

<b>Repair Task:</b>	<b>Task 27 – Bridge 262 Opoutama Abutment</b>
<b>Track Location:</b>	Rail Chainage 335.43km
<b>Description:</b>	Repair abutment erosion and reinstate abutment support on northern end of Bridge 262
<b>Required Works</b>	Repair abutment erosion and reinstate abutment support on northern end of Bridge 262
<b>Scale/ Scope/Volumes:</b>	Abutment retaining design, require coastal design input. Check structure issues with Novare.
<b>Construction Comment:</b>	
<b>Designer Comment:</b>	Combination concrete block walling and hard rock spoils to control coastal erosion at head of the beach.
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.





Drone shot looking northwest into Bridge 262,  
Opoutama settlement in rear part of photograph

Bridge 262 Northern Abutment  
erosion area











SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

METHODOLOGY – SITE SPECIFIC:		
SITE SPECIFIC RISK ITEMS	SPECIFIC ACTIVITIES	RESPONSIBILITY
<b>ITEM 1</b> <b>ITEM 2</b> <b>ITEM 3</b>	1.1	Site management Contractors
	1.2	Site management Contractors
	1.3	Site management Contractors
	1.4	Site management Contractors
	1.5	Site management Contractors
	1.6	Site management Contractors
	1.7	Site management Contractors
	1.8	Site management Contractors



<b>Repair Task:</b>	<b>Task 28 – Seawall Reinstatement &amp; Erosion Protection @ 335.26km</b>
<b>Track Location:</b>	Rail Chainage 335.26km
<b>Description:</b>	Seawall reinstatement over nominal 60m of track formation
<b>Required Works</b>	
<b>Scale/ Scope/Volumes:</b>	<p>Existing seawall requires repair / extension – has been ongoing design issue since late 1960s. Original 1938 seawalls were butted up against rock outcrop that has eroded away in past 80 years.</p> <p>Remedial design either big bags concrete pump filled, large rock spoils or Stonestrong seawall</p> <p>Seawall priced high side using piles &amp; blocks for costing purposes, although bags potentially more expensive due to concrete volumes.</p>
<b>Construction Comment:</b>	
<b>Designer Comment:</b>	Consent issues will require early consideration & discussion with HBRC & WDC as part of detailed design. Options available to remove / relocate old railway wagons to remove visual issue at end of beach and replace with wall to improve.
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.

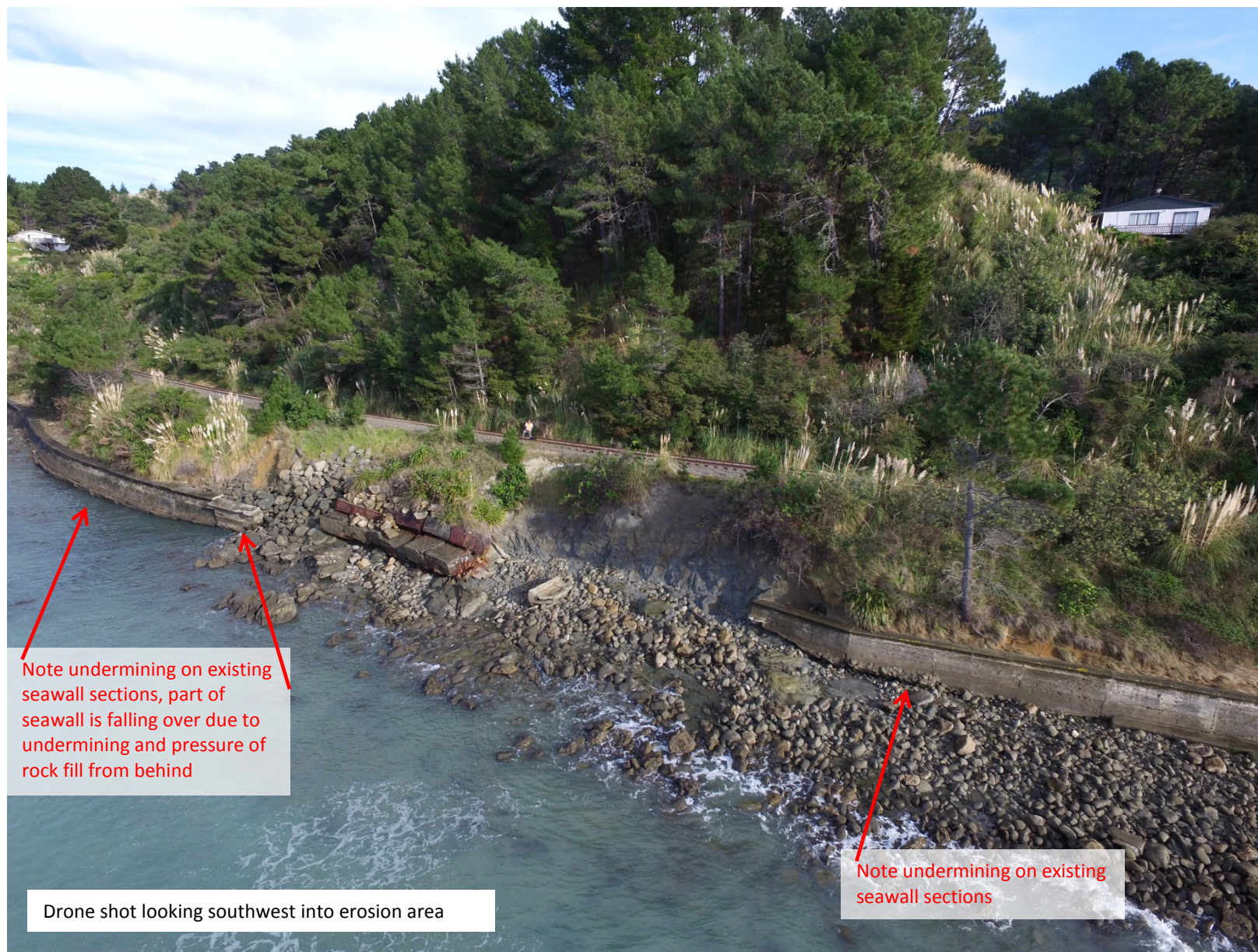




Erosion area – note undermining  
to north and south on existing  
seawall

Drone shot looking northwest into erosion area





Note undermining on existing seawall sections, part of seawall is falling over due to undermining and pressure of rock fill from behind

