E.2 Water Levels

E.2.1 Astronomical Tides

Tide levels for Wellington and for Cape Palliser were taken from LINZ Data Service[1] and are presented in Table 6:

Table 6. Astronomical tidal levels (m CD) for Wellington and Cape Palliser from LINZ Data Service Wellington and Cape Palliser stations.

Location	MHWS	MHWN	MLWN	MLWS	MSL	HAT	LAT
Wellington	1.83	1.49	0.75	0.46	1.13	1.93	0.39
Cape Palliser	1.5	1.4	0.5	0.3	0.9	No information	

We can assume that the data obtained from Cape Palliser is applicable to our study area as it the closest data point available. From the table the neap tide range for Cape Palliser is 0.9 m while the spring tide range is 1.2 m. This indicates that the tidal range in Palliser Bay falls into a microtidal classification.

Table 6 acronyms are defined in LINZ Service Data[2] as follows:

- **Mean High Water Spring (MHWS) and Mean Low Water Spring (MLWS):** the average of the levels of each pair of successive high waters, and of each pair of successive low waters, during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is greatest (Spring Range)
- **Mean High Water Neaps (MHWN) & Mean Low Water Neaps (MLWN)**: the average of the levels of each pair of successive high waters, and of each pair of successive low waters, during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is least (Neap Range).
- **Highest & Lowest Astronomical Tide (HAT & LAT):** the highest and lowest tidal levels which can be predicted to occur under average meteorological conditions over 18 years. Modern chart datums are set at the approximate level of Lowest Astronomical Tide (LAT) and Tide Tables list the predicted height of tide above Chart Datum. It should be noted that water level may fall below the level of LAT if abnormal meteorological conditions are experienced.
- **Mean Sea Level (MSL):** the average level of the sea surface over a long period or the average level, which would exist in the absence of tides.

E.2.2 Storm Surge

Storm surges are associated with low atmospheric pressure and/or onshore winds which raise water levels above the normal astronomical tide levels. According to MfE (2017b), storm surge heights on open coasts around New Zealand rarely get larger than one metre. The coincidence of a storm surge with high tide, and the spring-neap tidal cycle, can cause 'extreme tide levels' (ETLs) that may result in coastal flooding (MfE, 2008).

For Cape Palliser Bay, no information on storm surge or any water level data analysis was found in the literature.

[1] LINZ Data Service standard port tidal levels: https://www.linz.govt.nz/sea/tides/tide-predictions/standard-port-tidal-levels (last accessed July 22nd, 2020)
[2] LINZ Data Service tidal definitions: https://www.linz.govt.nz/sea/tides/introduction-tides/definitions-tidal-terms

E.3 Wave Climate

The Wairarapa coastline is heavily influenced by wave action. Waves drive most of the coastal processes that shape the Wairarapa coast, and therefore waves are an important factor to consider when assessing coastal hazards such as erosion, overtopping and/or coastal inundation.

Palliser Bay consist of a wide and open coast located at the south of New Zealand's north island (Figure 23). The embayment is facing Cook Strait, and it is exposed mainly to swells from South and South-West directions: Figure 24 is a representative Palliser Bay wave rose, showing that 40% of waves are estimated to come from a southerly direction, and 30% of the waves from a South-West direction.

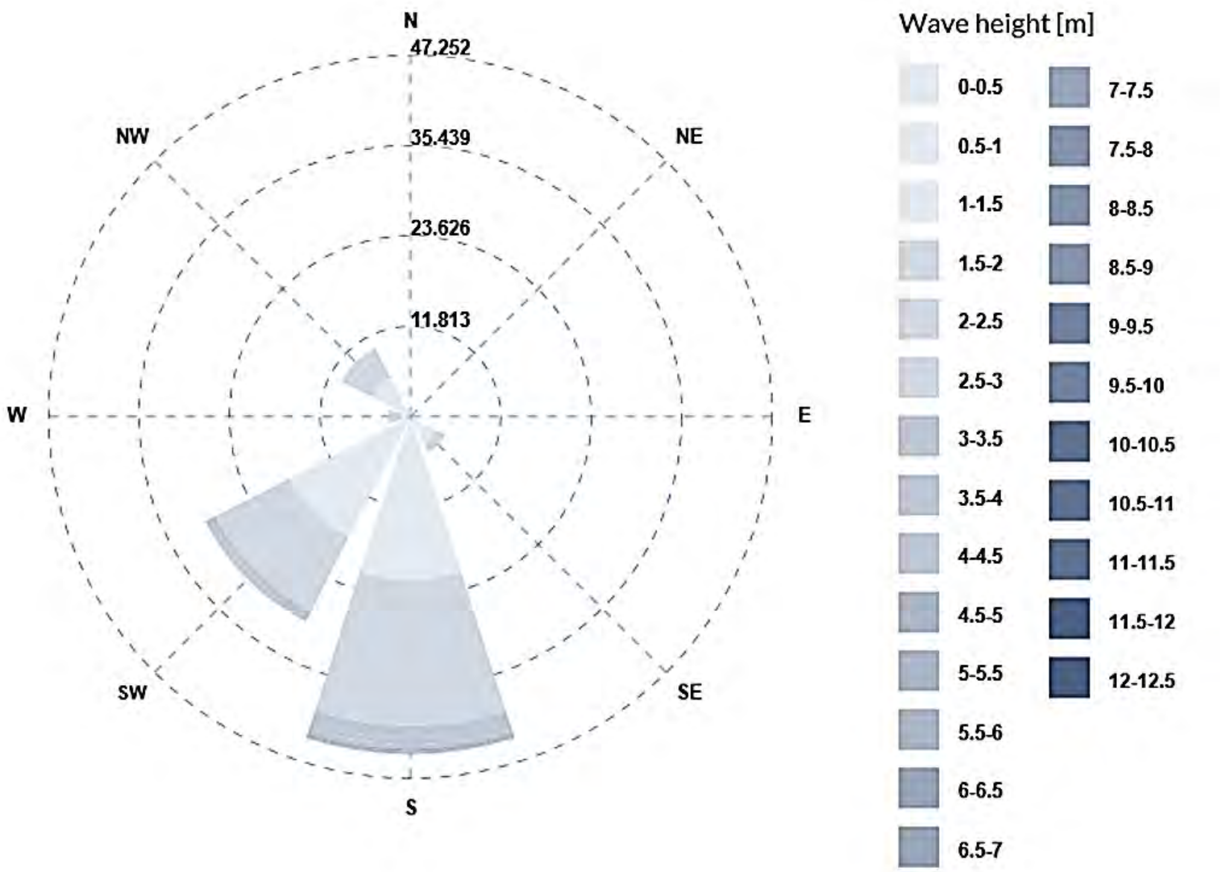


Figure 24. Wave rose generated from hindcast MSL SWAN hindcast model. Wave height units are average annual percentages. Data point located at 41.5S 175.05E, central/offshore Palliser Bay (MetOcean, 2020)

Publicly available hindcast models (MetOcean, 2020) provide wave data that can be assessed to evaluate the wave climate of certain areas in New Zealand. Three points (Figure 23) close to the study site has been selected to carry out a high-level assessment of wave exposure at eastern Palliser Bay.

Table 7 shows how the points selected suggest that the most exposed areas of eastern Palliser Bay are these closer to open ocean, i.e. the data points 1 and 2, located more to the north, seem to be more sheltered than point 3. This affirmation can be considered a generalisation, as each area will be affected differently depending on the individual conditions given in each storm and the condition and composition of the coast at that moment. Nonetheless, the results suggest that wave energy reaching more sheltered areas in the embayment experience more wave energy dissipation as a result of nearshore processes such as wave refracction, bottom friction and wave breaking among others.

Table 7. Offshore wave height data extracted from a SWAN model (MetOcean, 2020). The approximate location of the data points can be seen in Figure 23.*

Model grid data point		Wave height counts [%]				Wave height [m]
#	Coordinates	0-1 m	1-1.5 m	1.5-2 m	> 2 m	10 years Return Period*
1	41.45S 175.2E	61	23	10	6	6.4
2	41.5S 175.2E	46	30	15	9	6.4
3	41.55S 175.2E	36	30	19	15	6.7

* These values are estimated from the hindcasts using a Gumbel distribution. They are intended to give a general idea of extreme conditions but are not suitable as metocean design statistics. The values may not capture the peak magnitude of tropical cyclone extremes.

E.4 Sediment Budget and Sediment Transport

The sediment budget of a coastal cell can be defined as the balance between sediment inputted to and removed from the coastal system. It has been extensively proven that negative sediment budgets, i.e. a sediment budget where the sediment output from the systems is larger than the sediment input, affects the beach post-storm recovery capabilities and induces chronic erosion and consequent beach retreat (Hinkel, 2014; Fatoric & Chelleri, 2012).

No information about sediment budget for the South Wairarapa Coast has been found during this desktop study. Furthermore, there is little information about current coastal processes in the Wairarapa, specially about large scale sediment transport patterns (Barrow, 2002).

Satellite imagery show the dynamic character of Palliser Bay when it comes to sediment transport: historical aerial images show sediment suspension and movement nearshore the study area. Without long-term sediment transport data records, it is not possible to quantify net longshore sediment transport and/or direction. Nonetheless, because of the sand spit dividing Lake Onoke and Palliser Bay open ocean, it could be said that net longshore sediment transport is likely to occur from West to East.

