GOVERNMENT OF BERMUDA
Ministry of Public Works and Environment

Annex I

Swing Bridge Replacement
2026

Geotechnical Information Summary

APPENDIX 5

Rev P02

GEOTECHNICAL REPORT - HIGHWAY STRUCTURE SUMMARY INFORMATION

GEOTECHNICAL REPORT
HIGHWAY STRUCTURE SUMMARY INFORMATION

STRUCTURE NAME	OS Grid Reference	Reference/ comments
Swing Bridge Replacement	555412.16m E 141133.99m N	
STRUCTURE TYPE 7-span bridge with main navigation channel	AIP Ref No 3502-RAM-SB-XX-RP-CB-30001	
DESIGN LIFE 75 Years		
RELEVANT TRIAL HOLES BH201, BH202, BH203, BH204, BH205, BH206, BH207 *(Report: Geotechnical Investigation for Two Bridges in Bermuda Islands: Longbird and St. George's Bridge, Final Report, October 2018)*		
Strata	Typical Thicknesses	

Unit Thickness (m)		Sand and Gravel	Coralline Deposits	Karst Limestone	Clayey Silt Design Layer		Karst Limestone	Silty Clay	Weathered Basalt/Basalt Breccia	Unweathered Basalt/Basalt Breccia
					Clayey Silt	*Sandy Silt*				
Swing Bridge	BH201 (Northern Abutment)	-	2.1	4.7	3.8	-	3.0	11.6	3.1	Extent not proven
	BH202 (Piers 3+4)	1.3	1.3	13.4	-	-	-	4.0	6.5	Extent not proven
	BH203 (Nose Pier)	1.7	-	9.8	-	-	-	5.6	3.6	Extent not proven
	BH204 (Lift Pier)	1.4	-	-	2.3	5.8	-	9.3	3.0	Extent not proven
	BH205 (Pier 2)	1.2	-	-	3.3	-	-	9.5	3.8	Extent not proven
	BH206 (Pier 1)	5.8	-	-	2.7	-	6.0	4.5	1.8	Extent not proven
	BH207 (Southern Abutment)	-	6.6	-	14.7	-	-	-	1.5	Extent not proven

PREVIOUS GROUND HISTORY

The historic ground use adjacent to the site is that of an airport development found on reclaimed land but more locally, an existing bridge structure.

Previous ground investigations have been undertaken on and around the site:

- Geotechnical Investigation for proposed new apron and widening of existing taxiway LF Wade International Airport (2016)
- Preliminary Geotechnical Assessment New Grotto Bay/Castle Harbour Crossing Bermuda (2007)
- St George's Town Cut Project, Geotechnical Data Report (2015)

GROUNDWATER

Groundwater was encountered on the southern (airport side) abutment location in TP203 and TP205 (On shore Test Pits dug to 3.5m)

EARTH PRESSURE VALUE k_0*	Coralline Deposits	Sand and Gravel	Silty Clays	Clayey Silts
	0.48	0.44	0.64	0.64

SOIL PARAMETERS

Stratum	Bulk Density, γ (kN/m³)	Undrained Shear Strength Parameters		Drained Shear Strength Parameters		UCS (MPa)	Hoek Brown		
		Undrained Shear Strength, c_u (kN/m²)	*Change with depth, z*	Effective Angle of Shearing Resistance Φ' (°)	Drained cohesion (kN/m²)		mb	a	s
Sand and Gravel	17.0			31	0				
Coralline Deposits	16.0			34	0				
Clayey Silt	19.0	50	0	21	0				
Silty Clay	19.0	50	21.4 kN/m²/m depth	21	0				
Karst Limestone	24.8			48	247	16	1.6	0.50	0.01
Weathered Basalt	21.3			36	181	3.2	3.383	0.51	0.002
Unweathered Basalt	23.0			62	404	30	5.99	0.50	0.01

PILE DESIGN									
Structure Element	Founding Stratum	Founding Rock Head Level (mOAD)	Pile Cap Head Level (mAOD)	Pile Length (m)	Pile Toe Level (m AOD)	Pile Diameter (mm)	Ultimate Bearing Capacity (kN)	Pile Compressive Load (Tensile Load) (kN)	
Northern Abutment	Weathered Basalt	-25.7	-0.50	25.7	-26.2	900	22135	1100 (600)	0.5m rock socket
Pier 4	Weathered Basalt	-22.0	-2.04	20.5	-22.5	900	35102	1900 (500)	0.5m rock socket
Pier 3	Weathered Basalt	-24.3	-4.29	20.5	-24.8	900	35102	2400 (900)	0.5m rock socket
Nose Pier	Weathered Basalt	-21.6	-4.50	18.1	-22.6	900	27327	2400 (900)	1m rock socket
Lift Pier	Basalt	-27.8	-6.02	23.3	-29.3	900	33889	2900 (2200)	1.5m into Basalt
Pier 2	Basalt	-24.3	-6.50	19.3	-25.8	900	35582	2400 (900)	1.5m into Basalt
Pier 1	Weathered Basalt	-21.8	-2.85	20	-22.8	900	18620	1900 (500)	1m rock socket
Southern Abutment	Basalt	-22.5	0.26	23.3	-23.0	900	30135	1100 (600)	0.5m into Basalt

Pile type……Steel Tube (Driven)
Criteria for selecting pile toe level……Strength/Stiffness of founding stratum
Allowance for negative skin friction within design……None

SETTLEMENT					
Structural Element	Founding Level (m AOD)	Immediate Settlement (mm)	Total Settlement (mm)	Time for 90%	Settlement Remaining at Completion
Not Applicable					

GROUND MOVEMENTS

Associated Earthworks	Settlement due to Embankment loading	Heave due to Cutting Excavation	Subsidence Due to Mineral Extraction	Flowing Water	Other	
Cause of Movement	Not Applicable					
Maximum Movement (mm)						
Measures to Deal with Movement						