



Wellington Water Ltd

Streamlining Minimum Flood Level Advice Digitally

Ivan Kholodov



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Stormwater 2024

15–17 May | Takina Wellington Te Whanganui-a-Tara

Managing Flood Risk

Resource Management Act (RMA)

- Controls activities which may impact environment including flood hazard.
- Section 106 of the RMA ensures that considerations related to environmental protection, land use, and sustainable development are integrated into building projects, even if they may conflict with specific provisions of the Building Act.

District Plan Rules Building Act

- Establishes a licensing regime and minimal performance standards for buildings including flood protection.

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Flood Modelling Programme

On behalf of the five councils in the Wellington region, Wellington Water have been carrying out stormwater modelling programme to map flood hazards for District Planning purposes. The modelling has also been used for asset and emergency management and community preparedness.

The modelling team became advisors to the Land Development and Planning processes.



Modelling Results

Base Model Results 100 yr ARI (CC)

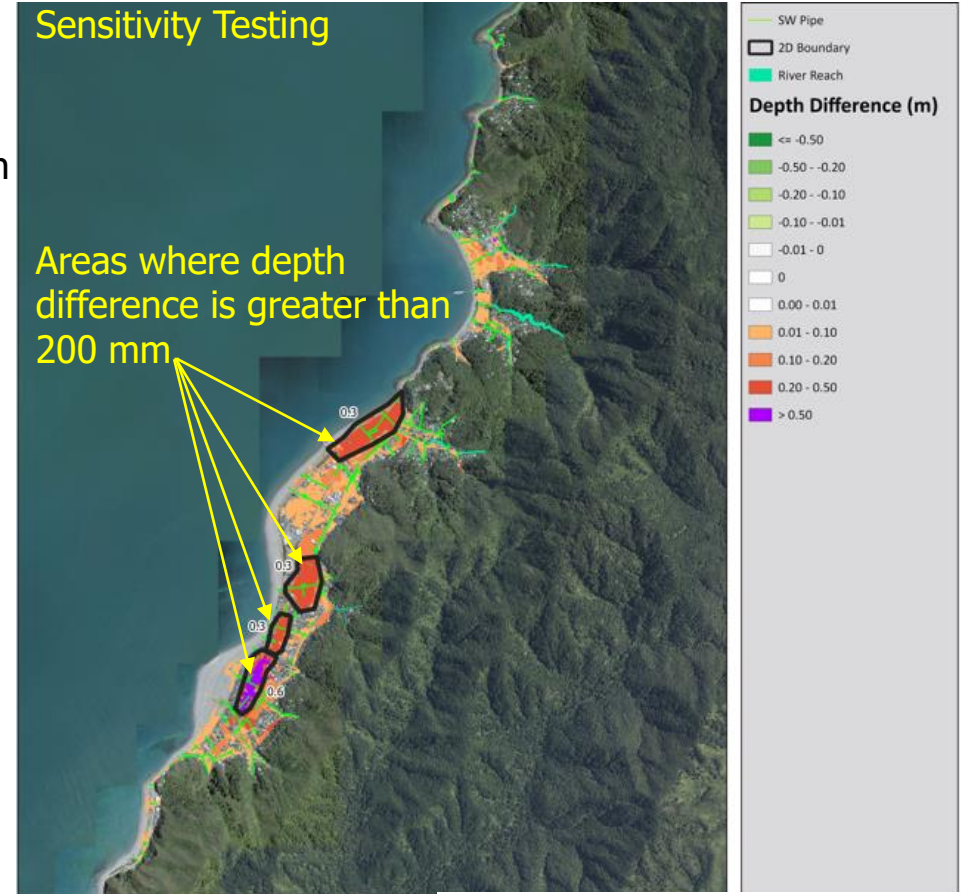


- Inlet/Outlet blockages
- Pump Station failure
- 1.5 x Base Rainfall



Sensitivity Testing

Areas where depth difference is greater than 200 mm



Dynamic Freeboard

This could be 200mm or any other freeboard allowance we established through sensitivity testing



Flood Hazard Overlays



- Stream corridors typically consist of a buffer of 5m either side of the stream centerline. Open water courses in urban areas are selected to be included in the stream corridor layer.
- The overland flowpaths were identified and mapped using the modelled results backed up with flood records considering depth and velocity to identify hydraulically significant paths.
- Inundation/Ponding are the low velocity flood extents which have ponding deeper than 50mm.