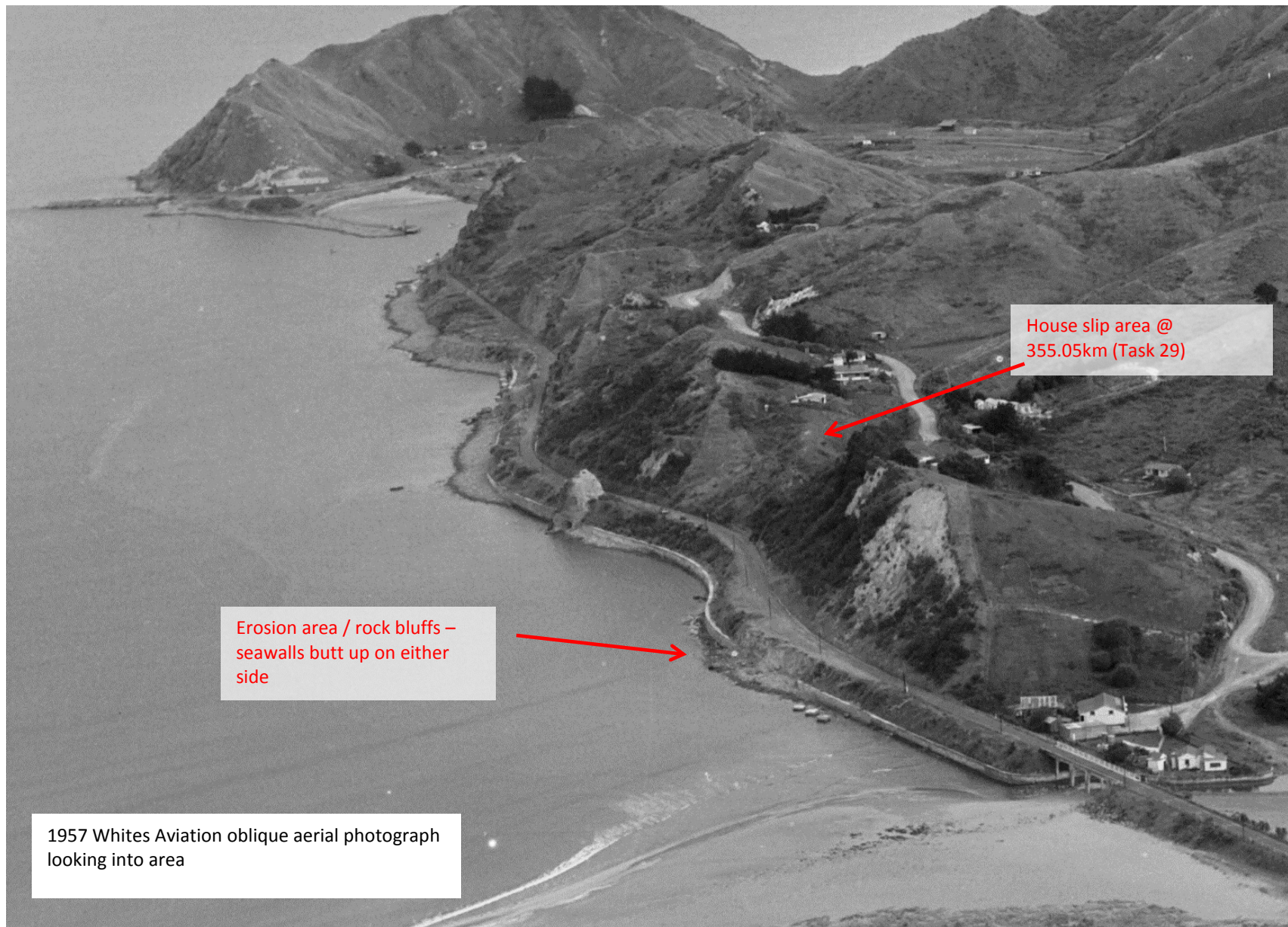
Drone shot looking southwest into erosion area

Note undermining on existing seawall sections









Erosion area / rock bluffs –  
seawalls butt up on either  
side

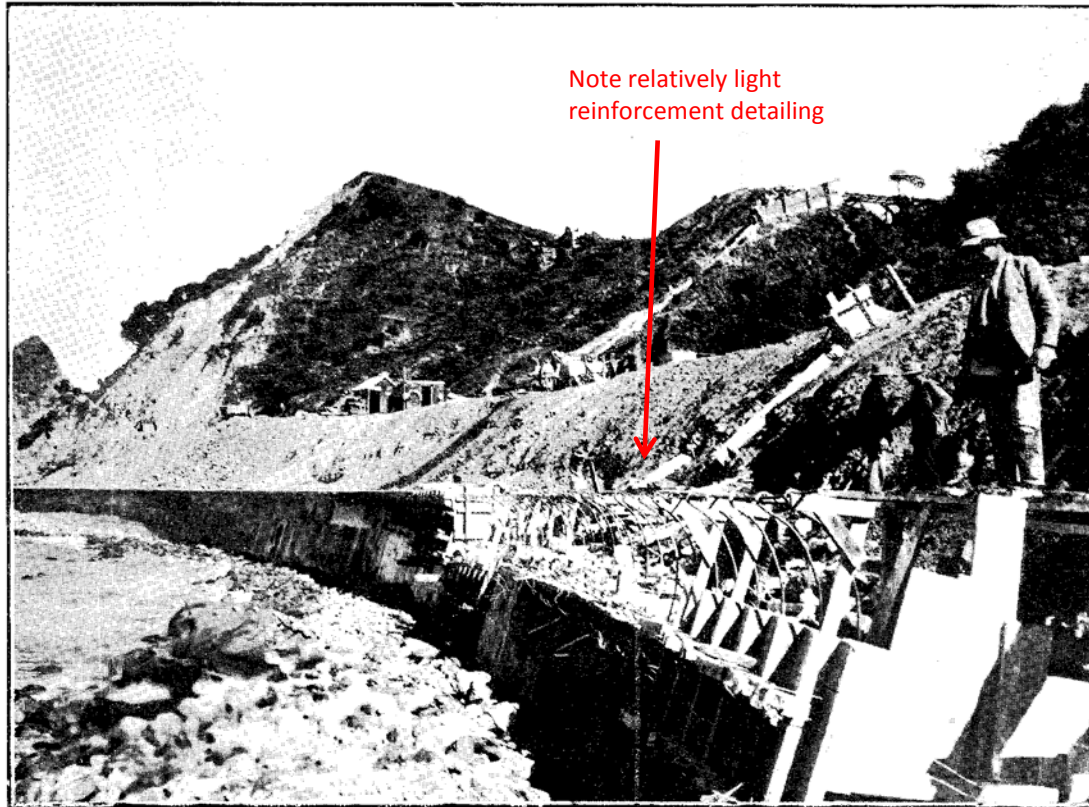
House slip area @  
355.05km (Task 29)

1957 Whites Aviation oblique aerial photograph  
looking into area



1957 Whites Aviation oblique aerial photograph  
looking into area – enlarged view





SEA-WALL IN COURSE OF CONSTRUCTION, WAIKOKOPU BLUFFS.



1938 construction photo above (taken from (1938 NZR government reports) showing construction detail and view of erosion area below





Photos showing general erosion areas and underlying fractured rockmass





View looking south into railway wagon erosion protection



Note undermining on existing seawall, seawall is falling over due to undermining and pressure of rock fill from behind



SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

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<b>Repair Task:</b>	<b>Task 29 – House Slip @ 355.05km</b>
<b>Track Location:</b>	Rail Chainage 335.05km
<b>Description:</b>	Slip failing in front of house onto rail formation below
<b>Required Works</b>	
<b>Scale/ Scope/Volumes:</b>	Slip removal and upslope stabilisation
<b>Construction Comment:</b>	
<b>Designer Comment:</b>	<p>Assess failure causes.</p> <p>Consider if proposed earthworks will worsen upslope stability in vicinity of house?</p> <p>Slip appears to be reactivation on previous slip area – multiple ongoing events visible in aerial photos over time.</p> <p>Stability of adjacent house site requires assessment – works need to make sure that the house site is not further destabilised ( There are duty of care issues to upslope neighbour from slope stability works)</p>
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.