From satellite imagery, it is also apparent that sediment exchange between both Palliser Bay and adjacent coast can occur. Therefore, it is likely that sediment reaching Palliser Bay, or sediment introduced to the coast due to cliff erosion, may be lost to adjacent coasts or even offshore.

A sediment budget analysis studying Palliser Bay as a coastal system/cell could be beneficial to improve the understanding of sediment dynamics within the study area. However, no scientific study supporting the above assumptions has been found during desktop study.

Appendix F

Performance of Existing Coastal Protection Measures

Appendix F – Performance of Existing Coastal Protection Measures

The performance of the existing coastal structures has been evaluated based on the status of the infrastructure, which was assessed from the 3D Model.

F.1 Section 1 – DOC Station

The cliff edge of this section is primarily covered by randomly placed rocks with exposed gabion baskets and geotextile (Figure 25). Technically, a coastal revetment structure can be determined as a failed structure when the most exterior layer of rocks, the armour layer, is moved by currents, turbulence and/or wave action, and leaves either underlayers or geotextile material exposed.

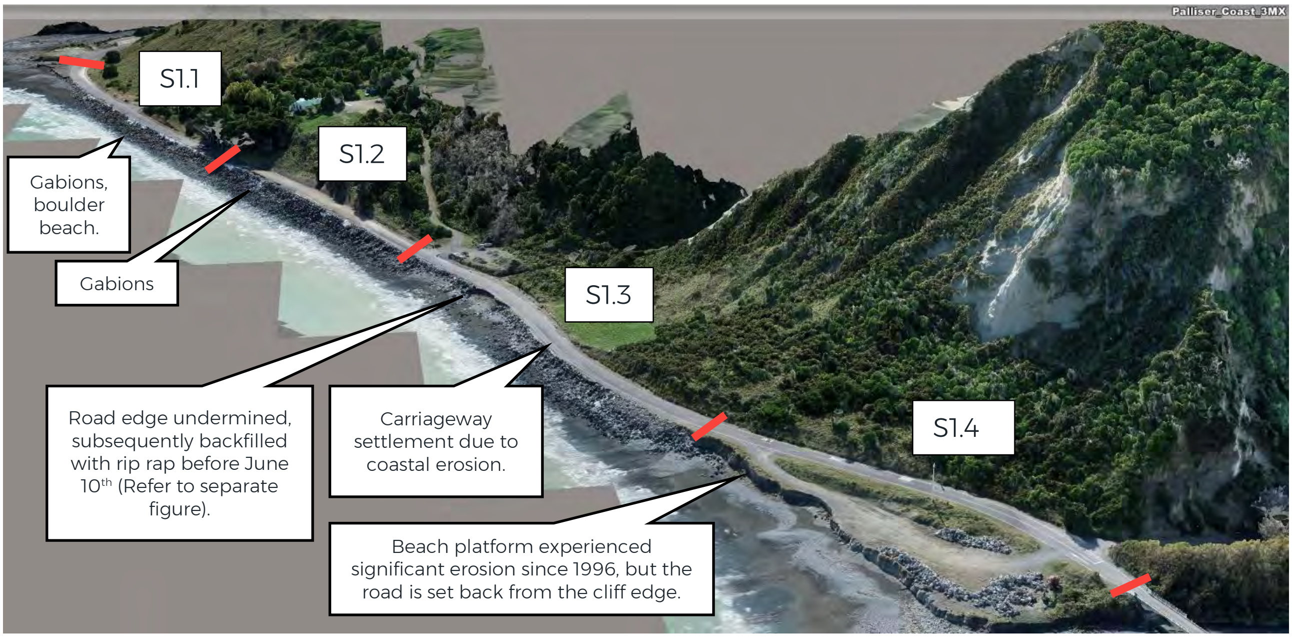


Figure 25: Screenshot from the May 2020 3D model of section 1, DOC Station, looking north. Subsection limits are represented by the red-lines.

The original revetment design is shown in Figure 26. These original drawings show that the revetment was design with a single layer of armour rock over a geotextile layer. One of the main advantages of rock revetments, is their ability to dissipate wave energy: a combination of rock layers allows the dissipation of some incoming wave energy instead of fully reflect it.

The larger the *porosity* of a rock revetment, assuming good rock interlocking, the greater the capacity to dissipate wave energy. Taking into consideration the exposure of this section of the Palliser Bay to high water levels and waves, a single armour layer seems insufficient to cope with wave and current action during storm events.

Furthermore, the toe detail indicates a trench of only 1 m below beach level. The toe detail is a key element of a revetment, hence needs to be designed according to expected wave conditions and foreshore variations. Due to the dynamic nature of the beach foreshore at Cape Palliser, i.e. seasonal and episodic fluctuations of the foreshore's vertical level, the toe detail combined with limited capacity of the single rock layer to dissipate wave energy has proven to be insufficient to maintain an adequate level of service for the road.

The latter led to a high maintenance structure with a short serviceability life and currently unreliable.

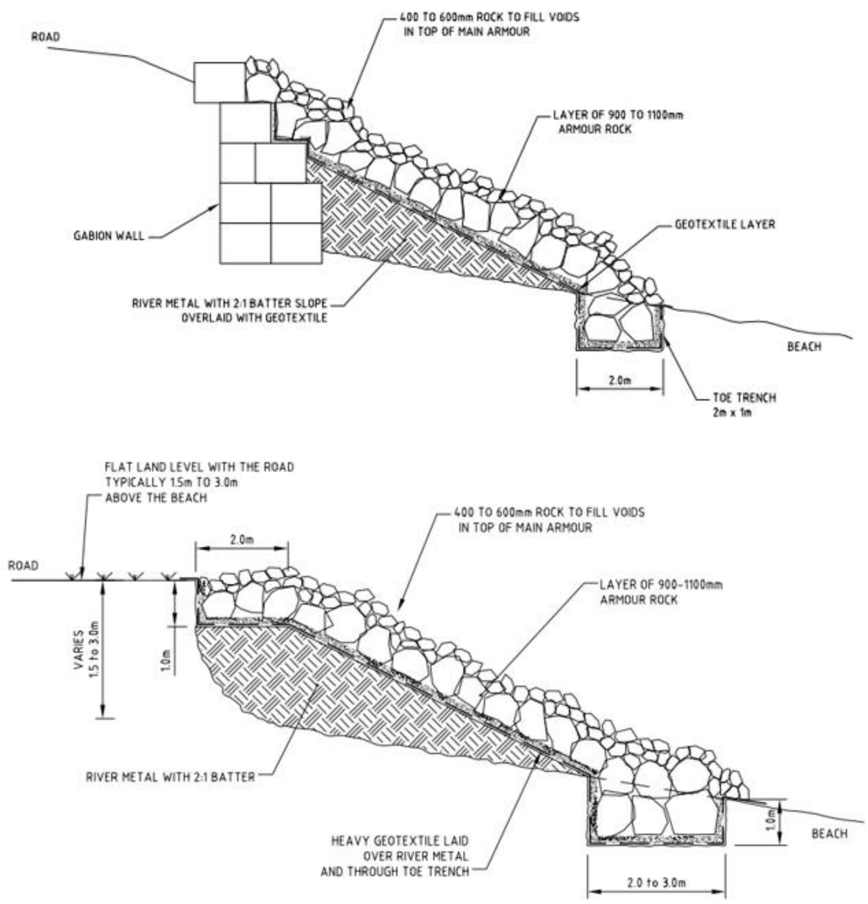


Figure 26: Original revetment design with and without gabion wall (Beca, 2009).

The following observations from the 3D models are highlighted:

- There is clear **slope steepness irregularity** (Figure 27). Different slope steepness along the revetment can lead to sections of the revetment that are more susceptible to wave run-up and wave overtopping. The most vulnerable sections are usually those with steeper slopes, and these can be identified as the road behind these tends to require maintenance after storm events. It has been noted that a section of the road within Section 1 is lowered (Figure 27) to alter the slope and to reduce frequent maintenance costs. An elevation profile along the road is shown in Figure 28.
- **Exposed geotextile and gabion baskets** (Figure 29). The original revetment design (Figure 26) is no longer withstanding. The rocks composing the rock revetment armour layer are now scattered along the beach creating longshore irregularities. Also, both the geotextile placed underneath the armour layer and the gabions baskets used as a wall to sustain the road embankment are now in poor conditions and exposed to sea action. As mentioned before, this coastal structure is no longer fulfilling its erosion protection function.
- **The lack of base or support** directly affects the integrity of the structure. Screenshots from the May 2020 3D Model show revetment subsidence (Figure 29), which can be directly linked to the lack of structural support combined with wave action and natural fluctuations of foreshore levels. In Figure 32, a tension crack on the road is apparent along a section with newly placed rock rip-rap.
- **Stabilising cement sections are now undermined** (Figure 30). Cement has been used in the past in order to provide support to the road. The stabilisation cement is now overhanging and "floating" because wave action, combined with foreshore level fluctuations, have undermined the structure further. Undermining of the structure increases the risk of sudden

failure of the road and this, in turn, increases the risk of failure of the landward embankment and/or cliffs. Furthermore, with no base, the overhanging cement adds tension to the road and the cliff edge.