Flood Advice Standardisation

Wellington Water

MEMO

TO Land Development

COPIED TO

FROM Ivan Kholodov

DATE 9/04/2024

SUBJECT Response to Land Development Enquiry for 30 Pencarrow Crescent, Wainuiomata

FOR YOUR INFORMATION

Asset impact assessment

SITE DETAILS	
Address	30 Pencarrow Crescent, Wainuiomata
Source	Email date 5/04/2024
Type	Development enquiry
Reference	
Asset	Stormwater

FLOODING RESULTS

Software	InfoWorks ICM
Model	Wainuiomata
Model Status	Validated
Flood Scenario	100 year ARI + Climate Change (assuming 2.1 C temperature increase)
Sea Water Level	2.1 m aMSL
Vertical Datum	Wellington 1953

FLOOD IMPACT ON THE PROPERTY

DEPTH2D

- ≤0.05
- ≤0.25
- ≤0.50
- ≤1.00
- ≤3.66

Maximum Flood Depth	600 mm (proposed location)
Maximum Water Level	4.4 m aMSL
Minimum Water Level	
Overland Flow	0.2 m/s

RECOMMENDATIONS

Minimum Floor Level (Including 300mm Freeboard)	4.7 m aMSL (Minimum floor level provided is quoted to the underside of the concrete slab or floor timber joist)
Overland Flow	Moderate flow velocity adjacent to the proposed extension.

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Pilot App for Floor Level Advice

Recommended Floor Levels

42 Totara Crescent, Woburn, Lower Hutt

Results: 1

Recommended Minimum Floor Level, including freeboard (m aMSL)	4.3
Recommended Minimum Floor Height, including freeboard (m)	0.6
Freeboard (m)	0.2
Potential Overland Flowpath Constraint	Potential for obstructing flow path is low

Flooding Details

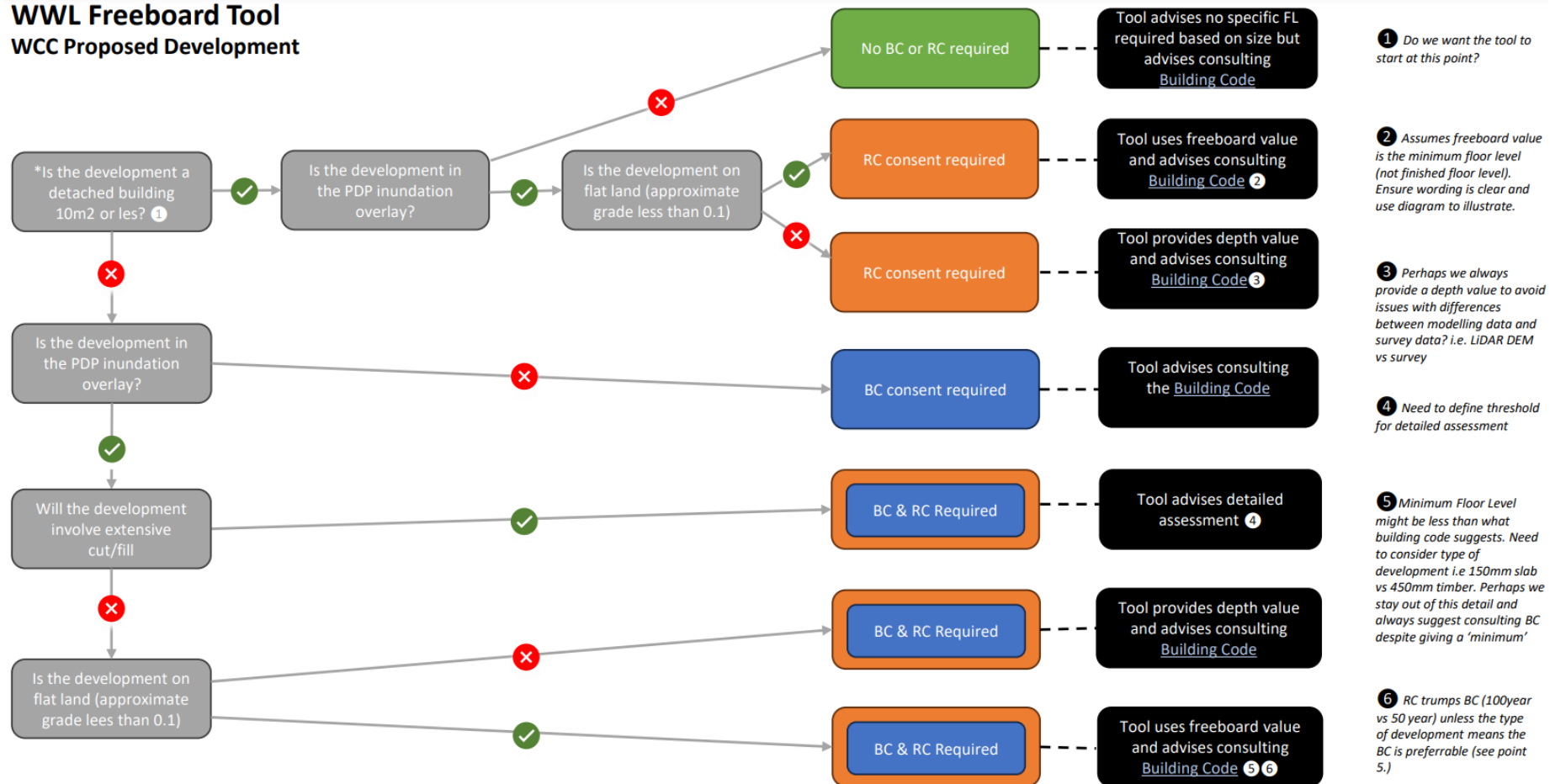
Maximum Depth (m)	0.4
Minimum Depth (m)	0.1