Culvert discharge from adjacent road in this area

Drone shot looking west into house site / slip area









Site clearance works early July 2019 for track access - note minimum material removed to provide access (leaving as much buttress in place as practicable), pending further geotechnical assessment.



SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

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<b>Repair Task:</b>	<b>Task 30/31/32 – Seawall Under Erosion and Overtopping Protection</b>
<b>Track Location:</b>	Rail Chainage 335.1-335.2km, 335.26-335.34km & 334.91km
<b>Description:</b>	Toe erosion reinstatement at base and overtopping protection on top of existing seawall
<b>Required Works</b>	Toe erosion reinstatement at base and overtopping protection on top of existing seawall
<b>Scale/ Scope/Volumes:</b>	<p>Multiple overtopping sites, albeit relatively short lengths on southeast facing wall sections – require additional 1.2 – 1.8m height plus repair of significant erosion under existing 1937 / 1938 seawall.</p> <p>Significant lengths of toe erosion underlying 300mm – 1.2 m beneath current wall – requires backfilling and toe protection with bagged concrete or similar.</p>
<b>Construction Comment:</b>	Significant issues around working in tidal and wave conditions
<b>Designer Comment:</b>	<p>Designer comments – walls were mostly cast against rockmass outcrops apart from some minor gully fill areas. Repair of scouring using pumped concrete bags plus additional toe protection required in multiple locations.</p> <p>For overtop protection – geotechnical capacity of concrete wall likely to be limited in terms of supporting additional fill surcharge, particularly where fill imposes a lateral wedge load at top of wall . Consider self-drilling grouted anchors to provide stabilising force at top of wall where new height is installed.</p>
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.





Typical over topping areas -  
note erosion above and behind  
wall





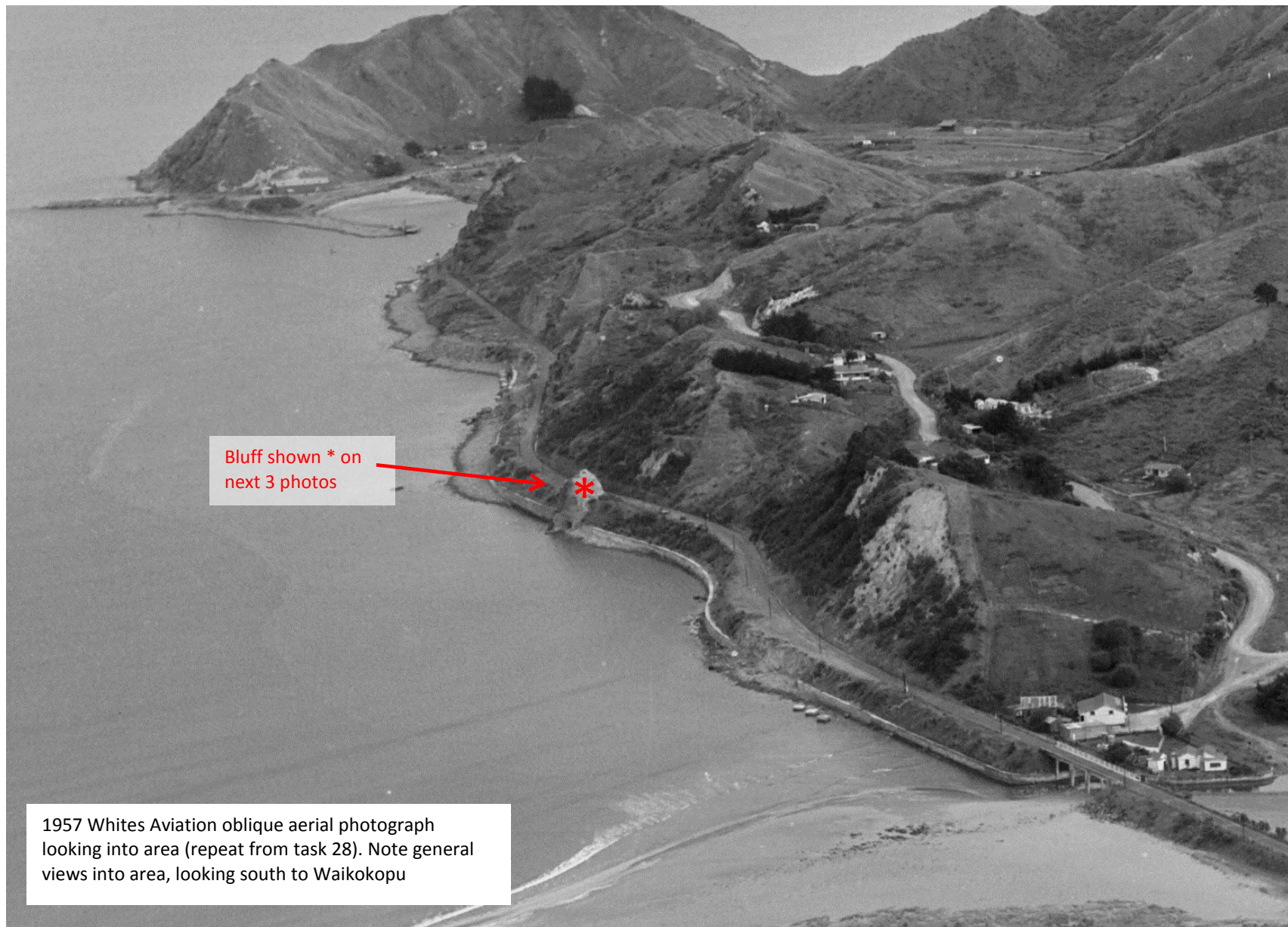
Typical over topping areas -  
note erosion above and behind  
wall





