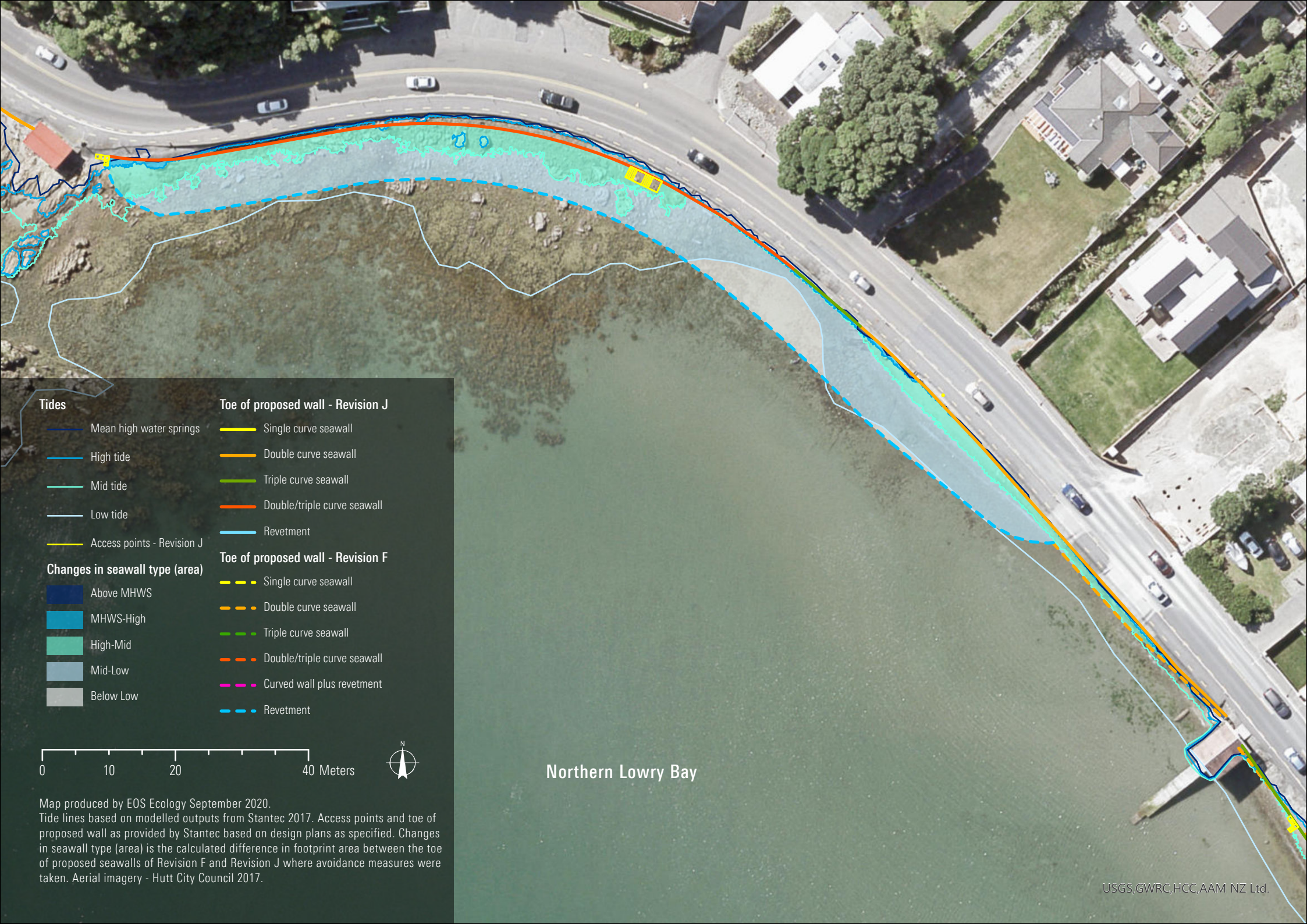
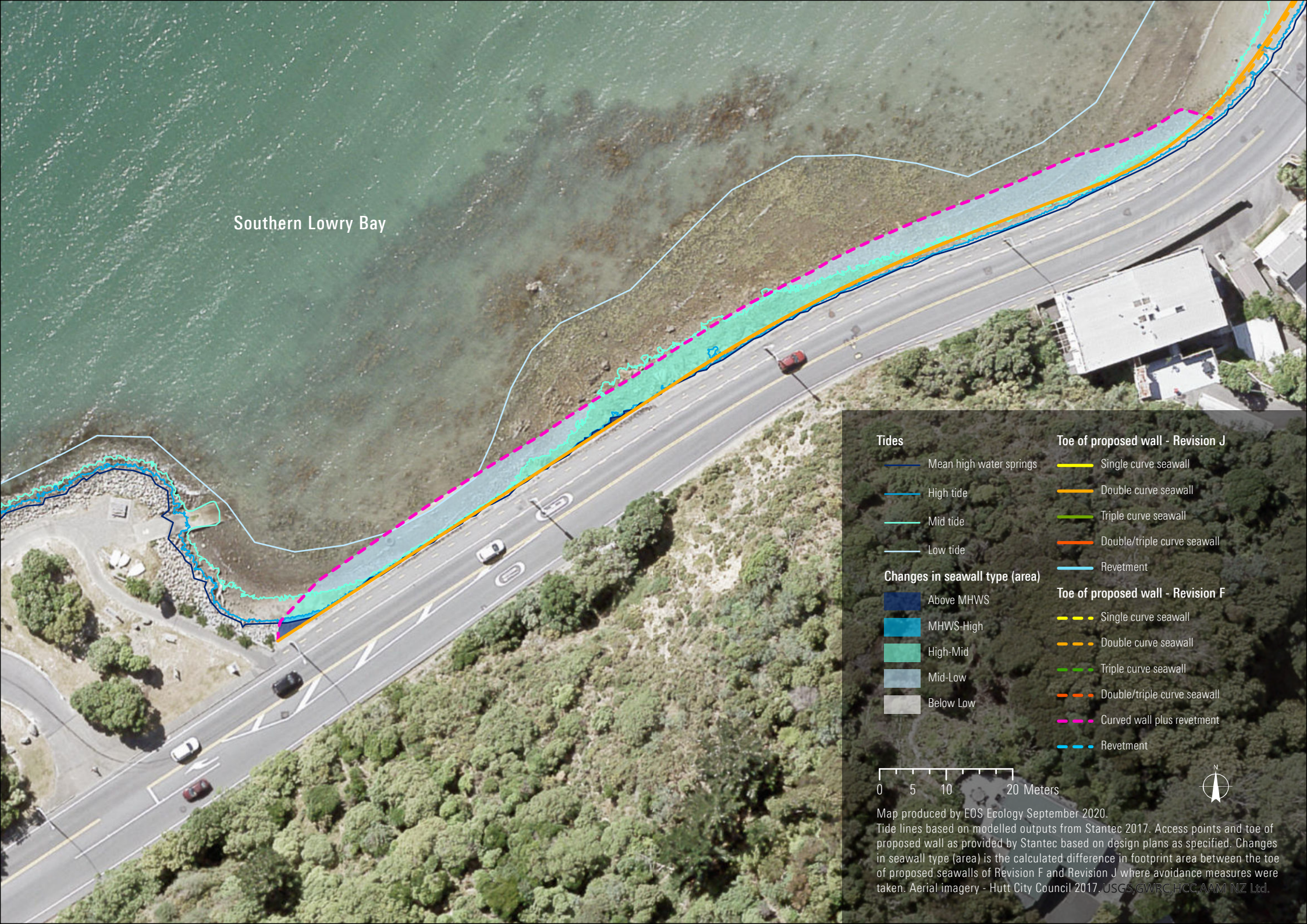
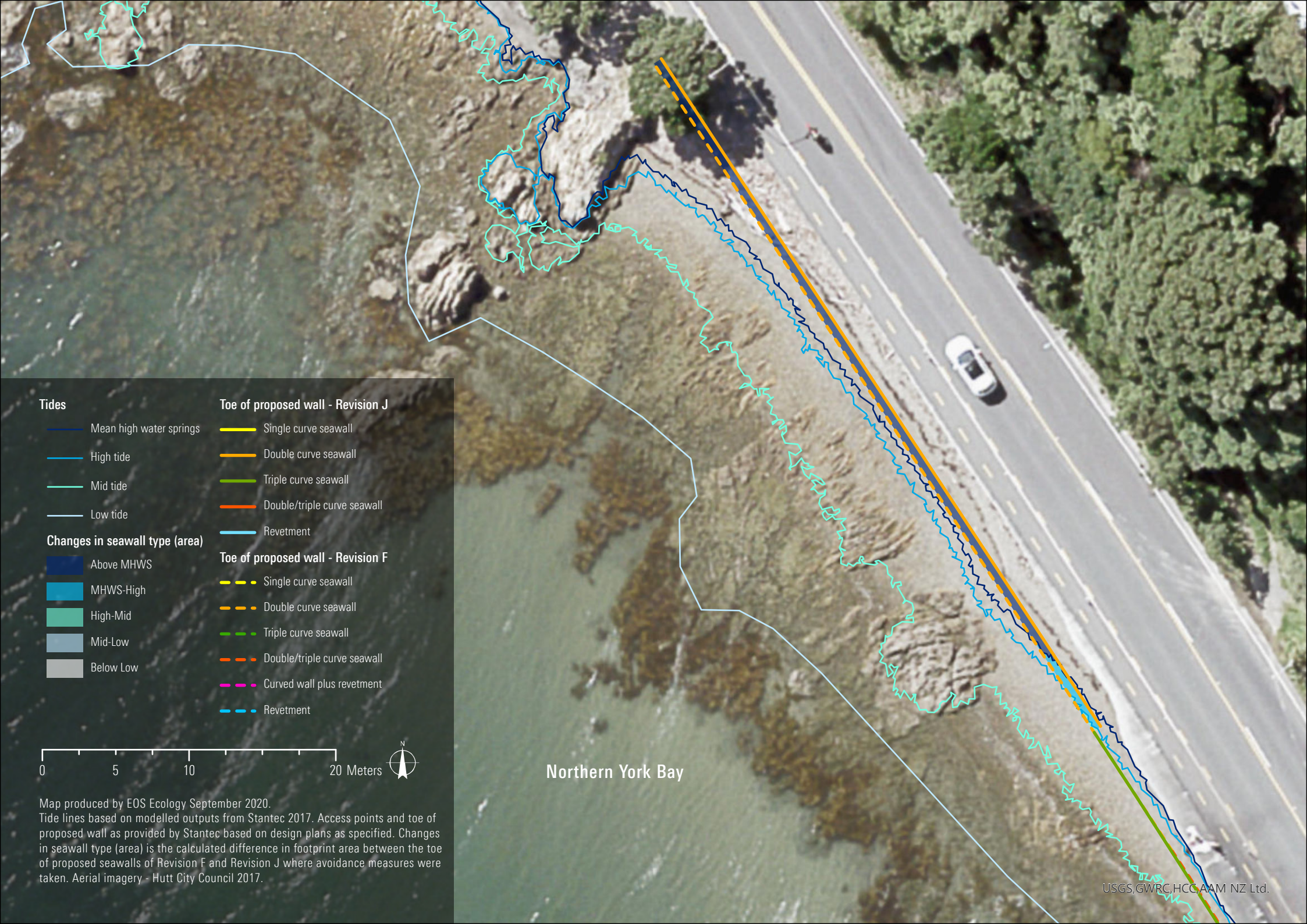
Avoidance measures - Based on Revision J	Location (if relevant)	Lineal Length (m)	Area (m2) of encroachment that was avoided						Description of how the calculation was made	Map reference pdf name	Shapefile reference (EOS Ecology)
			Above MHWS	Between MHWS-High tide line	Between High-Mid tide line	Between Mid-low tide line	Below low tide line	TOTAL			
CHANGES IN SEAWALL TYPE - Revision F compared with Revision J		**418**	**55**	**39**	**639**	**1225**	**146**	**2104**	The number in this row is a summation of the values in the 4 rows below.		