- **Erosion hots spots due to alongshore discontinuities** (Figure 31). The placing of hard structures along the coast usually imply *end effects*: the transition between hard structure and, in this case, coastal cliff, tend to suffer from aggravated erosion. To avoid these *end effects*, a good transition zone between structure and natural cliff is necessary. If no transition zone is design and constructed, it is likely that turbulence and differences in water set-ups generate erosive currents at this particular zone as alongshore irregularities favour that phenomenon.
- From drone imagery, more **recently placed rock rip-rap appears to have a steep slope**. As mentioned before, steep slopes are more susceptible to wave run-up and overtopping. Furthermore, if new sections of revetment are placed on top of existing rocks without considering the reinforcement/improvement of the structure's toe, the coastal structure integrity is likely to be more vulnerable to coastal dynamics.

Figure 27: Perspective view of DOC Station (Section 1), approx. 800m in length. From WSP's UAV model, May 2020.

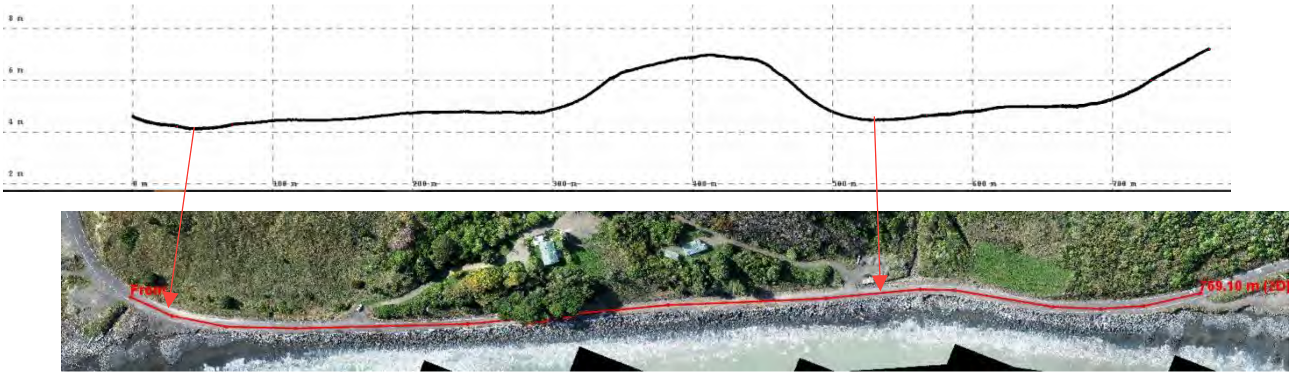


Figure 28: Road centre-line elevation profile for Section 1. Vertical scale is exaggerated. From WSP's UAV model, 10 May 2020.

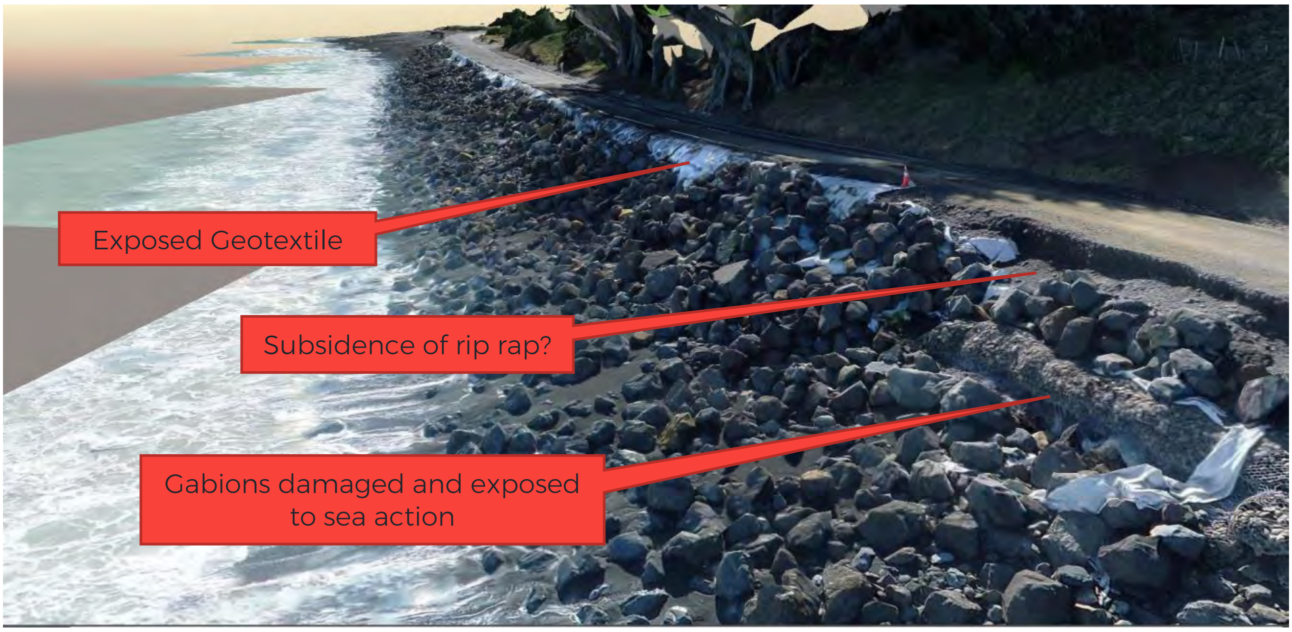


Figure 29: Coastal protection structures in Section 1.1. From WSP's UAV model, May 2020.

Figure 30: Section where stabilising cement has been used in the road sub-base in the northern section of the DOC Station reach.

Figure 31: Screenshot of Section 1, DOC Station, showing from aerial view erosion hot spots and exposed geotextile at the road edge.

Figure 32: Drone imagery in central section of Section 1 from May and June 2020, showing crack and displacement of carriageway in foreground and earthworks to lower road level in middle distance. Newly placed rip rap indicated.

F.2 Section 2 – Johnson's Hill

A screenshot of Johnson's Hill section from the May 2020 3D model is presented in Figure 33. The road in this section of the study area is not as evidently affected by coastal erosion as Section 1 (DOC Station). The following comments extracted from observations of the May 2020 3D model are highlighted:

- Coastal **erosion rates are large** for Section 2.1 (Table 4) and erosive patterns are visible at the coastal platform edge. The absence of coastal erosion protection measures in this subsection is likely to contribute to a faster cliff recession. Nonetheless, in this section overall, the road is at a considerable distance landwards the coastal edge: the land between road and cliff edge acts as a buffer against coastal erosion.
- Section 2 **road has a higher vertical elevation** than Section 1, which protects the road from wave overtopping erosive effects. Nonetheless, the Section 2 cliff face appears to be heavily eroded by water run-off as it presents vertical indents produced by water eroding the soil, potentially faster during rainy events.
- **The toe of the coastal cliff is affected by wave induced coastal erosion**. Wave action causes erosion of the cliff base, i.e. undermining of the cliff, which contributes to slope instabilities and consequent slope failures.
- The **rocks placed at the toe** of the southern side of this section seems to contribute to wave energy dissipation and to the mitigation of wave induced erosion. Nonetheless, some undermining is present along the rocks. Also, as the rocks are not uniformly placed, erosion hot spots are present due to the irregularities along the cliff toe. Because of structural end-effects, these erosion hot spots are generally present at the *rock rip rap* terminations and discontinuities.

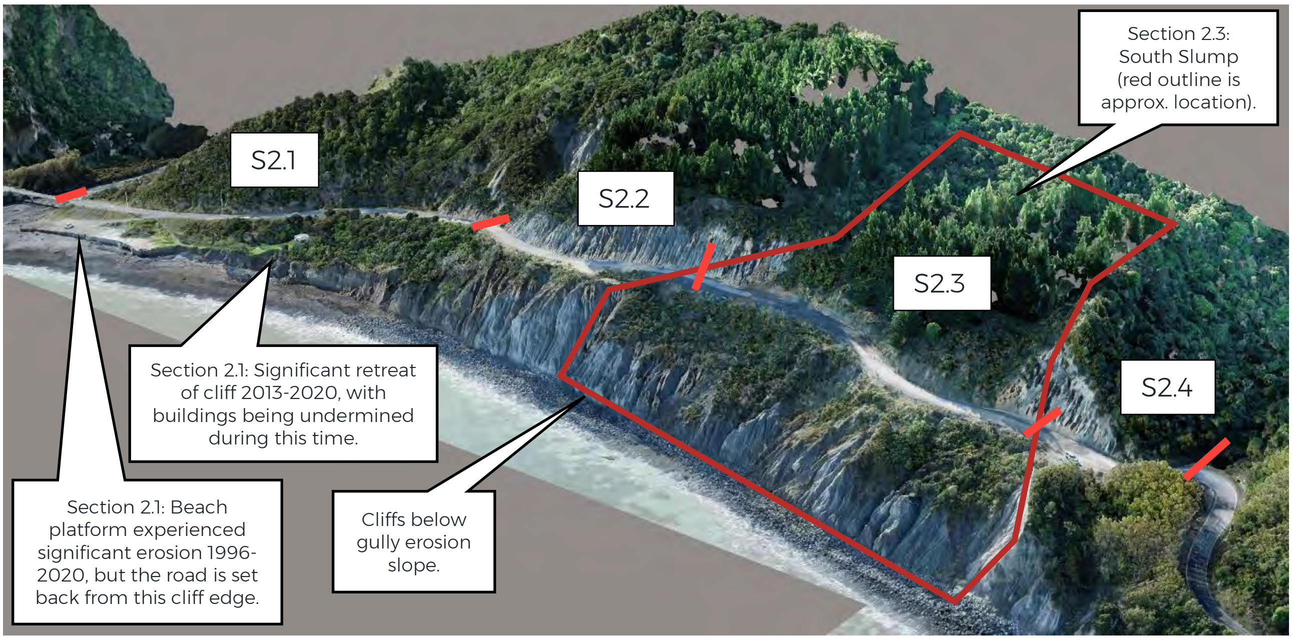


Figure 33: Johnson's Hill, looking north-east. From WSP's UAV model.