Note toe erosion and  
undermining under concrete  
seawalls

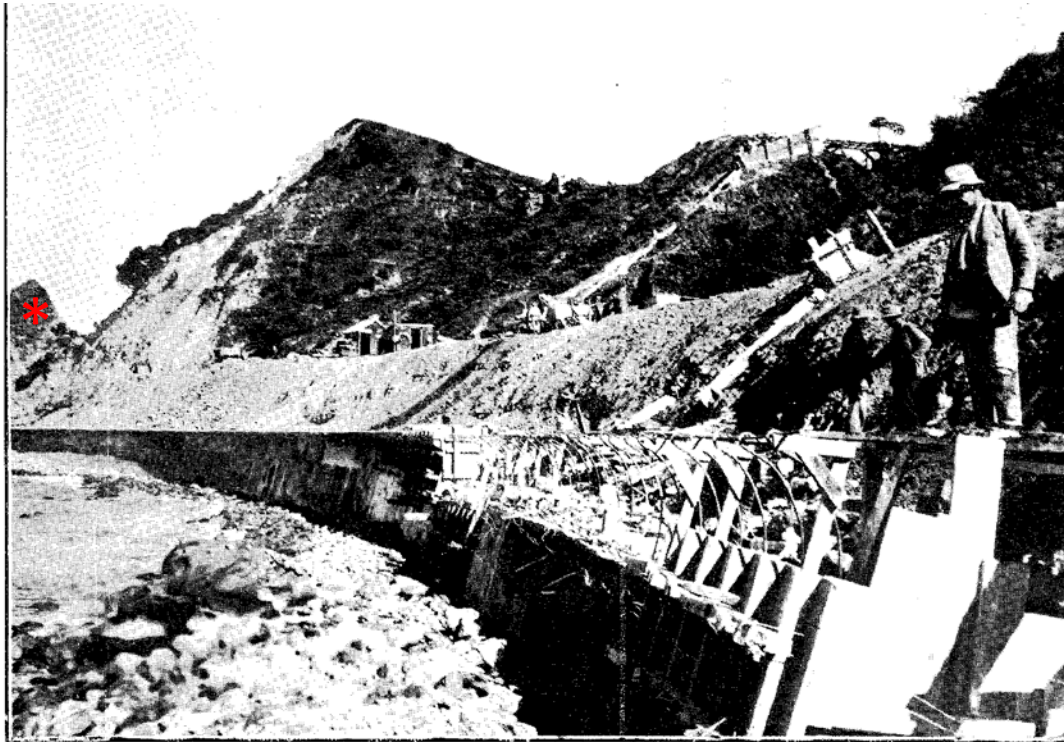




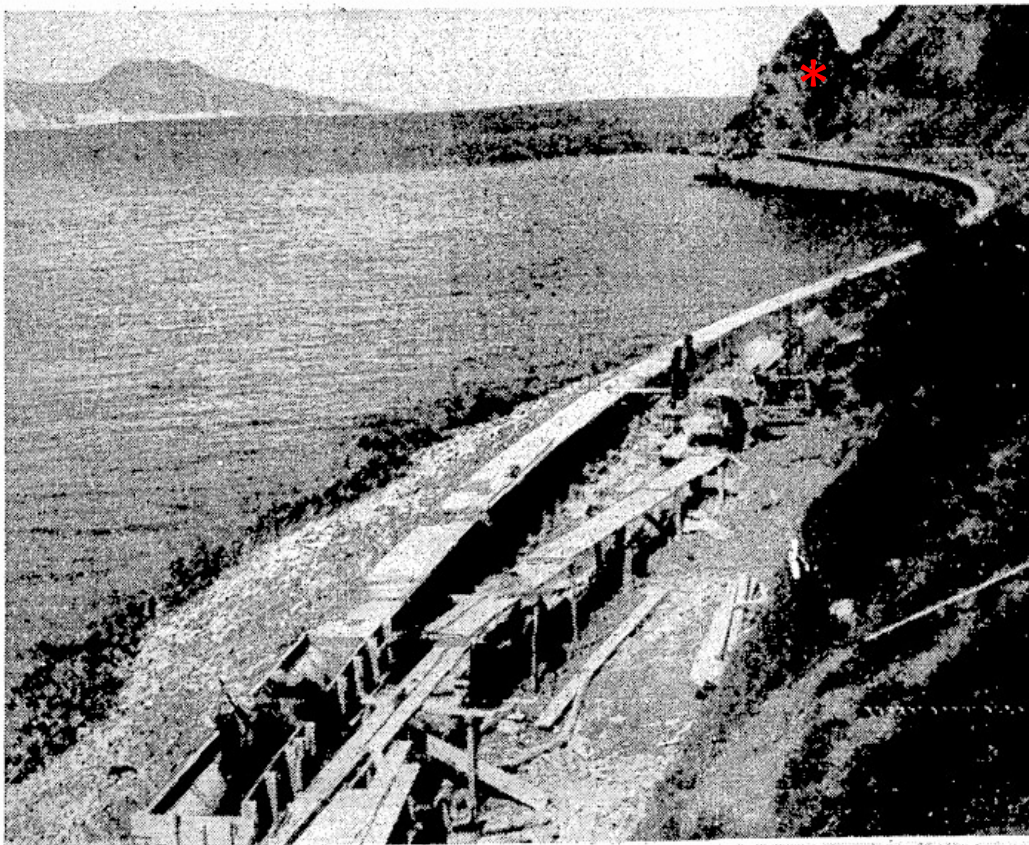
Bluff shown \* on  
next 3 photos

1957 Whites Aviation oblique aerial photograph  
looking into area (repeat from task 28). Note general  
views into area, looking south to Waikokopu





SEA-WALL IN COURSE OF CONSTRUCTION, WAIKOKOPU BLUFFS.



*Building a sea-wall on the route of the East Coast railway, the construction of which is nearing completion. This wall, in the neighbourhood of Waikokopu, is to protect the new line from erosion along a shingly beach, where the sea constantly alters the coastline.*