Revetement changed to double/triple curved seawall	Northern Lowry Bay	166	4	26	355	806	138	**1329**	Took the footprint of the original proposed design (Revision F) and then minused the footprint of the current proposed seawall design (Revision J) - the difference shown here is the amount of encroachment that has been avoided by using the current design. This was also broken down into the different tidal zones indicated in column D-H	Changeinseawalltype_NorthernLowry.pdf	Seawall_type_avoidance_area
Double curve wall reduced encroachment	Northern Lowry Bay	36	11	5	23	4		**43**	as per above	Changeinseawalltype_NorthernLowry.pdf	Seawall_type_avoidance_area
Curved seawall + revetment changed to double curved seawall	Southern Lowry Bay	161	11	5	261	415	8	**700**	as per above	Changeinseawalltype_SouthernLowry.pdf	Seawall_type_avoidance_area
Double curve wall reduced encroachment	Northern York Bay	55	29	3				**32**	as per above	Changeinseawalltype_NorthernYork.pdf	Seawall_type_avoidance_area
AVOIDANCE BY DESIGN IN ACCESS TYPE - Based on Revision J steps		**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	NOTE - the calculations below cannot be summed together as they present different ways to show avoidance based on a range of possible access point designs that could have been used.		
The reduction in encroachment by the design and positioning of access points as shown in Revision J compared with full steps **perpendicular** to the toe of the seawall			19	13	55	19		**106**	Took the footprint of a perpendicular full step and subtracted the footprint of the proposed access point that extends beyond the toe of the proposed wall - the remaining area (the green/blue area shown in the picture in Cell B9) is the amount of encroachment that has been avoided by using the current designed steps instead of using all perpendicular full sized steps. The calculation has been made for each individual access point and the area of avoidance has also been broken down into the different tidal zones indicated in column D-H.	StepAvoidance_Perpendicular.pdf	Steps_perpendicular_avoidance
