastic Trail	*5*	*1*	*5*	*5*	*5*	*5*
Avoid or Minimize Disturbance/Impacts to built Cultural Heritage Sites (Heritage Register and Cemeteries)	*5*	*5*	*5*	*5*	*2*	*1*
Avoid or Minimize Impacts to Community/Neighbourhood Cohesion	*5*	*4*	*4*	*4*	*1*	*1*
Sub-Total: Social	***30 out of 30***	***24 out of 30***	***28 out of 30***	***28 out of 30***	***19 out of 30***	***10 out of 30***

Rankings: 5 represents the best possible score, 1 represents the worst possible score

5 Engineering Constraints

The Engineering Constraints include the necessities to construct the proposed project. The goal of the project is to construct a sound and resilient roadway that best meets the identified purpose and needs for the project. The Engineering Constraints below were developed based on the anticipated constructability challenges and evaluated using professional experience and desktop analysis.

It should be noted that the avoidance of flooding to residential and commercial properties is not included as part of the Longlist Evaluation. Based upon the nature of roadway construction and the nature of Cayman, it is acknowledged that all alternatives have the potential to impact flooding to properties within the identified Study Area. It should be noted that detailed hydrologic modelling and evaluations will be included when more details of each alternative are better known during the shortlist evaluation. In addition, hydrology will be evaluated throughout the design of the project so that the EWA can be designed and constructed to avoid flooding impacts.

Table 7 below lists the constraints evaluated. Details regarding ranking systems are provided below the table for each Criterion.

Table 7 - Engineering Constraints Evaluation

Criteria	Target
v. Provide for sound geometric design conditions	Amount of property affected to improve roadway to achieve sound geometric design conditions
w. Provide for the areas necessary for construction	Provide areas required for construction staging and for construction activities

v) Provide for sound geometric design conditions

The target for this criterion is to evaluate the amount of property affected to achieve sound geometric design conditions for each alternative. The amount of property affected includes the area disturbed by the roadway improvements along with the disturbances which would result for connecting any cross streets, driveways and adjacent properties to the roadway. There are also engineering considerations that include providing for elevation changes, drainage needs, utility requirements, transit, pedestrian and bicycle accommodations, and safety considerations. These elements also would result in design and construction costs. Cost information will be included as part of the Shortlist and Preferred Alternative evaluations. The ranking for this criterion is focused on the ability to achieve reasonable design standards and is as follows:

- Excellent Fit – Alternative achieves reasonable design standards without challenges.
- Good Fit – Alternative achieves reasonable design standards with minor challenges.
- Reasonable Fit – Alternative achieves reasonable design standards with moderate challenges.

- Low Fit – Alternative achieves reasonable design standards with significant challenges.
- Poor Fit – Alternative presents the inability to achieve reasonable design standards.

1. Planned Future Roadway Infrastructure (No-Build): This alternative presents the inability to achieve reasonable design standards since the existing roadway facility within the study area remains as is in its current state. Therefore, it is ranked as a Poor Fit.
2. B1: This alternative achieves reasonable design standards with minor challenges as it is a new roadway facility. Therefore, it is ranked as a Good Fit.
3. B2: This alternative achieves reasonable design standards with minor challenges as it is a new roadway facility. Therefore, it is ranked as a Good Fit.
4. B3: This alternative achieves reasonable design standards with minor challenges as it is a new roadway facility. Therefore, it is ranked as a Good Fit.
5. B4: This alternative achieves reasonable design standards with moderate challenges as it is partly a new roadway facility and an existing roadway facility. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative achieves reasonable design standards with significant challenges as it is an existing roadway facility with development in proximity on either side. Therefore, it is ranked as a Low Fit.

w) Provide for the areas necessary for construction

The target for this criterion is to provide the areas required for construction staging and construction activities, while maintaining traffic/property access. The ranking for this criterion is as follows:

- Excellent Fit – No construction
- Good Fit – Alternative provides adequate space for maintenance of traffic and property access during construction.
- Reasonable Fit – Up to approximately 50% of the alternative alignment presents challenges for maintenance of traffic and property access during construction.
- Low Fit – Alternative presents significant challenges for providing construction staging and construction activities, while maintaining traffic/property access.
- Poor Fit – Alternative presents the inability to provide construction staging and construction activities, while maintaining traffic/property access.

1. Planned Future Roadway Infrastructure (No-Build): This alternative does not involve any construction as part of the EWA EIA, therefore it is ranked as an Excellent Fit.
2. B1: This alternative provides adequate space for maintenance of traffic and property access during construction as it is a new roadway facility. Therefore, it is ranked as a Good Fit.
3. B2: This alternative provides adequate space for maintenance of traffic and property access during construction as it is a new roadway facility. Therefore, it is ranked as a Good Fit.