Typical photos of toe erosion and wall over topping erosion







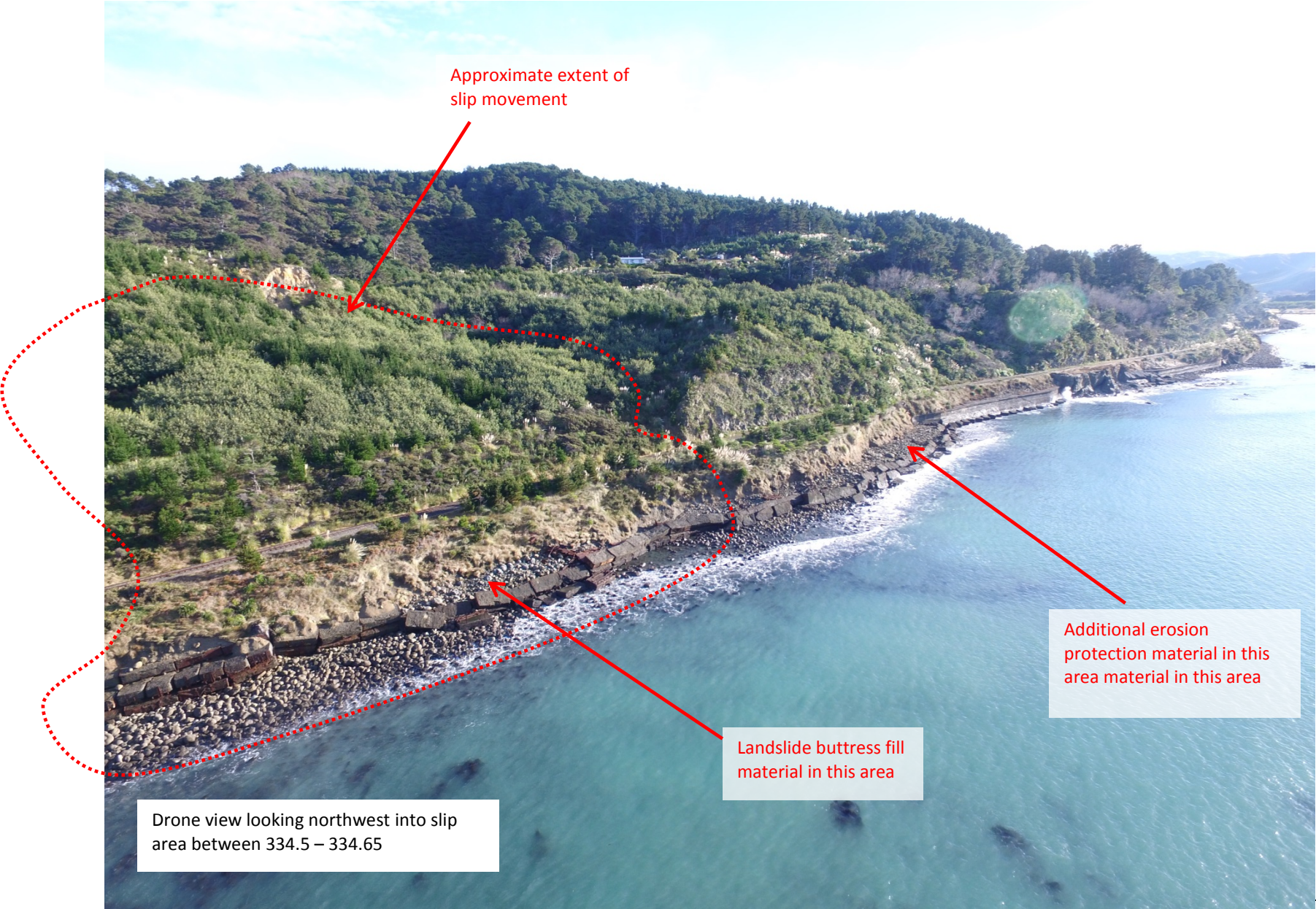
SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

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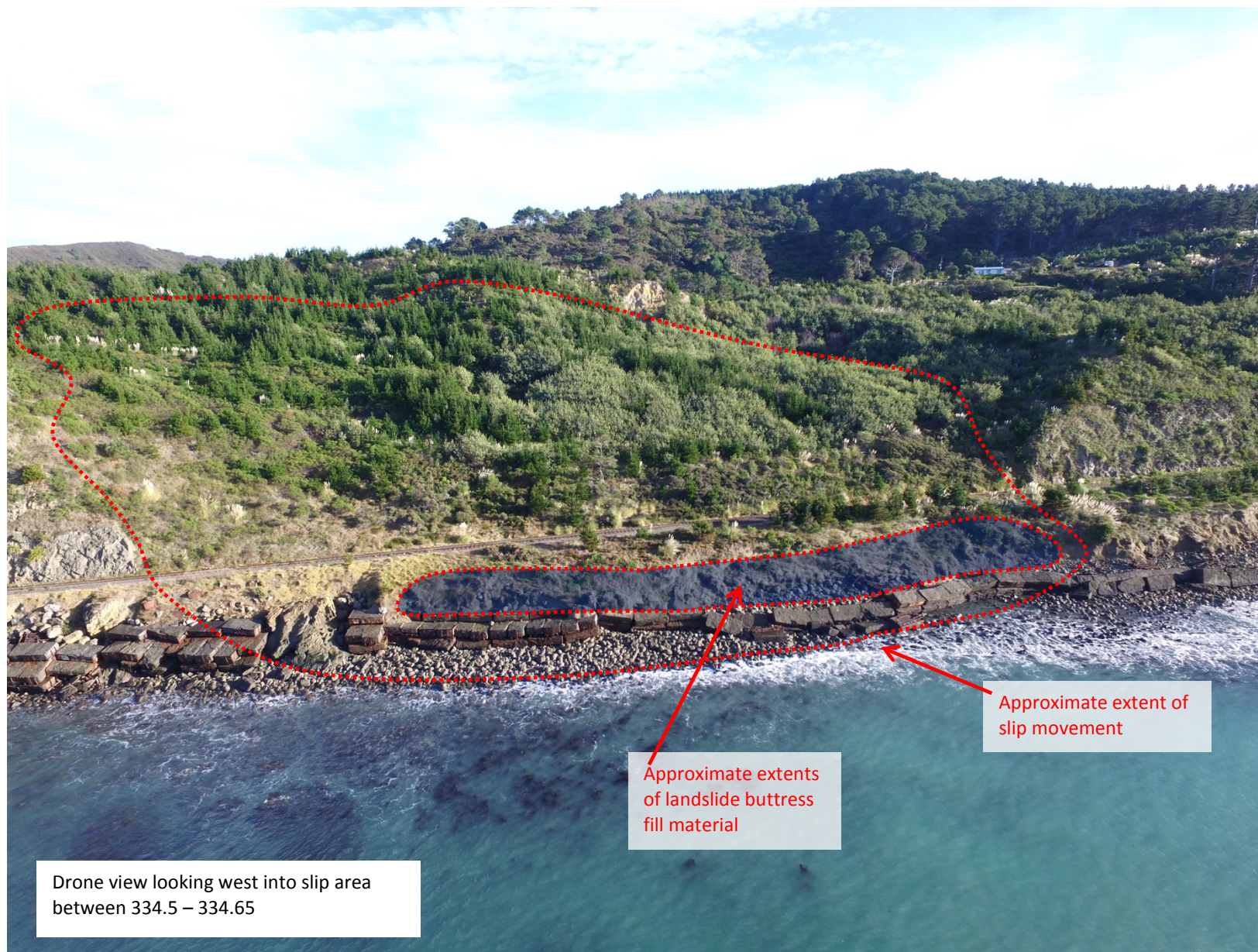


<b>Repair Task:</b>	<b>Task 33 – Rock Protection Behind Railway Wagons @ 334.5km</b>
<b>Track Location:</b>	Rail Chainage 334.5-334.65km
<b>Description:</b>	Buttress rockfill on slip area behind railway wagons - weight on slip toe to preserve global stability as well as minimise removal of soil by wave action
<b>Required Works</b>	Buttress rockfill on slip area behind railway wagons - weight on slip toe to preserve global stability as well as minimise removal of soil by wave action
<b>Scale/ Scope/Volumes:</b>	Area is currently protected by wagons at mid tide level but overtopping waves are eroding away slip debris and material behind wagons – needs some rock fall armouring to prevent loss of soil.
<b>Construction Comment:</b>	Significant issues around working in tidal and wave conditions
<b>Designer Comment:</b>	Check global stability – wagons and new rock fall expected to be required to provide for adequate FOS on upslope movement
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.