The reduction in encroachment by the design and positioning of access points as shown in Revision J compared with full steps **parallel** to the toe of the seawall			15	16	31	7		**69**	Took the footprint of a parallel full step and subtracted the footprint of the proposed access point that extends beyond the toe of the proposed wall - the remaining area (the green/blue area shown in the picture in Cell B10) is the amount of encroachment that has been avoided by using the current designed steps instead of using all parallell full sized steps. The calculation has been made for each individual access point and the area of avoidance has also been broken down into the different tidal zones indicated in column D-H.	StepAvoidance_Parallel.pdf	Steps_parallel_avoidance
The reduction in encroachment by the design and positioning of access points as shown in Revision J compared to if those same steps were not inset back into the seawall at all.			5	4	6			**15**	Took the footprint of the part of the existing steps that is inset back into the seawall (the green area shown in the picture in Cell B11) - this is the amount of encroachment that was avoided by insetting the steps back into the seawall. The calculation has been made for each individual access point and the area of avoidance has also been broken down into the different tidal zones indicated in column D-H (this was done by siting the area of inset step on the seaward side of the propsed seawall toe to work out what tidal level it would have encroached into).	StepAvoidance_Inset.pdf	Steps_area_avoided



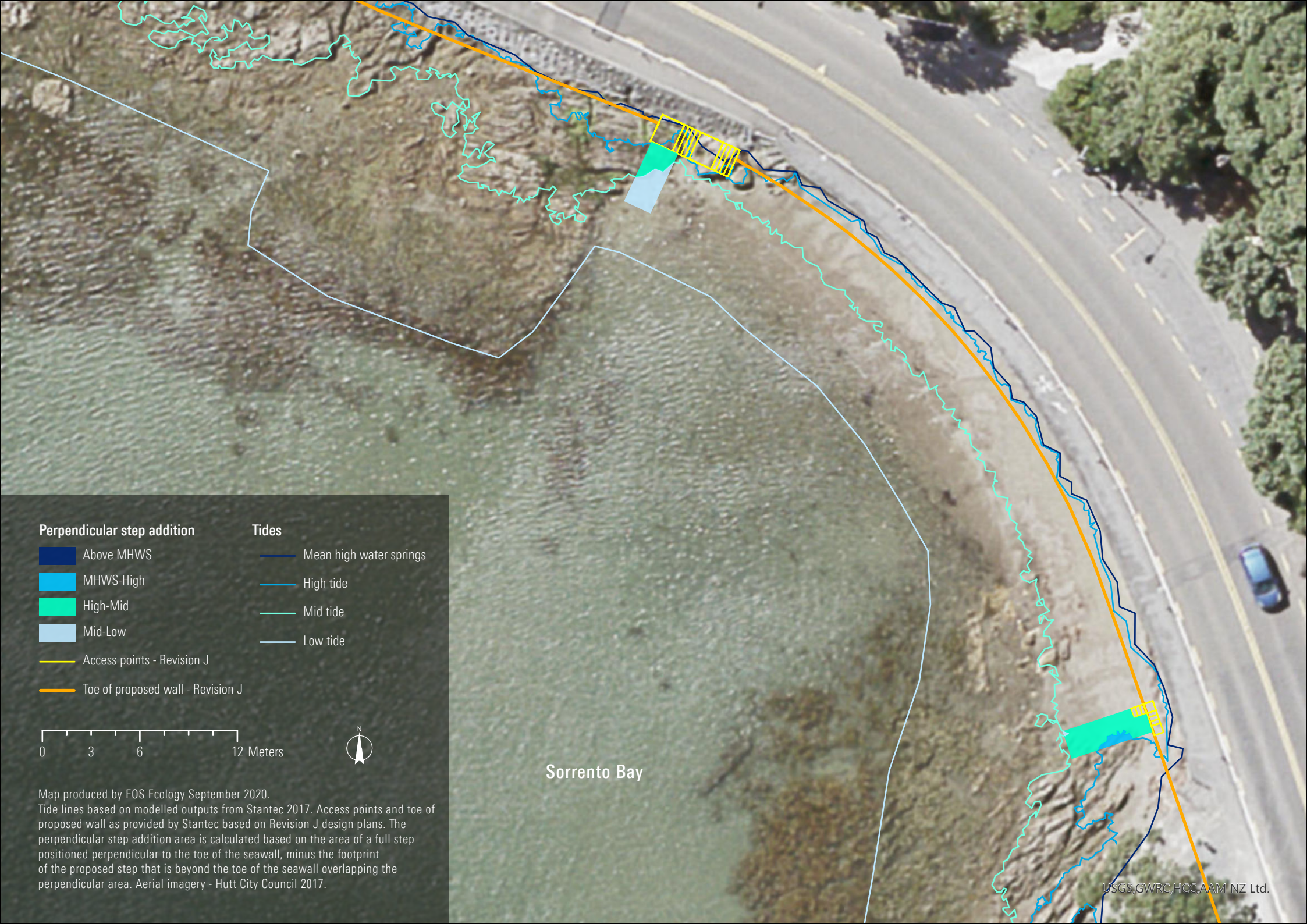
Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on design plans as specified. Changes in seawall type (area) is the calculated difference in footprint area between the toe of proposed seawalls of Revision F and Revision J where avoidance measures were taken. Aerial imagery - Hutt City Council 2017.