4. B3: This alternative provides adequate space for maintenance of traffic and property access during construction as it is a new roadway facility. Therefore, it is ranked as a Good Fit.
5. B4: Up to approximately 50% of this alternative's alignment presents challenges for maintenance of traffic and property access during construction as it is partly a new roadway facility and an existing roadway facility. Therefore, it is ranked as a Reasonable Fit.
6. C1: This alternative presents significant challenges in providing construction staging and construction activities, while maintaining traffic/property access as it is an existing roadway facility with development in proximity on either side. Therefore, it is ranked as a Low Fit.

Table 8 - Engineering Constraints Evaluation

Evaluation Criteria	Alignments					
	No-Build	B1	B2	B3	B4	C1
Provide for sound geometric design conditions	*1*	*4*	*4*	*4*	*3*	*2*
Provide for the areas necessary for construction	*5*	*4*	*4*	*4*	*3*	*2*
Sub-Total: Engineering	***6 out of 10***	***8 out of 10***	***8 out of 10***	***8 out of 10***	***6 out of 10***	***4 out of 10***
Rankings: 5 represents the best possible score, 1 represents the worst possible score						

6 Cumulative Scores

The scores for the evaluations of the Critical Success Factors, Environmental Constraints – Natural, Environmental Constraints – Social, and Engineering Constraints have been tallied and are represented in Table 9 below. The Cumulative Evaluation row shows the total score of all categories for each alternative out of the highest possible score.

Table 9 – Cumulative Evaluation

CSFs and Constraints	**Planned Infra. (No-Build)**	**B1**	**B2**	**B3**	**B4**	**C1**
Critical Success Factors [max. 65]	10*	62	62	62	48	35
Environmental Constraints – Natural [max. 25]	30	9	17	12	18	20
Environmental Constraints – Social [max. 25]	30	24	28	28	19	10
Engineering Constraints [max. 10]	6	8	8	8	6	4
Cumulative Evaluation:	**76 out of 120**	**103 out of 135**	**115 out of 135**	**110 out of 135**	**91 out of 135**	**69 out of 135**
*Max. 50 for the Planned Infra. (No-Build) Critical Success Factors						

7 Conclusion and Shortlist of Alternatives

The EWA EIA Steering Committee met on August 23rd and 24th of 2023 to discuss the Longlist Alternatives Evaluation. The below are the conclusions discussed in identifying the alternatives for further studies in the Shortlist Evaluation.

Planned Future Roadway Infrastructure (No-Build) Alternative: The Planned Future Roadway Infrastructure Alternative (No-Build) is to be carried forward through the entire EIA evaluation process per the UK Greenbook guidance.

Alternative B1: This alternative would not to be carried forward because it would result in potential direct impacts to sensitive environmental features including the Mastic Reserve thus resulting in the lowest ranking for environmental impacts. In addition, since there are other Build alternatives that would result in potentially less environmental impacts, Alternative B1 was not justified for further study in the Shortlist Evaluation.

Alternative B2: This alternative was chosen to be carried forward to the Shortlist Evaluation due to its high ranking when meeting the CSFs while also providing the least potential impacts on Environmental and Social Constraints. This alternative also had the highest overall cumulative ranking.

Alternative B3: This alternative was chosen to be carried forward to the Shortlist Evaluation due to having less potential environmental impacts than Alternative B1 and accruing the second highest cumulative ranking.

Alternative B4: This alternative was chosen to be carried forward to the Shortlist Evaluation due to its ability to incorporate a new roadway section while also utilizing the existing roadway corridors. It also had the highest ranking in evaluating the potential environmental impacts.

Alternative C1: This alternative would not be carried forward based on its inability to meet the CSFs and the anticipated numerous Social Impacts along with its inability to address the numerous engineering constraints. This alternative scored the lowest in both subject areas and resulted in the lowest overall cumulative ranking.

Steering Committee's Decision on Shortlist of Alternatives:

- Planned Future Roadway Infrastructure (No-Build) Alternative
- Alternative B2
- Alternative B3
- Alternative B4

X

Digitally signed by Gina Petrie
DN: cn=Gina Petrie, o=Cayman Islands Government, ou=Department of Environment, email=gina.ebanks-petrie@gov.ky, c=US
Date: 2023.09.08 17:02:45 -05'00'