Drone view looking west into slip area  
between 334.5 – 334.65

Approximate extents  
of landslide buttress  
fill material

Approximate extent of  
slip movement





Drone view looking west into slip area  
between 334.5 – 334.65

Landslide area

Approximate extents of additional erosion  
protection fill above railway wagons  
immediately north of landslide





Photos showing landslip / wagons at ground level







Photos showing landslip / wagons at ground level





SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

METHODOLOGY – SITE SPECIFIC:		
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<b>Repair Task:</b>	<b>Task 34 – Rock Scaling 334-334.38</b>
<b>Track Location:</b>	Rail Chainage 334-334.38km
<b>Description:</b>	Cliff face areas require scaling to remove significant rock fall hazard.
<b>Required Works</b>	
<b>Scale/ Scope/Volumes:</b>	Allow to scale cliff face - significantly less work than around Dropout 3. Rockmass dipping into slope, cut face appears to be relatively stable with minimal rock in adjacent swale. Allow for any minor scaling as part of scaling works further north
<b>Construction Comment:</b>	Require expert assistance to define scale and scope of problem - prelim budget 7 days of actual abseil work on site.
<b>Designer Comment:</b>	Require expert assistance to define scale and scope of problem - prelim budget 7 days of actual abseil work on site.
<b>Rail Operations:</b>	Early works – ahead of rail operations.





Drone view looking southwest into rock fall area. Note extensive coastal protection using railway wagons

Rock scaling area looking to Waikokokopu. Benching operations date from 1937 - 38





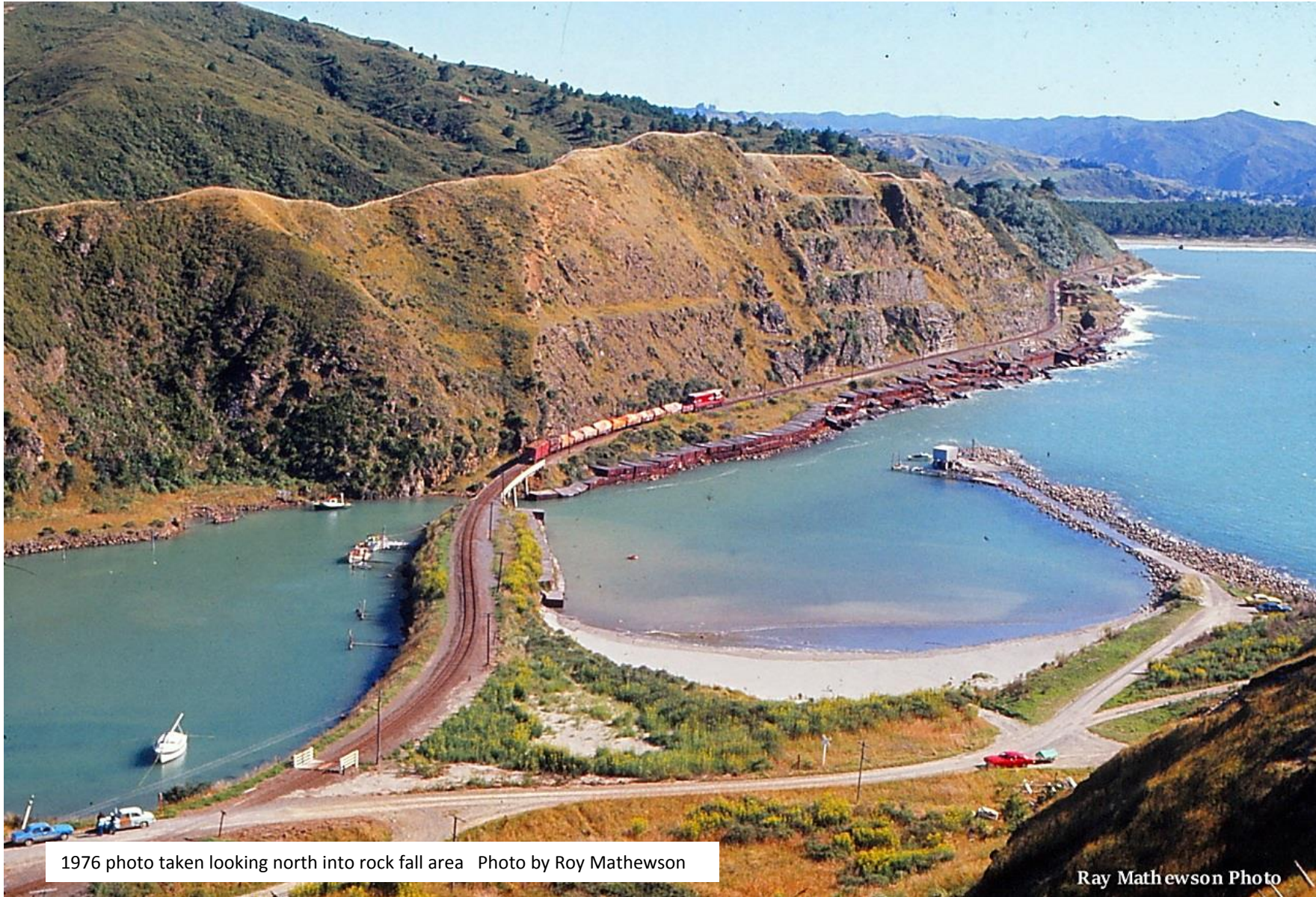












1976 photo taken looking north into rock fall area Photo by Roy Mathewson

Ray Mathewson Photo









1957 Whites Aviation oblique aerial photograph  
looking south into Waikokopu area





RAILWAY FORMATION, WAIKOKOPU BLUFFS.  
NAPIER-GISBORNE RAILWAY.

1938 photo looking south through bluff area to Waikokopu – this photo predates benching operations and shows Bridge 261 under construction





View of track looking south to bridge 261 – note relatively limited drop rock in side swales.