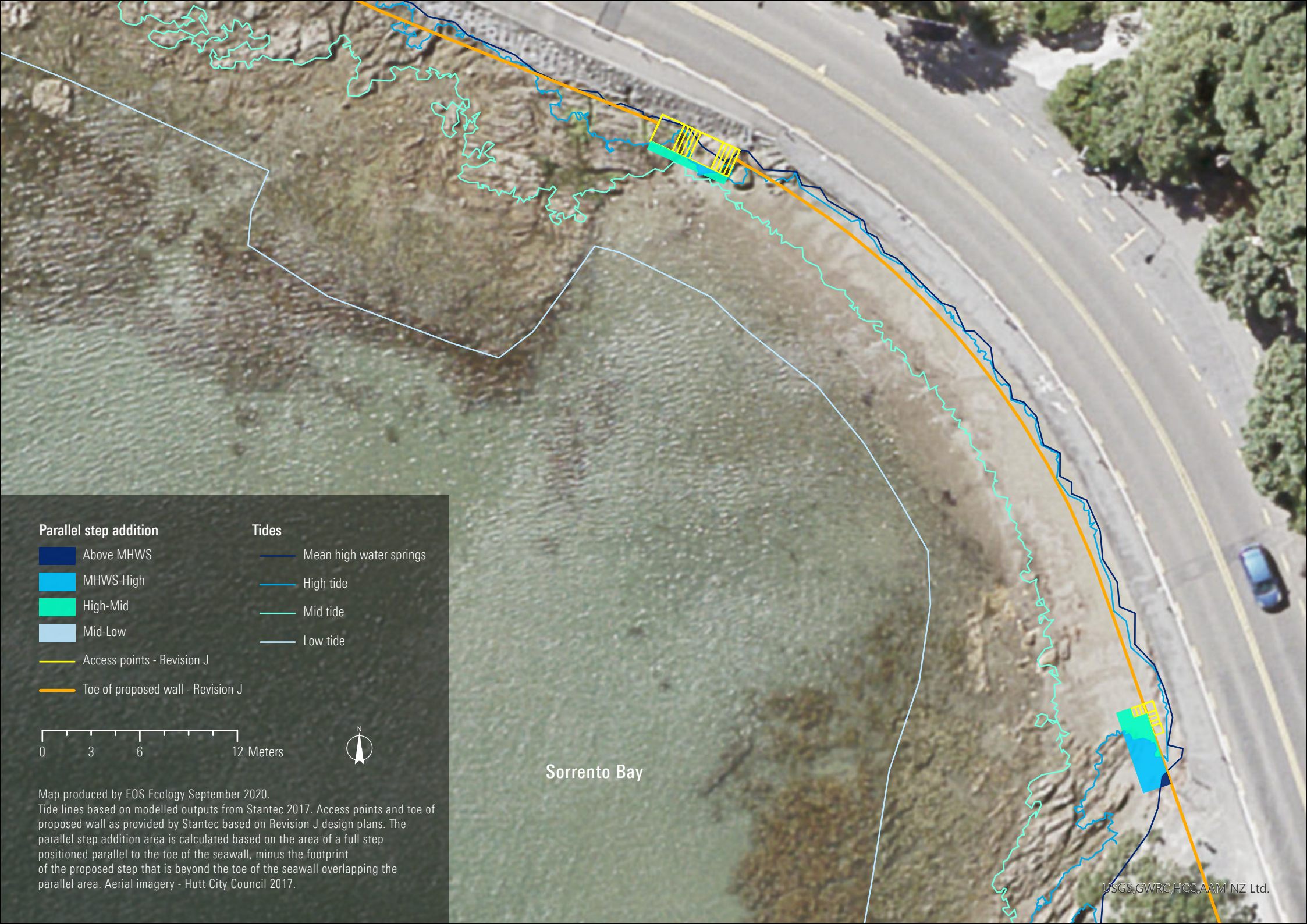
Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on design plans as specified. Changes in seawall type (area) is the calculated difference in footprint area between the toe of proposed seawalls of Revision F and Revision J where avoidance measures were taken. Aerial imagery - Hutt City Council 2017. USGS,GWRC,HCC,AAM NZ Ltd.