Further Information

If you would benefit from further detailed assessment, or need clarification on the advice provided, please contact Wellington Water at Land.Development@wellingtonwater.co.nz. Ensure you have included development details and the site location/address.

Recommended Floor Level App

WWL Freeboard Tool WCC Proposed Development



Recommended Floor Level App

The screenshot displays the 'Recommended Floor Level Application' interface. At the top, it shows the 'Wellington City' and 'Hutt City' tabs. The main map area shows an aerial view with a yellow flood zone and a blue area. A search bar at the top of the map says 'Find address or place'. A sidebar on the left contains a legend, layers, and info panels. The info panel is expanded to show 'Customer Information', 'Site Information', 'Flood Information', and 'Model Information'. A 10m scale bar is visible at the bottom of the map. The footer of the map area includes copyright information: 'Eagle Technology, LINZ | Copyright 2016 Crown copyright (c) - Land Information New Zealand | Modelling Team, Wellington Water Ltd' and 'Powered by Esri'.

Recommended Floor Level Application

Wellington City | Hutt City

Legend | Layers | Info | Edit

Customer Information:
Customer Name - Ivan Kholodov
Customer Email - Ivan.Kholodov@wellingtonwater.co.nz
Council Reference - 123

Site Information:
Address - 105 Brougham Street, Mt Victoria
Polygon Area - 20.3m²