F.3 Section 3 – Te Kopi

A screenshot of Te Kopi section from the May 2020 3D model is presented in Figure 34. The northern section of this road (S3.1 and S3.2) have similar characteristics to section 2. The road at S3.3 is further inland, protected from coastal erosion by a buffer of both vegetation and private land. On the contrary, the most southern subsection of the road (S3.4 and S3.5) are clearly affected by coastal erosion. For the most exposed subsections, S3.4 and S3.5, the following comments extracted from observations of the May 2020 3D model are highlighted:

- **Cliff erosion** is evident and threatening the integrity of the road at S3.4. The existing vegetation and the current rock rip-rap may contribute to wave energy dissipation during storm events. Nonetheless, high water levels can reach the top of the cliff, making this section of the road vulnerable to erosion.
- Between S3.4 and S3.5, there is a clear **erosion hot spot** where the road shoulder has been partially eroded (Figure 35). This erosion hot spot is likely to be consequence of an end-effect of the rock rip-rap and the discontinuity between cliff toe composition in this particular section. Both alongshore discontinuities are likely to have caused an erosion focused area by enhancing both strong currents and turbulence during storm events.
- The **cliff toe** in section 3.5 is composed of hard substrate/rock. The rock at the toe of the revetment provides a natural defence from coastal erosion of the cliff. This less erodible part of the cliff avoids rapid wave action erosion and helps maintain cliff stability by providing a solid base.

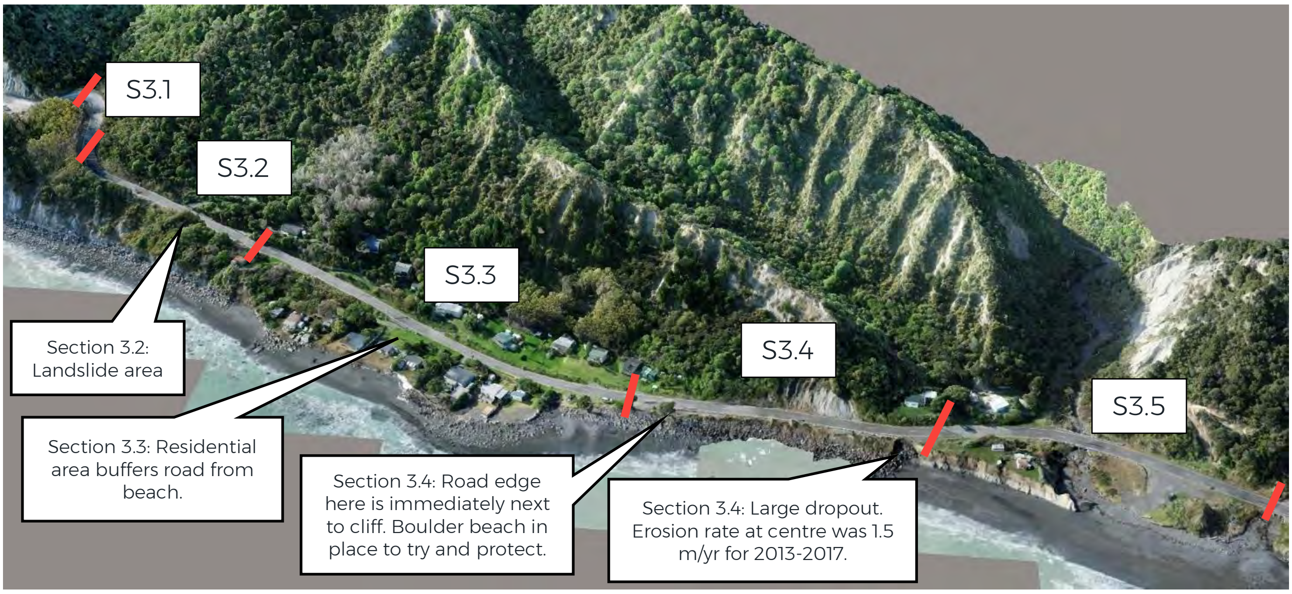


Figure 34: Screenshot from the May 2020 3D model of section 3, Te Kopi, looking north-east. Subsection limits are represented by the red-lines.

Figure 35. Screenshot from WSP's UAV model, showing the significant dropout in Section 3.4.

F.4 Section 4 – Whatarangi Bluff

A screenshot of Whatarangi section from the May 2020 3D model is presented in Figure 36. This section appears to be the most exposed to offshore wave conditions: S4.4 has the largest erosion rates in this section (Table 4), with three distinct scallops cut into the cliffs. The following comments are made from observations of the May 2020 3D UAV model:

- **Cliff erosion** in S4.2 is a consequence of not only coastal erosion, but also water run-off. This sub-section cliff is made of more easily erodible material and has no vegetation to help against erosion.
- Various erosion protection structures are in place along this section of the coast. The protected sections have performed well against erosion, nonetheless, careful attention should be payed to the **erosion end-effects** these structures are already showing, specially immediately adjacent to them, but also further away along the coast.
- Section 4 southern corner appear to have suffered from **episodic erosion** (Figure 37). Erosion in this area may not only be caused by coastal erosion as poor water drainage is likely to have contributed to cliff failure. The currently eroded areas are likely to enhance further erosion due to the alongshore irregularities created. The rock rip-rap placed at the bottom of the cliff indents may help reduce wave energy and cliff toe wave erosion, but can also create end-effects as seen in other sections of the embayment.
- Figure 38 shows a typical cross section of rip rap structures present at the base of the cliffs throughout Section 4. These rip rap structures have been damaged and undermined in places due to wave action, with boulders lost (Figure 38) and geotextile exposed (Figure 40). The function of these damaged sections is compromised, and once the geotextile is ruptured the underlying river metal is likely to erode out quickly. Repair or reconstruction of these structures would be prudent to form a more robust defence.

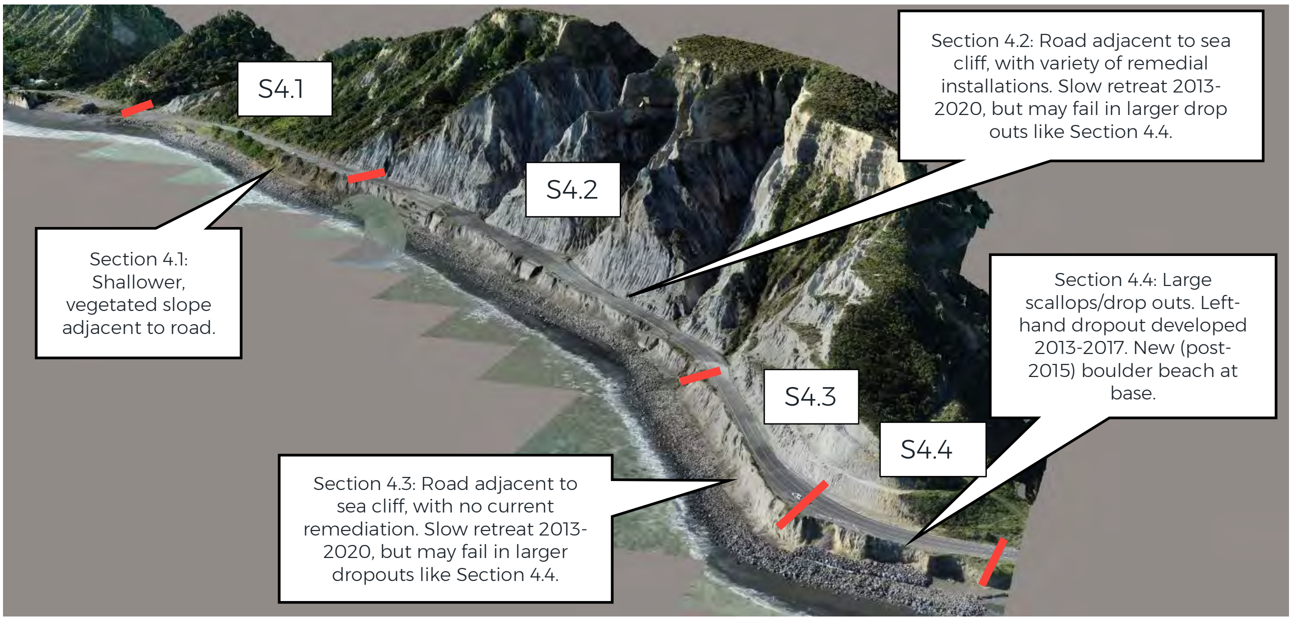


Figure 36. Screenshot from the May 2020 3D model of section 4, Whatarangi Bluff, looking east. Subsection limits are represented by the red-lines.