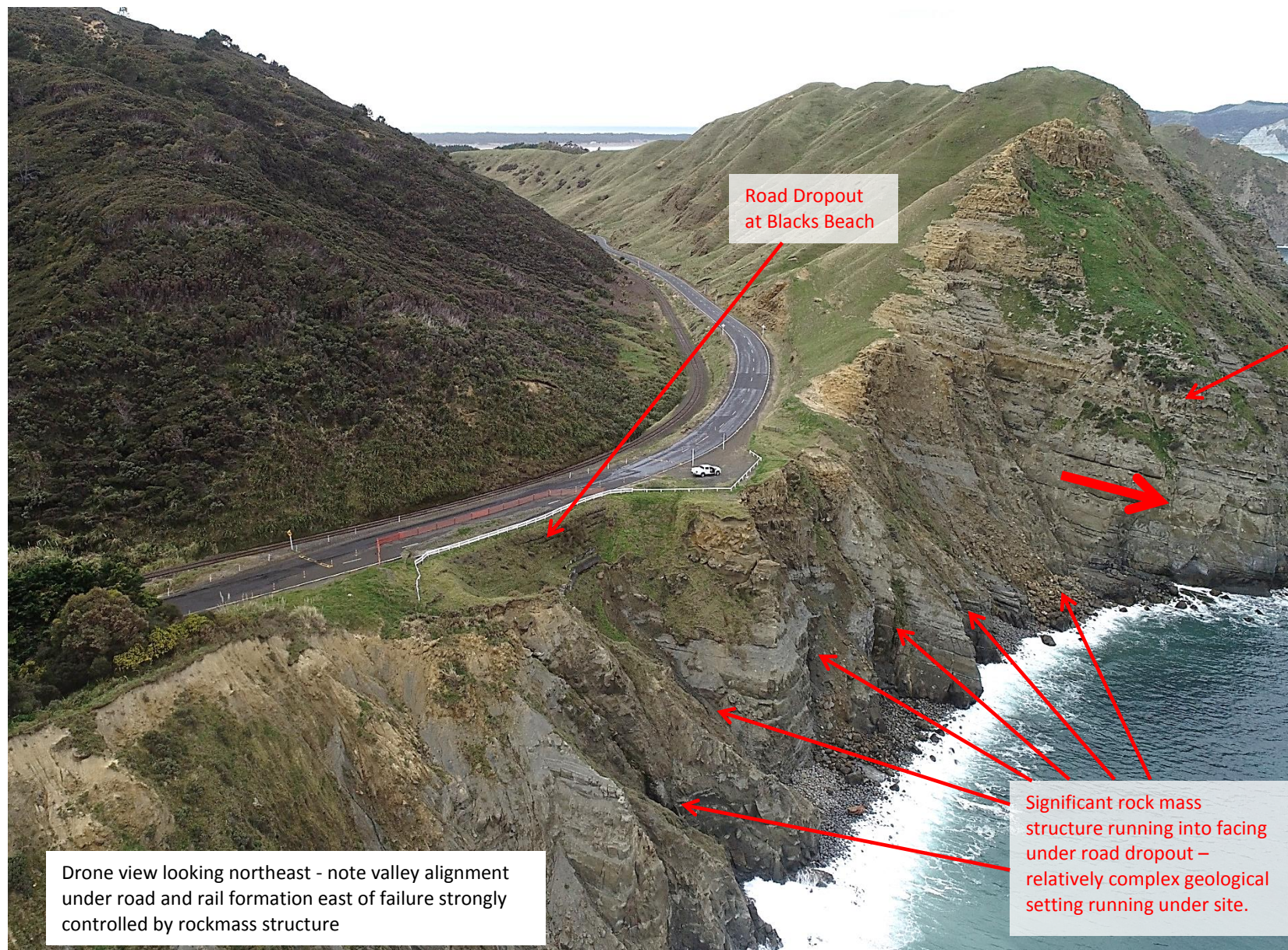
SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

METHODOLOGY – SITE SPECIFIC:		
SITE SPECIFIC RISK ITEMS	SPECIFIC ACTIVITIES	RESPONSIBILITY
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<b>Repair Task:</b>	<b>Task 35 Road Dropout @ Blacks Beach</b>
<b>Track Location:</b>	Rail Chainage 331.4km
<b>Description:</b>	Road has failed - track will require movement back into hill to reinstate road carriageway and track formation
<b>Required Works</b>	Road has failed - track will require movement back into hill to reinstate road carriageway and track formation.
<b>Scale/ Scope/Volumes:</b>	Significant work undertaken by Wairoa District Council, including geotechnical & geological assessment and proposed realignment works, discussions with KR including land ownership and entry permits.
<b>Construction Comment:</b>	Significant work undertaken by Wairoa District Council, including geotechnical & geological assessment and proposed realignment works, discussions with KR including land ownership and entry permits.  Note excavated spoil could be used for toe buttress material on slip under Task 33 – TBC.
<b>Designer Comment:</b>	Peer review undertaken by Holmes Consulting for Kiwirail. In summary recommendations for additional investigation & updating of ground model required. We consider current reports & proposed solution from LDE on behalf of WDC look reasonable based on local geological conditions however wider / larger retreat could potentially be considered.  Concur need for investigations to confirm failure depth and extents - significant investment required based on limited information at the moment.
<b>Rail Operations:</b>	Work trains past site, including potential deliveries for Dropouts 4 – 6 from southern end, dependant on program timing.





Road Dropout  
at Blacks Beach

Note bedding dip approx.  
10-15 degrees seaward;  
varies around site, flatter  
under slip area

Significant rock mass  
structure running into facing  
under road dropout –  
relatively complex geological  
setting running under site.

Drone view looking northeast - note valley alignment  
under road and rail formation east of failure strongly  
controlled by rockmass structure





Drone view looking North – approx. slip extent shown

Nominal extent of deep seated rock mass movement based on WDC reporting

Road Dropout – moving under reinforced soil slope (which has also been piled and anchored back)





Drone view looking North – approx. slip extent shown

Nominal extent of deep seated rock mass movement based on WDC reporting



1957 planar failure  
movement

Road Dropout  
at Blacks Beach

Drone view looking West - Blacks Beach in distance; 1957  
planar failure highlighted – approx. slip extent shown











Blacks Beach Dropout – view from road level



SCOPE OF WORKS	
DRAWING PACKAGE:	
SITE ACCESS:	
SITE PREPARATION:	
SUBSOIL DRAINAGE:	
STORMWATER DRAINAGE:	
EARTHWORKS:	
OTHER 1:	
OTHER 2:	

METHODOLOGY – SITE SPECIFIC:		
SITE SPECIFIC RISK ITEMS	SPECIFIC ACTIVITIES	RESPONSIBILITY
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<b>Repair Task:</b>	<b>Task 36 Generic culvert &amp; swale cleanout and reinstatement Wairoa – Gisborne 296.30km -390.50km</b>
<b>Track Location:</b>	Rail Chainage 296.3-390.5km (Kiwi Road Crossing Wairoa to Gisborne Yard)
<b>Description:</b>	Culvert and swale cleanouts and repairs
<b>Required Works</b>	Culvert & swale issues extending from Wairoa through to Gisborne, outside of those specifically addressed in preceding work packages. Allow for culvert cleanout, outlet protection, scour protection, excavation / cleanout and reshaping of swale drains where required.
<b>Scale/ Scope/Volumes:</b>	Culvert & swale issues extending from Wairoa through to Gisborne, outside of those specifically addressed in preceding work packages. Allow for culvert cleanout, outlet protection, scour protection, excavation / cleanout and reshaping of swale drains where required.
<b>Construction Comment:</b>	Over 175 culverts are recorded on KR culvert log between 296.3 & 390.5km
<b>Designer Comment:</b>	Relatively straightforward conditions expected outside of the Nuhaka to Maraetaha hill country area ( 324km to 365km )
<b>Rail Operations:</b>	Work trains throughout area



<b>Repair Task:</b>	<b>Task 37 Generic Bridge erosion protection &amp; scour protection issues Wairoa – Gisborne 296.30km -390.50km</b>
<b>Track Location:</b>	Rail Chainage 296.3-390.5km (Kiwi Road Crossing Wairoa to Gisborne yard)
<b>Description:</b>	Bridge erosion and scour assessment and civil works
<b>Required Works</b>	Bridge erosion and scour /abutment protection
<b>Scale/ Scope/Volumes:</b>	Bridge erosion and scour /abutment protection
<b>Construction Comment:</b>	Known problems between 324km & 365 km have been allocated as a specific task.
<b>Designer Comment:</b>	Additional assessment required, considered predominantly minor works required based on information to date.
<b>Rail Operations:</b>	Work trains throughout area