Gina Ebanks-Petrie
Environmental Assessment Board Chair

X

Edward Howard
National Roads Authority Managing Director

Attachment A

Summary of Evaluation Tables

Critical Success Factors

Evaluation Criteria	Target	Alignments					
		No-Build	B1	B2	B3	B4	C1
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	1	5	5	5	3	2
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	1	4	4	4	3	2
Support current and future traffic demand.	Provide travel lanes necessary to accommodate projected trips/vehicles	1	5	5	5	5	5
	Provide controlled access points to enter roadway facility	1	5	5	5	4	2
Improve travel time between North Side/East End and George Town	Projected travel time between North Side/East End and George Town		5	5	5	4	4
Accommodate utility expansion (electricity, fiber, water, central sewerage system) *	Establish area adjacent to roadway to provide for utility needs	1	5	5	5	3	1
Provide opportunity to safely accommodate and expand public transportation *	Establish public transportation facilities that include bus pull offs	1	5	5	5	4	3
	Improve bus travel time reliability	1	4	4	4	3	2
Reduce tourism travel time between North Side/East End and George Town	Reduce travel times from North Side to Owen Roberts International Airport		5	5	5	4	4
	Reduce travel time from Grand Cayman Cruise Port (George Town Cruise Port) to Bodden Town/North Side/East End		4	4	4	3	3
Improve safe vehicular travel by reducing roadway conflict points	Number of Cross Street Intersections along the primary east-west corridor	1	5	5	5	4	1
	Number of Driveway Access Points along the primary east-west corridor	1	5	5	5	3	1
Provide opportunity for enhanced and safe pedestrian and bicycle travel	Establish dedicated pedestrian and bicycle facilities adjacent to vehicular travel lanes	1	5	5	5	5	5
CSFs Total		***10 out of 50***	***62 out of 65***	***62 out of 65***	***62 out of 65***	***48 out of 65***	***35 out of 65***

Rankings: 5 represents the best possible score, 1 represents the worst possible score

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

Critical Constraints

Evaluation Criteria	Target	Alignments					
		No-Build	B1	B2	B3	B4	C1
Environmental Constraints - Natural							
Avoid or Minimize Disturbance/Impacts to Areas of Ecologically Valuable Habitat	Amount of species habitat intersected and location within habitat (adjacent, bisecting, etc.)	5	1	2	1	3	4
Avoid or Minimize Disturbance/Impacts to National Trust-Owned Natural Properties	Amount of property intersected and location	5	1	3	2	3	5
Avoid or Minimize Disturbance/Impacts to Freshwater Lens	Amount of property intersected	5	3	4	4	4	2
Avoid or Minimize Disturbance/Impacts to Mastic Reserve	Amount of property intersected	5	1	5	2	5	5
Avoid or Minimize Disturbance/Impacts to Land or Areas protected under the NCA	Amount of property intersected and functionality	5	2	2	2	1	1
Avoid or Minimize Disturbance/Impacts to the Central Mangrove Wetland	Amount of property intersected	5	1	1	1	2	3
Sub-Total: Natural		***30 out of 30***	***9 out of 30***	***17 out of 30***	***12 out of 30***	***18 out of 30***	***20 out of 30***
Environmental Constraints - Social							
Avoid or Minimize Built Property Relocations	Number of residential, commercial, and community facility relocations	5	4	4	4	1	1
Avoid or Minimize Disturbance/Impacts to Historic (Built) National Trust-Owned Properties	Number of sites affected and functionality	5	5	5	5	5	1
Avoid or Minimize Disturbance/Impacts to Historic Overlay Zones	Amount of property affected	5	5	5	5	5	1
Avoid or Minimize Disturbance/Impacts to the Mastic Trail	Amount of potential effect	5	1	5	5	5	5
Avoid or Minimize Disturbance/Impacts to built Cultural Heritage Sites (Heritage Register and Cemeteries)	Number of sites affected and functionality	5	5	5	5	2	1
Avoid or Minimize Impacts to Community/Neighbourhood Cohesion	Number of residential neighbourhoods bisected	5	4	4	4	1	1
Sub-Total: Social		***30 out of 30***	***24 out of 30***	***28 out of 30***	***28 out of 30***	***19 out of 30***	***10 out of 30***
Engineering Constraints							
Provide for sound geometric design conditions	Amount of property affected to improve roadway to achieve sound geometric design conditions	1	4	4	4	3	2
Provide for the areas necessary for construction	Provide areas required for construction staging and for construction activities	5	4	4	4	3	2
Sub-Total: Engineering		***6 out of 10***	***8 out of 10***	***8 out of 10***	***8 out of 10***	***6 out of 10***	***4 out of 10***
Constraints Total		***66 out of 70***	***41 out of 70***	***53 out of 70***	***48 out of 70***	***43 out of 70***	***34 out of 70***
Grand Total		***76 out of 120***	***103 out of 135***	***115 out of 135***	***110 out of 135***	***91 out of 135***	***69 out of 135***

Rankings: 5 represents the best possible score, 1 represents the worst possible score