Figure 37. Screenshot from 3D model showing S4.4 eroded areas and placed rock rip-rap, which are currently creating alongshore irregularities.

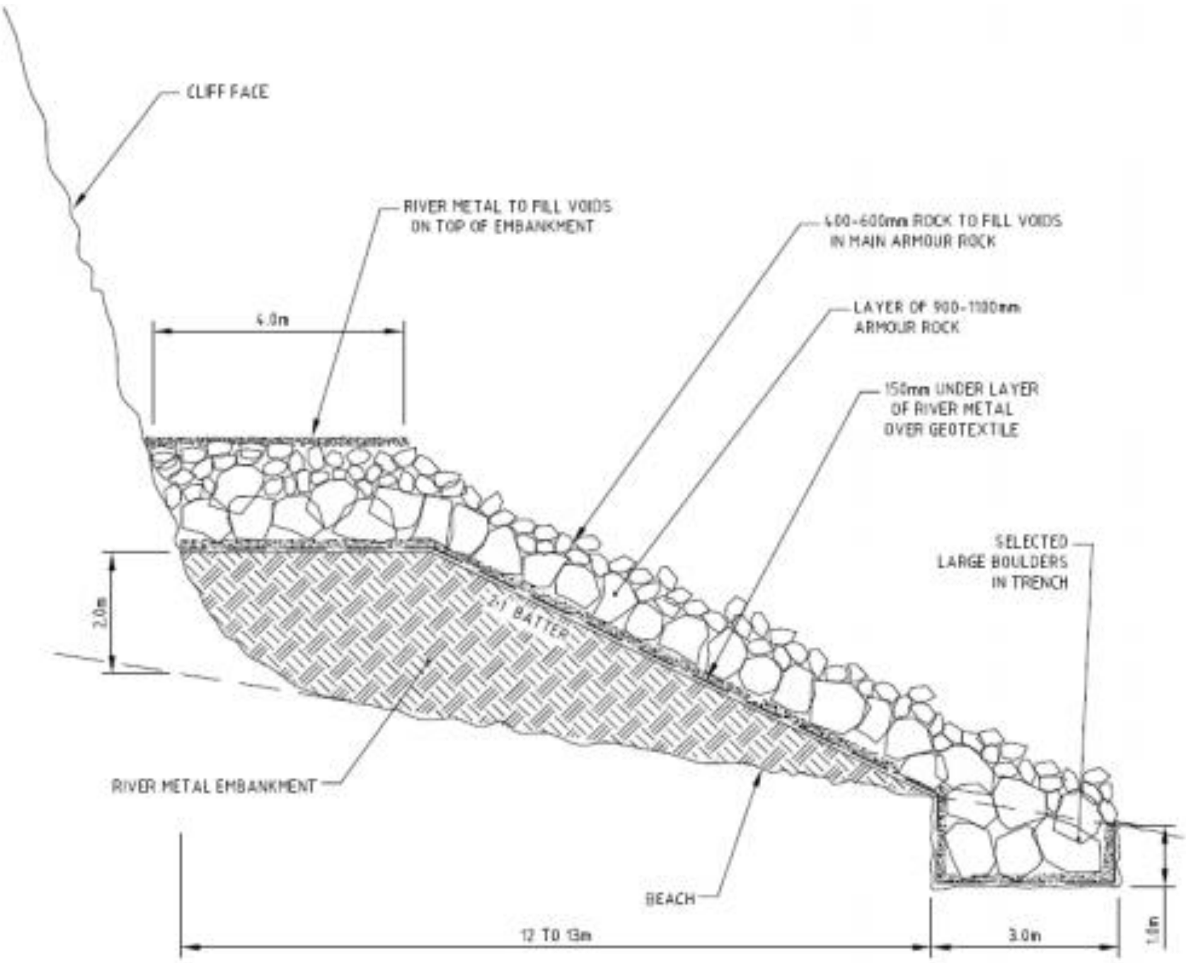


Figure 38: Typical rip rap arrangement to protect cliff areas, reproduced from Beca (2009).

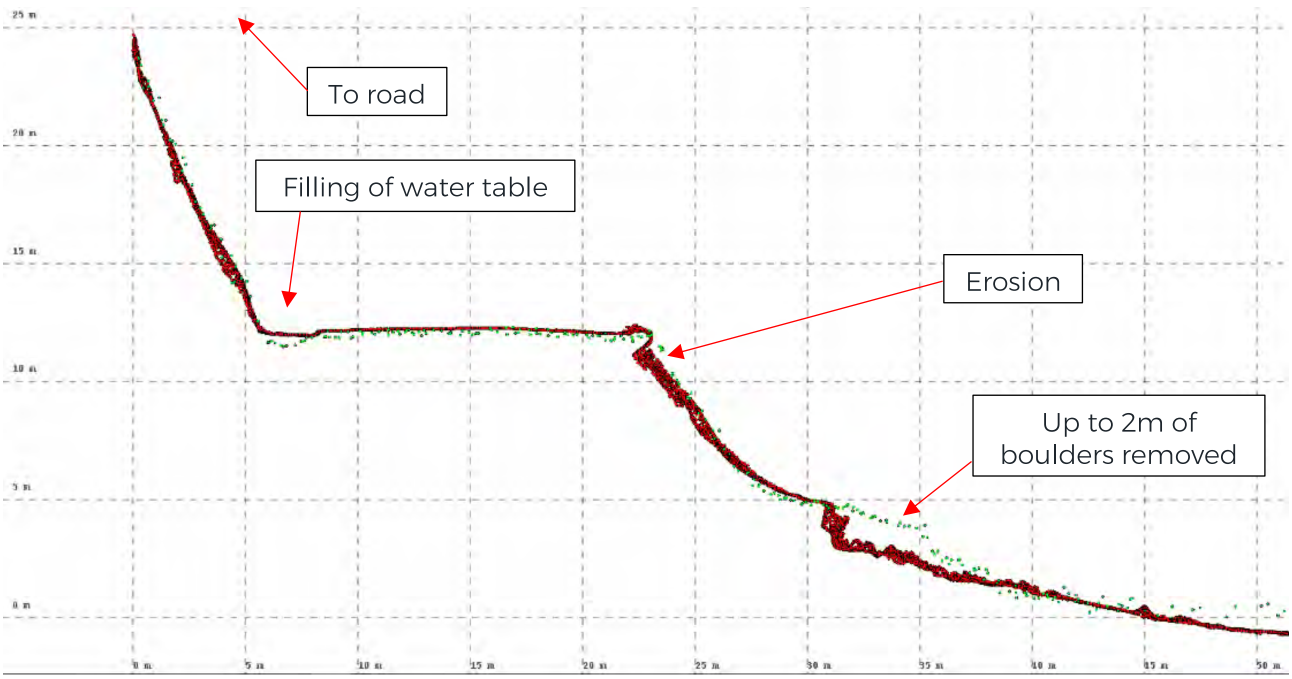


Figure 39: Comparison of elevation profiles from 2013 LiDAR data (green) and 2020 UAV data (red) at Whatarangi Bluff (RP 15.7), showing loss of rip rap structure.

Figure 40: Sections of exposed geotextile at Whatarangi Bluff, where the rip rap structure has collapsed and needs repairing or replacing to reinstate effective coastal protection. [top] South of concrete wall (CONC2 in the preliminary risk assessment table). [bottom] North of crib wall (CRIB1).

Appendix G
Coastal Inundation

Appendix G – Coastal Inundation

In this section, three different types of coastal inundation will be considered for areas within the study site:

1. wave overtopping;
2. potential long-term inundation due to climate change and the associated sea level rise; and
3. episodic coastal inundation due to storm events.

G.1 Wave Overtopping

Wave overtopping refers to the volumetric rate at which wave runup flows over crest of a coastal structure, whether it is naturally occurring (for instance a dune or a reef) or an anthropogenic structure such as a revetment or sea wall.

There are many factors influencing overtopping rates, some of which are linked directly with offshore and nearshore sea conditions such as wave height, wave incident angle, and water level, and others associated with the natural or artificial coastal defence, such as roughness, porosity, slope and crest height, or freeboard.