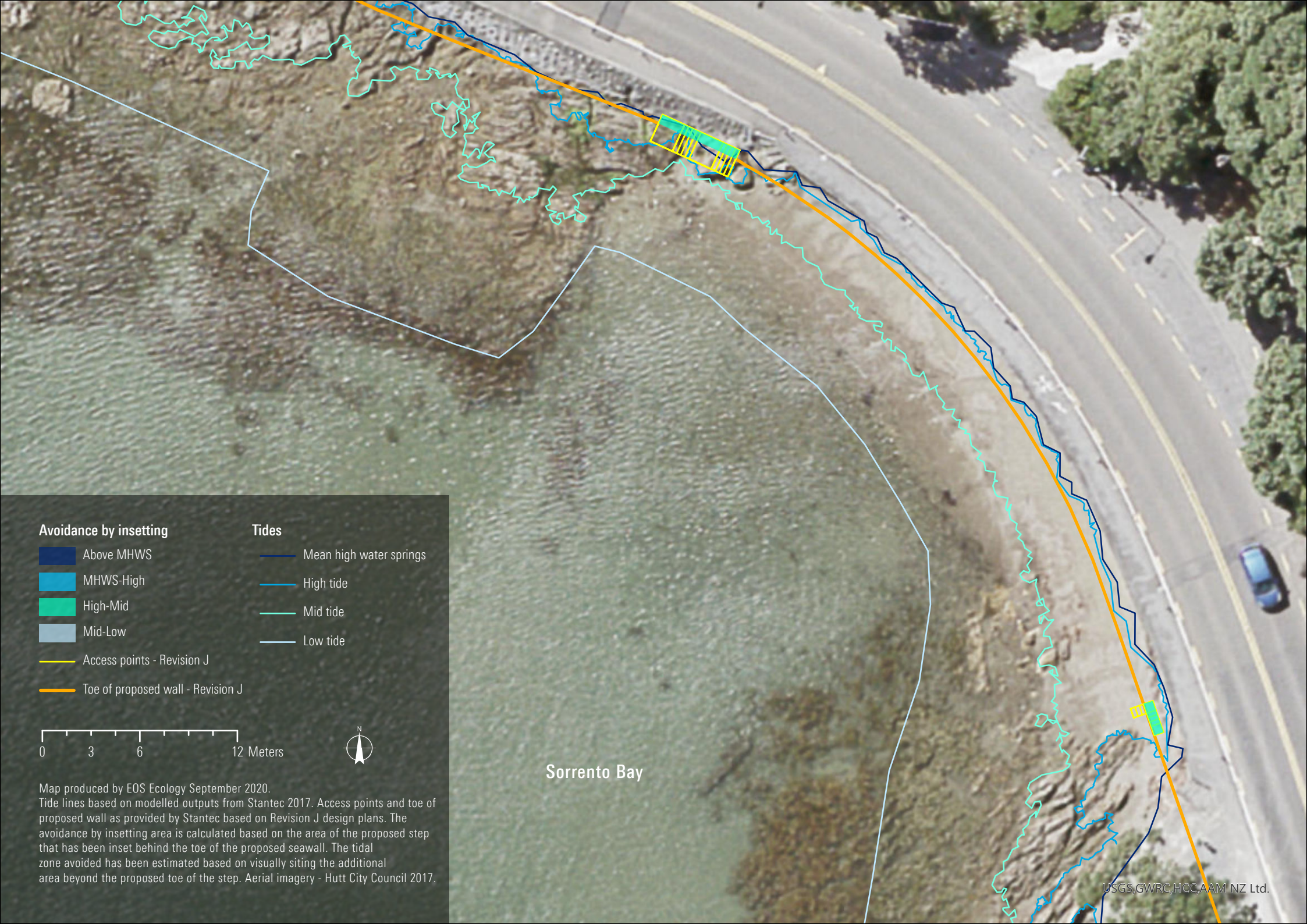
Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on design plans as specified. Changes in seawall type (area) is the calculated difference in footprint area between the toe of proposed seawalls of Revision F and Revision J where avoidance measures were taken. Aerial imagery - Hutt City Council 2017.



Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on Revision J design plans. The perpendicular step addition area is calculated based on the area of a full step positioned perpendicular to the toe of the seawall, minus the footprint of the proposed step that is beyond the toe of the seawall overlapping the perpendicular area. Aerial imagery - Hutt City Council 2017.



Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on Revision J design plans. The parallel step addition area is calculated based on the area of a full step positioned parallel to the toe of the seawall, minus the footprint of the proposed step that is beyond the toe of the seawall overlapping the parallel area. Aerial imagery - Hutt City Council 2017.



Map produced by EOS Ecology September 2020.
Tide lines based on modelled outputs from Stantec 2017. Access points and toe of proposed wall as provided by Stantec based on Revision J design plans. The avoidance by insetting area is calculated based on the area of the proposed step that has been inset behind the toe of the proposed seawall. The tidal zone avoided has been estimated based on visually siting the additional area beyond the proposed toe of the step. Aerial imagery - Hutt City Council 2017.