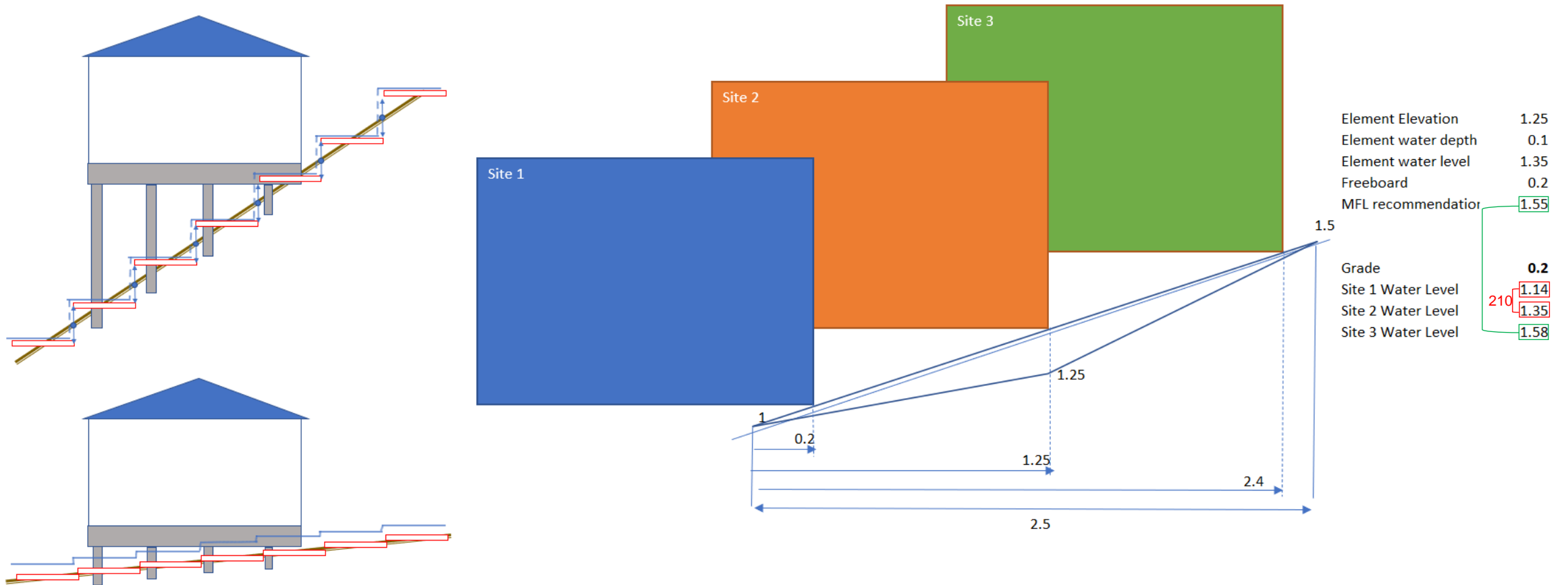
Flood Information:
Recommended Floor Level (aMSL) - 14.2
Intersects Stream Corridor? - No
Intersects Overland Flow? - Yes
Sloping Site? - No
Final Recommendation -