Cape Palliser has been experiencing wave overtopping in the past (refer to Appendix E – Coastal Processes), and currently, this phenomenon continues to take place during storm events. From photographs taken during the site visit, and thanks to the 3D model produced after the drone survey, the following factors influencing overtopping rates have been highlighted:

- **Low crest levels with respect to water levels:** some sections of Palliser Bay foreshore are under water during high tide, leaving limited to no space for waves to fully dissipate. Large waves reaching the coast will run-up the current revetments and/or narrow shore, and these can eventually overtop the coastal structures. This combination of wave run-up and wave overtopping is more likely to happen during storm events as waves tend to be larger and water levels are increased due to low barometric pressures (storm surge).
- **Steep and variable slopes.** Wave run-up and consequent overtopping is directly linked to slope steepness: the steeper the slope, the higher the wave is likely to run-up, therefore the more likely overtopping will occur. Furthermore, variable slopes create discontinuities in the shore, which may intensify localised turbulence, wave action focusing and strong currents. The latter effects can result in areas where erosion and wave overtopping are enhanced.
- **Wave exposure and nearshore bathymetry.** Wave overtopping is linked to different wave properties, such as wave height and period, wave length and incident wave angle. Wave breaking and bed friction will dissipate wave energy as it approaches the coast. Generally, waves experience less energy dissipation in sections where water depth is larger in front of a structure or cliff, hence making these sections are most exposed to wave action and wave energy. Nearshore bathymetry and associated processes such as wave refraction, will also determine wave incident angle and associated wave overtopping rates.

Section 1, DOC Station, is the most vulnerable to this phenomenon due to a lack of beach foreshore during high tide, the proximity of the road to the cliff edge, and because it is the most low-lying section of the study area. Furthermore, the poor condition of the current revetment is likely to exacerbate wave run-up and consequent overtopping at areas with steeper slopes. Also, the discontinuity of the revetment slope is likely to enhance focalise overtopping and consequent localised road damage. These areas can be identified as the road section which usually need further maintenance after storm events.

Section 4, Whatarangi Bluff, is also vulnerable to wave overtopping. This road section is not as low-lying as Section 1, but it is more exposed to the offshore wave climate, and higher waves are likely to reach this section of the coast and largely contribute to overtopping rates when combined with high water levels. Furthermore, the road in Section 4 has a minimal buffer zone between cliff edge and road pavement, leading to a more direct impact of overtopping water onto the roading infrastructure.

In coastal engineering, it is normal practice to estimate wave overtopping rates when designing coastal infrastructure such as revetments or seawalls. The EurOtop (2016) Manual presents tolerable overtopping rates for different coastal defences and their protective purpose: for example, it provides different tolerable overtopping rates for people and vehicles before wave overtopping constitutes a hazard for pedestrians or circulating vehicles. To ensure a higher infrastructure level of service and safety to property, vehicles and people, it is good practice to consider maximum tolerable overtopping rates for future planning on Cape Palliser.

G.2 Long-term Inundation – Sea Level Rise

The Ministry for the Environment (MfE) guidance for local government on coastal hazards and climate change (MfE, 2017) advises the SLR projections to be considered for the design and adaptive development of coastal assets and infrastructure. The four SLR projection scenarios are shown in Figure 41.

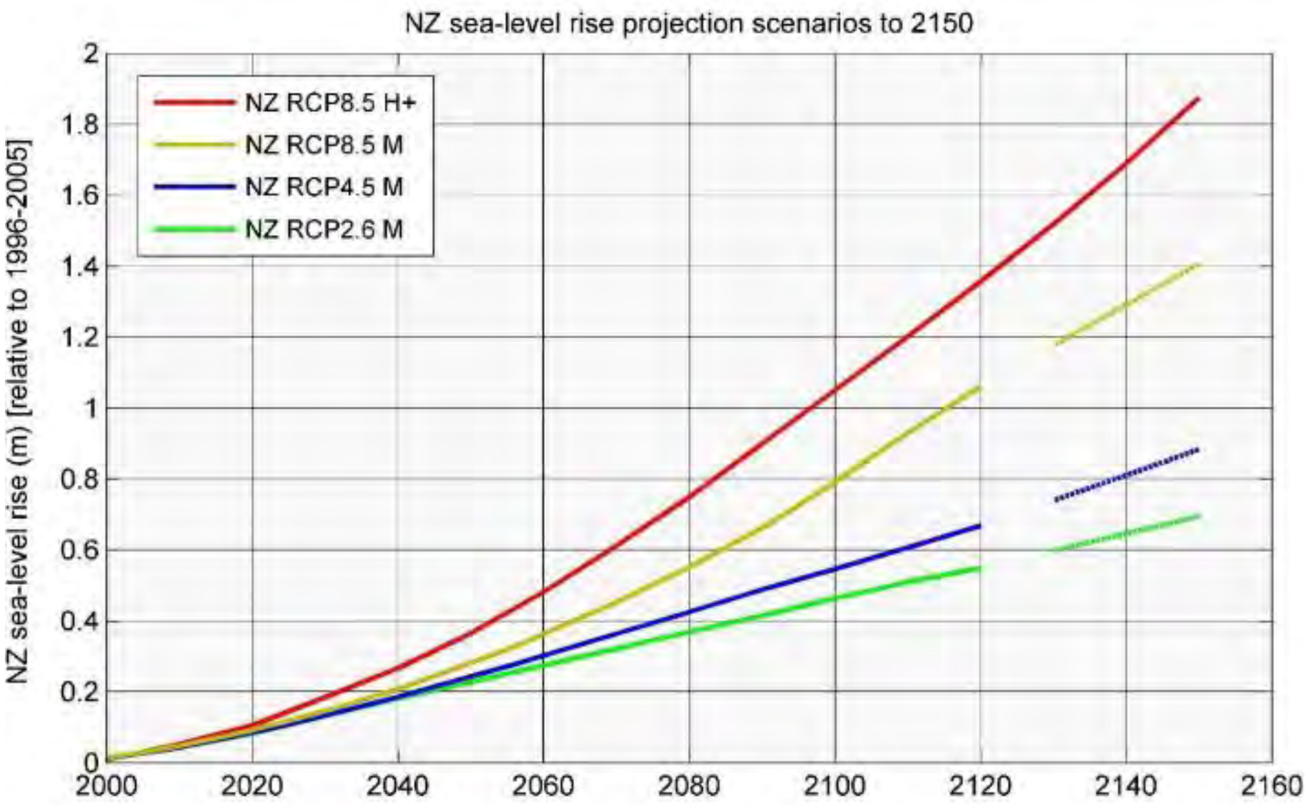


Figure 41. Sea Level Rise projections for NZ according to different emissions scenarios (MfE, 2017)

The guidance recommends adoption of the NZ RCP8.5 M scenario as a minimum. It also provides a table with SLR decadal increments. Table 8 presents the extracted decadal increments from 2020 to 2070.

Table 8. SLR decadal increment projections by climate change scenario (MfE, 2017)

	SLR Projections for the wider New Zealand region [m]			
	NZ RCP2.6 M (median)	NZ RCP4.5 M (median)	NZ RCP8.5 M (median)	RCP8.5 H+ (83rd percentile)
2020	0.08	0.08	0.09	0.11
2030	0.13	0.13	0.15	0.18
2040	0.18	0.19	0.21	0.27
2050	0.23	0.24	0.28	0.37
2060	0.27	0.30	0.36	0.48
2070	0.32	0.36	0.45	0.61
2080	0.37	0.42	0.55	0.75
2090	0.42	0.49	0.67	0.90
2100	0.46	0.55	0.79	1.05
2110	0.51	0.61	0.93	1.20
2120	0.55	0.67	1.06	1.36

The 3D model of Cape Palliser was developed in NZVD2016 as the vertical datum. To convert Chart Datum water levels, to NZVD2016 water levels, 1.225m must be subtracted. By making the conversion from CD to NZVD2016, the tidal water levels are as follows:

Table 9. Astronomical tidal levels (m NZVD2016) for Wellington and Cape Palliser from LINZ Cape Palliser station.

Location	MHWS	MHWN	MLWN	MLWS	MSL
Cape Palliser	0.275	0.265	-0.475	-0.765	-0.095

The model can be used to show the above tidal levels, but also to simulate static water levels considering the sea level rise projections shown in Table 8. The following water levels have been simulated for this report:

Table 10. Simulated static water level scenarios considering 0.275m NZVD2016(MHWS) as a baseline scenario.

MHWS						
Baseline	2050		2090		2120	
	NZ RCP4.5 M	NZ RCP8.5 M	NZ RCP4.5 M	NZ RCP8.5 M	NZ RCP4.5 M	NZ RCP8.5 M
0.275	0.515	0.555	0.765	0.945	0.945	1.335

Figure 42 shows two particularly low sections in the study area, one from DOC station and one from Te Kopi. The simulated water levels in Table 10 represent MHWS still water levels and do not include wave heights or the higher water levels produced by King tides or by low atmospheric pressures (i.e. storm surge). It is also important to note that wave heights nearshore largely depend on water depth, and that higher wave heights can be expected with higher water levels.