<b>Repair Task:</b>	<b>Task 38 Generic Tunnel Issues Wairoa – Gisborne 296.30km -390.50km</b>
<b>Track Location:</b>	Rail Chainage 296.3-390.5km (Kiwi Road Crossing Wairoa to Gisborne yard)
<b>Description:</b>	Tunnel lining / track / drainage issues, outside of specific assessment task 4 (Wharekakaho Tunnel 26) and task 18 (Tikiwhata Tunnel 19)
<b>Required Works</b>	Tunnel lining, roof leakage, track drainage and formation faults in tunnels 13 to 18, 20 to 23 & tunnel 25
<b>Scale/ Scope/Volumes:</b>	Most tunnels are in good condition with minimal faults. Some water proof lining requires additional fixing or refixing, some minor swale cleanouts at entrances (covered in several previous task outlines), no known formation faults or pumping track issues have been observed to date.
<b>Construction Comment:</b>	Relatively minor issues expected.
<b>Designer Comment:</b>	Relatively minor issues expected.
<b>Rail Operations:</b>	Work trains throughout area



<b>Repair Task:</b>	<b>Task 39 Generic rail formation issues Wairoa – Gisborne 296.30km -390.50km</b>
<b>Track Location:</b>	Rail Chainage 296.3-390.5km (Kiwi Road Crossing Wairoa to Gisborne yard)
<b>Description:</b>	Rail formation issues outside specific task areas outlined previously
<b>Required Works</b>	Rail formation issues outside specific task areas outlined previously
<b>Scale/ Scope/Volumes:</b>	Track formation throughout area is in relatively good repair with minimal subgrade and soft spot / pumping issues. Swale drainage required in some areas to maintain subgrade performance
<b>Construction Comment:</b>	
<b>Designer Comment:</b>	Additional assessment required, considered predominantly minor works required based on information to date.
<b>Rail Operations:</b>	Work trains throughout area

<b>Repair Task:</b>	<b>Task 40 Vegetation Clearance Wairoa – Gisborne 296.30km -390.50km</b>
<b>Track Location:</b>	Rail Chainage 296.3-390.5km (Kiwi Road Crossing Wairoa to Gisborne yard)
<b>Description:</b>	Vegetation clearance placeholder task – may be covered in other budget items elsewhere
<b>Required Works</b>	Vegetation clearance placeholder task – may be covered in other budget items elsewhere
<b>Scale/ Scope/Volumes:</b>	Significant vegetation clearance works required along formation as well as track spraying
<b>Construction Comment:</b>	Significant vegetation clearance works required along formation as well as track spraying
<b>Designer Comment:</b>	Significant cost component – several weeks work to clear and spray properly
<b>Rail Operations:</b>	Work trains throughout area



METHODOLOGY - GENERIC:		
RISK ITEMS	GENERIC ACTIVITIES	RESPONSIBILITY
<p><b>Multiple work train rail movements daily. All Personnel to be off and clear of the rail corridor during movements - RPO to lock off ALL affected works crews in movement area.</b></p> <p><b>Steep &amp; difficult ground access. Earthwork operators to assess ground conditions and go/no go.</b></p> <p><b>Steep adjacent ground to track formation.</b></p> <p><b>Rockfall, slip, trip &amp; fall hazards</b></p>	1.1 Rail protection and work site comms to be implemented before pre-start/ toolbox and works commence	Comms Team Site management
	1.2 Weather forecast for assessed and potential cancelation discussed.	Site management
	1.3 <b>Site pre-start &amp; toolbox briefing going over plan with whole crew for tasks.</b>	Site management Contractors
	1.4 Plant, equipment and materials delivered from rail loading yard at Maraetaha CH365 via rail rolling stock. Work train movements to be discussed and confirmed with each work site.	Site management Contractors
	1.5 Plant and materials delivered to site, Access to site laydown area will be via rail corridor and by locomotive rolling stock.	Site management Contractors
	1.6 Confirm train crew briefed to work site areas and comms procedures	
	1.7 Ensure that planned works do not conflict with other crews working in this area.	
	1.8	

RESOURCES		
The following resource will be used to complete these works:		
<b>PERSONNEL:</b>	<ul style="list-style-type: none"> <li>• Project Engineer</li> <li>• Superintendent</li> <li>• 1 no. Supervisor</li> <li>• 1 no. Drainlayer</li> <li>• 1 no. Lead Operator</li> <li>• 1 no Second Operator</li> <li>• 2 Labourer</li> <li>• 1 RPO (Rail Protection Officer)</li> <li>• 1 Rail Observer</li> </ul>	
<b>PLANT AND EQUIPMENT:</b>	<ul style="list-style-type: none"> <li>• 20t Excavators</li> <li>• 14t Excavators</li> <li>• 30t Moxies</li> <li>• 9t Dumpers</li> <li>• Locomotive train &amp; rail transport units</li> <li>• Concrete Mixer</li> <li>• Rubbish Bin</li> <li>• Spill Kit</li> <li>• Fuel tanker on trailer</li> <li>• Water Trailer</li> <li>• 300-400kg Plate Compactors</li> <li>• Foot Compactors</li> <li>• Pipe Laser</li> <li>• Portaloo</li> <li>• Tool Container</li> <li>• Flexi drive pump</li> </ul>	



## SITE CONTACTS

### Project Team:

Maurice Fraser ( Designer) 021 378 399  
Tane Roderick (Construction Manager) 027 705 7933  
Other

### Comms Team:

Logistics - Radio Comms details TBC  
Emergency details TBC  
RPO details TBC

Radio channel 1:

Radio Channel 2:

Train Operators:

Emergency Channel: 145

### Other Contacts:

## HSE REQUIREMENTS

A Job Safety and Environmental Analysis (JSEA) will be compiled specifically for these works. It will contain Hazards and Controls relating to:

1. Generic Site Works
2. Working within the Rail Corridor
3. Working on this Specific Site

All personnel completing work will be briefed on this JSEA prior to commencing work onsite.

The project management team will ensure that all access requests and approvals are in place, along with service location, traffic management plans, and rail protection. Permits and approval paperwork to contractors prior to commencement of works.

## QA REQUIREMENTS

A QA check sheet will be developed specific to this works package that will cover:

1. Materials compliance – certification that all materials used to complete these works are in accordance with project design requirements and Kiwirail standard details where applicable.
2. Construction certification – including subgrade scale testing, line; length and level checks, and compaction NDM testing (90% MMD in Side Zone. 95% MMD to 300mm below Formation Level and 98% MMD to up to Formation Level.)
3. Works completion – ITP completion/reviewed/sign off and final site walkover for practical completion.

## RAIL AND CONSTRUCTION TRAFFIC MANAGEMENT

As required at lay-down stockpile areas for plant loading rail rolling stock.

Specific requirements for work trains passing through site