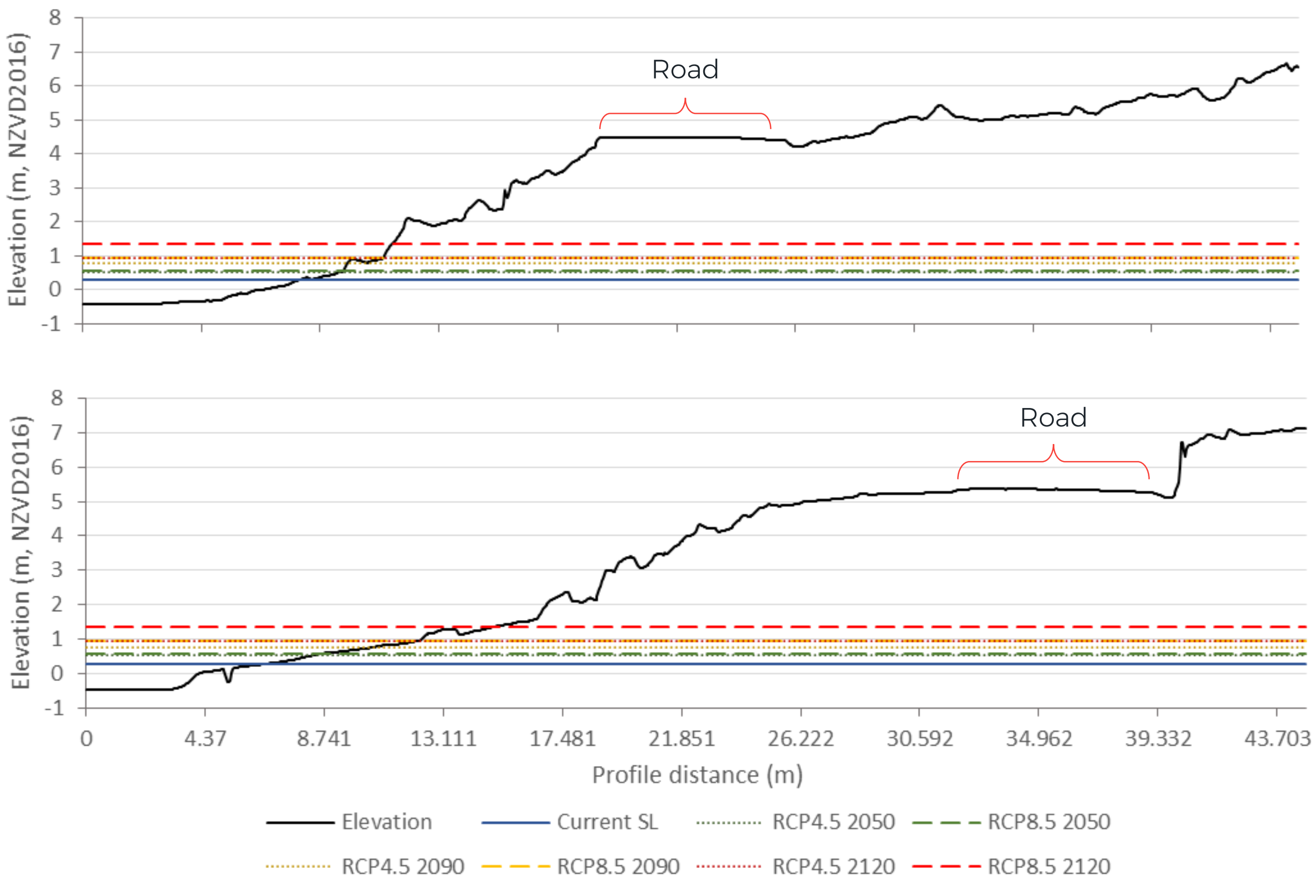


Figure 42. Sea level rise projections for two sections: DOC station section above and Te Kopi section below. Current SL refers to current MHWS tide mark.

Finally, because of the uncertainty associated with land elevations, the MfE (2017) guidelines do not recommend factoring occurrences of earthquake-generated uplift or subsidence events for foreseeable planning timeframes. Nonetheless, it is important to consider the historical land subsidence experienced in Wellington (Figure 43), which affects the relative sea-level rise in the region: sea water levels may remain the same, but if land sinks, there in an increase in relative water level. Using data from 1891 to 2015 (116 years), a trend of 2.23mm/year of relative sea level increase has been calculated from the Wellington Port data-set (MfE, 2017). If these trends were to continue, Wellington area would experience a relative increase in sea level rise of 0.78m by 2050, 1.67m by 2090 and 2.34m by 2120, which are largely more pessimistic values.

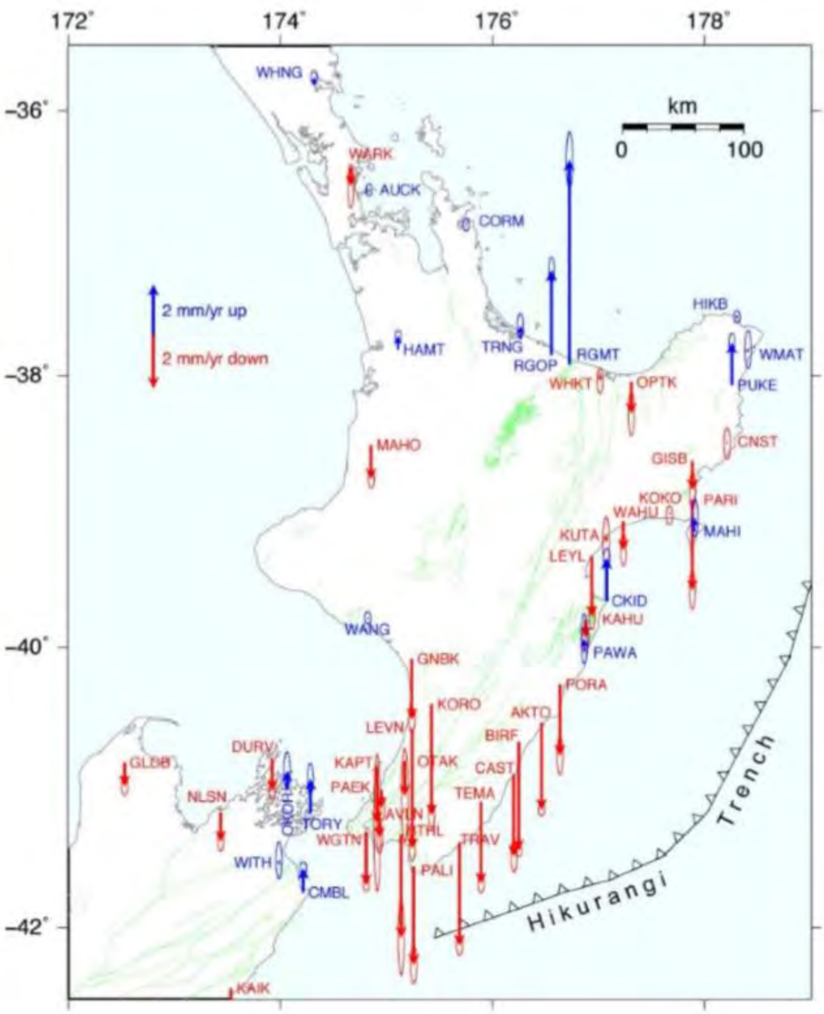


Figure 43. Average vertical land movements for near coastal continuous GPS sites in the north Island of New Zealand (Beacan & Litchfield, 2012).

G.3 Episodic Inundation (Tidal and Storm Surge)

Permanent inundation due to the increase in sea-level will not be unforeseen. Before having to plan for a permanent higher sea water level, episodic inundation should be considered as sea level will increase gradually.

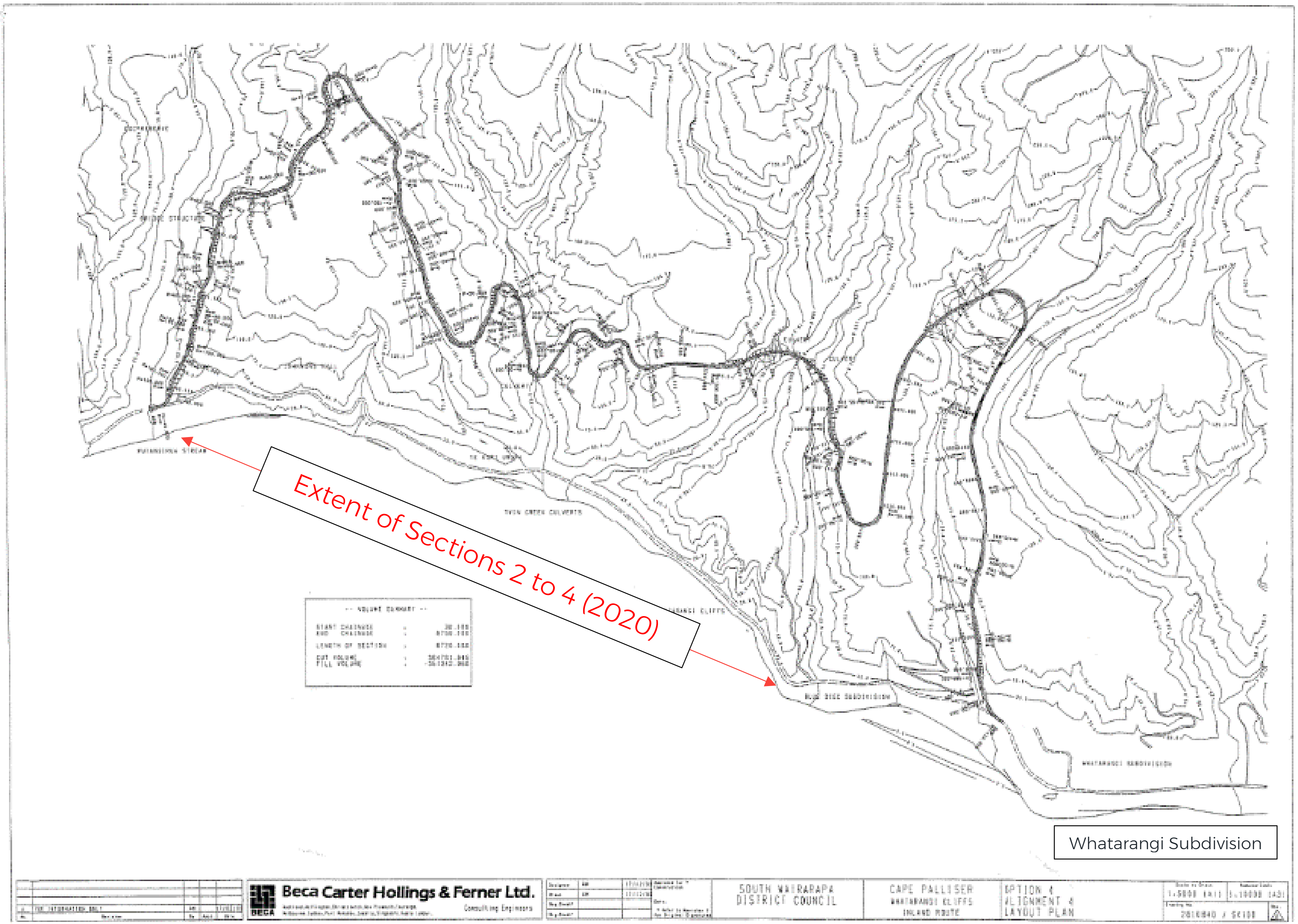
Currently, Cape Palliser may not experience fully inundated roads during storm events, but as New Zealand experiences gradual sea level rise (Figure 41), it is likely that the two following inundation scenarios will take place:

- Road inundation during high tides, which will directly affect the integrity and serviceability of the road daily.
- Inundation during storm events due to a higher water level baseline. This scenario includes the increased in overtopping rates and the possibility of fully inundated road sections.

To plan effectively for the associated effects of sea level rise, it is important to examine in more detail the exposure to gradual inundation of the different sections of Cape Palliser. A progressive plan to cope with sea level rise can be made flexible, which is a significant benefit considering the uncertainties associated with climate change, in particular with relative sea level rise.

Appendix H

Beca (2000) inland road realignment option


Extent of Sections 2 to 4 (2020)
Whatarangi Subdivision
TWIN CREEK CULVERTS
Beca Carter Hollings & Ferner Ltd.
Consulting Engineers
SOUTH WAIRARAPA DISTRICT COUNCIL
CAPE PALLISER
OPTION 4
ALIGNMENT &
LAYOUT PLAN

wsp.com/nz

ASSETS AND SERVICES COMMITTEE

16 DECEMBER 2020

AGENDA ITEM C3

ACTION ITEMS REPORT

Purpose of Report

To present the Assets and Services Committee with updates on actions and resolutions.

Recommendations

Officers recommend that the Committee:

1. Receive the Assets and Services Action Items Report.

1. Executive Summary

Action items from recent meetings are presented to the Committee for information. The Chair may ask officers for comment and all members may ask officers for clarification and information through the Chair.

If the action has been completed between meetings it will be shown as 'actioned' for one meeting and then will be remain in a master register but no longer reported on. Procedural resolutions are not reported on.

2. Appendices

Appendix 1 – Action items to 16 December 2020

Contact Officer: Euan Stitt, Group Manager Partnerships and Operations

Appendix 1 – Action Items to 16 December 2020

Number	Raised Date	Action Type	Responsible Manager	Action or Task details	Open	Notes
81	20-Feb-19	Resolution	Euan	COUNCIL RESOLVED (DC2019/15): 1. To receive the Wastewater Sewer Later Replacement Management Report. 2. That lateral renewal up to the boundary where necessary will be undertaken at Council's cost but only when main pipeline renewal is being undertaken (this will be regarded as an operational expense). 3. That council in the meantime will not fund depreciation of private lateral assets. 4. That clearing of obstructions and ensuring the lateral is functional will be carried out within Council land. 5. That private property owners remain responsible for lateral renewal maintenance and renewal as per the bylaw when (2 above) does not apply. 6. That the policy be altered to reflect this change and the bylaw remain unchanged. (Moved Cr Olds/Seconded Cr Craig) Carried Cr Wright voted against the motion. Cr Carter voted against the motion.	Open	Policy to to come to A&S meeting on the 24th of July 29/07/19 - The section 3.1.9 of the Bylaw will be amended when the bylaw is reviewed and the resolution is put into practice now. Lateral Renewals being done in conjunction with capital works is currently in practice and able to be done under the current bylaw. 27/08/19 Bylaw and Policy reviewed. Officers feel there is no need to amend as the changes can be done under existing policy. 4/9/19: Reopened, report required to next A&S Committee to ensure inconsistencies are address 12/2/20: To be placed on a policy review schedule for 2020 (for the purpose of checking consistency)
423	19-Jun-19	Resolution	Euan	ASSETS AND SERVICES RESOLVED (AS2019/12): 1. To receive the Directional Sign Policy for Accommodation, Information and Tourist Attraction Report. 2. That the Blue Signs Policy be amended and then circulated to community board chairs for feedback, and then presented to the Assets and Services Committee seeking a recommendation for Council to approve the Policy. (Moved Cornelissen/Seconded Cr Colenso) Carried	Open	16/08/19 policy is being redrafted in terms of NZTA Traffic Control Devices Manual to ensure Level of Service meets ONRC requirements for national consistency 12/2/20: To be placed on a policy review schedule for 2020
424	19-Jun-19	Action	Euan	Make amendments to the Directional Sign Policy so that consideration is given to generic vs business specific signs, historic business specific signs, making the policy relevant for all towns, consideration and appropriate use of coloured signs (blue and white vs black and yellow vs brown signs), policy exclusion situations, relevant NZTA policies,	Open	16/08/19 policy is being redrafted in terms of NZTA Traffic Control Devices Manual to ensure Level of Service meets ONRC requirements for national consistency 12/2/20: To be placed on a policy review schedule for 2020

Number	Raised Date	Action Type	Responsible Manager	Action or Task details	Open	Notes
				publication of the approved policy and application form, and a recommended process for managing requests		
39	19-Feb-20	Action	Euan	Provide a programme of scheduled maintenance works for the Senior Housing units to the A&S Committee	Open	12/08/20 programme being finalised. Update to work completed in P&O Officers Report.
114	18-Mar-20	Resolution	Euan	COUNCIL RESOLVED (DC2020/27): 1. To receive the Featherston Treated Wastewater to Land and Water Resource Consent Application Report. (Moved Cr West/Seconded Cr Colenso) Carried 2. To endorse Option 2 (withdrawal of the current consent application and lodging a new consent application) as the way forward for the Featherston Treated Wastewater to land and water consent application. 3. Within three months prepare options for the Assessment of Environmental Effects and a Community Engagement Plan. (Moved Cr Fox/Seconded Cr Colenso) Carried	Open	27/5/20: work continues on the Project Plan, AEE and Comms plans. Due to significance and budget, project sits within the Major Projects team at Wellington Water. GHD have been engaged to manage the project and progress the above work. 17/06/20 - A&S committee provided with updated timeline. 12/08/20 Work continues 04/11/20 – 2017 Consent application withdrawn in letter to GWRC. Ongoing update to project provided in Officers' Report.
236	17-Jun-20	Action	Euan	Forward councillors the drone survey results of Cape Palliser Road for information	Actioned	12/08/20 - Images from footage shared with Committee members as footage being finalised. Work 50% complete. 23/9/20: Work now 85% complete 04/11/20: Draft Report reviewed. Final Report to be provided to next A&S meeting. 16/12/20 - Report provided to A&S meeting.
400	12-Aug-20	Action	Euan	Investigate the nature of Moroa Water Race events resulting in an operational callout (e.g. urban vs rural vs stormwater), cost and location, and put together some analysis	Open	Work in Progress 16/12/20 - Data gathered, analysis under way
401	12-Aug-20	Action	Euan	Liaise with NZTA about the flooding and road camber issue at 97 Main Street in Greytown	Actioned	01/10/20 Officers met with Ian Wiggins on site and will feed back to NZTA small footpath depression will be levelled 04/11/20: Issue discussed with business owner and any remedial work to be completed.
591	4-Nov-20	Action	Euan	Review whether additional lighting can be placed on or around the Featherston War Memorial	Open	16/12/20 - Existing lighting has been removed due to earthquake risk. Alternative/additional lighting being considered as part of renovations

Number	Raised Date	Action Type	Responsible Manager	Action or Task details	Open	Notes
						but beyond scope of PGF funding. Work continues for best solution.
596	4-Nov-20	Action	Euan	Deliver fact sheets covering why the Papawai Road and Pinot Grove wastewater projects were undertaken, current and future capacity projections, how the budget was set and a conclusion on how Council will be assured of best value for money	Actioned	16/12/20 - facts sheets provided with Officer reports