Model Information:
Model - WCC Southern CBD

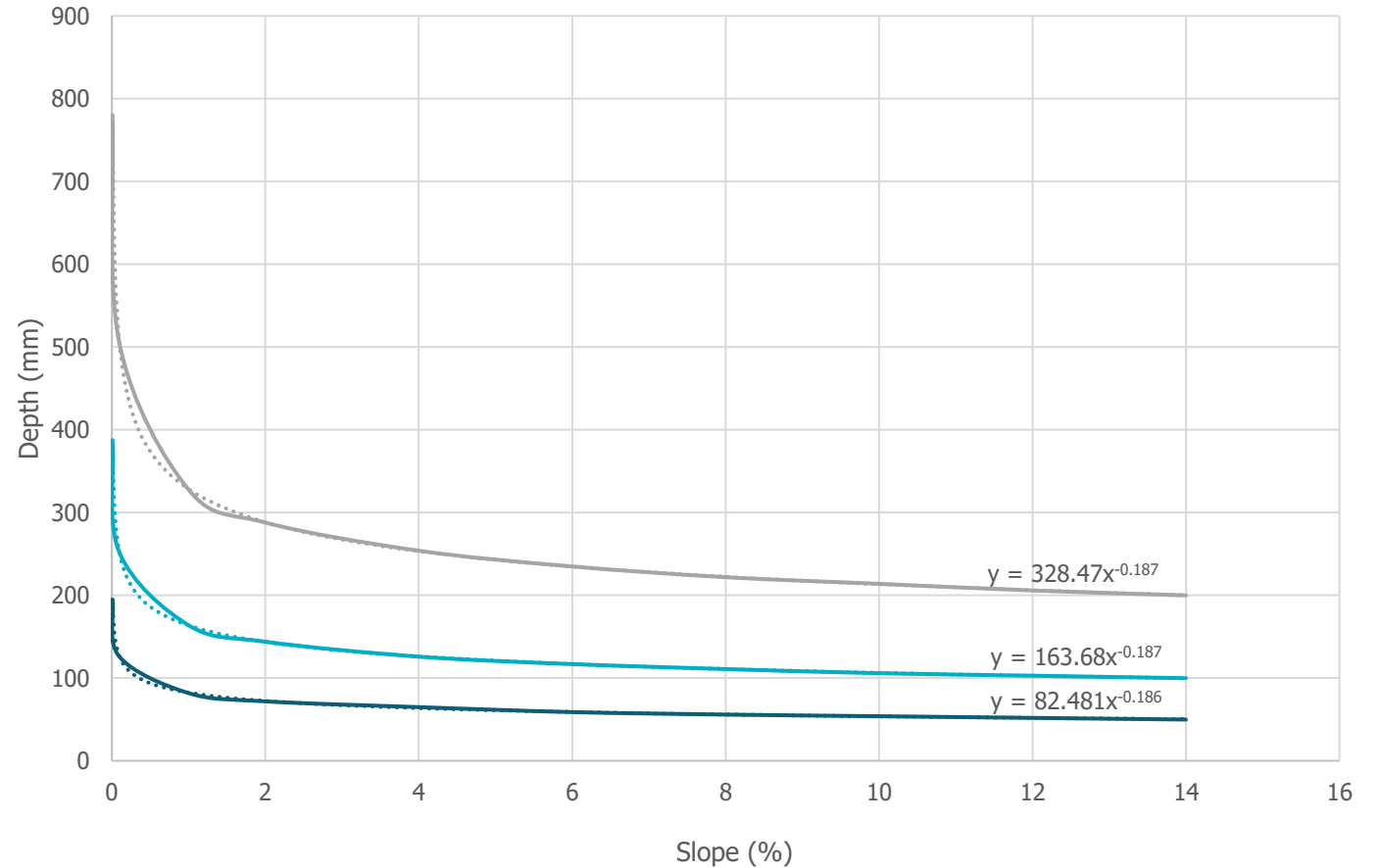
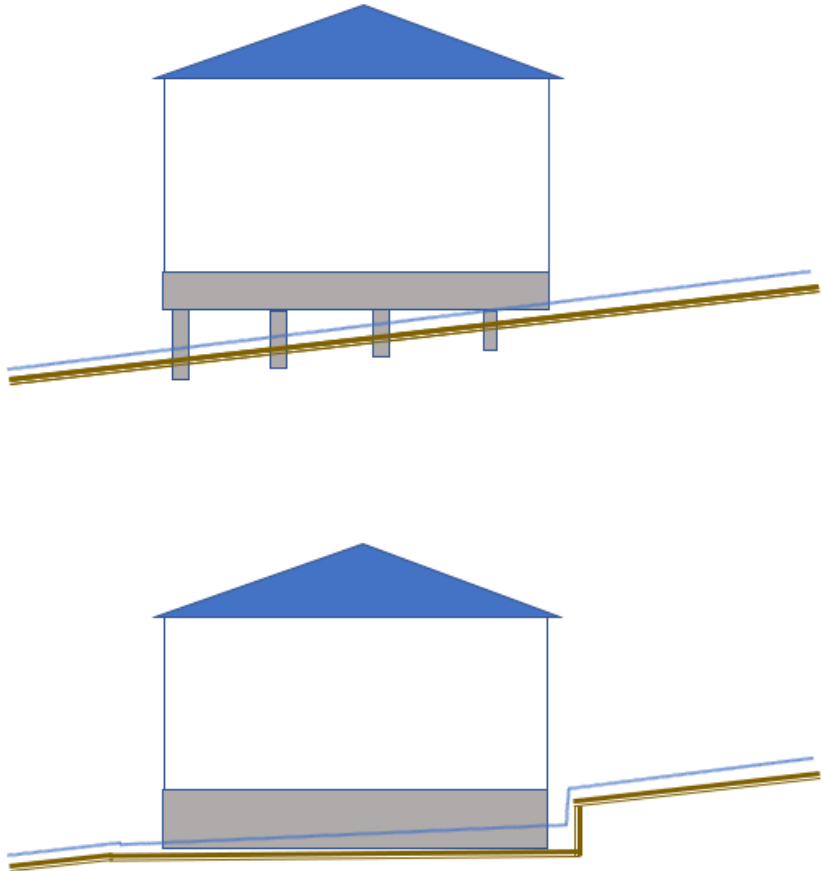
10 m

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Sloping Site Considerations

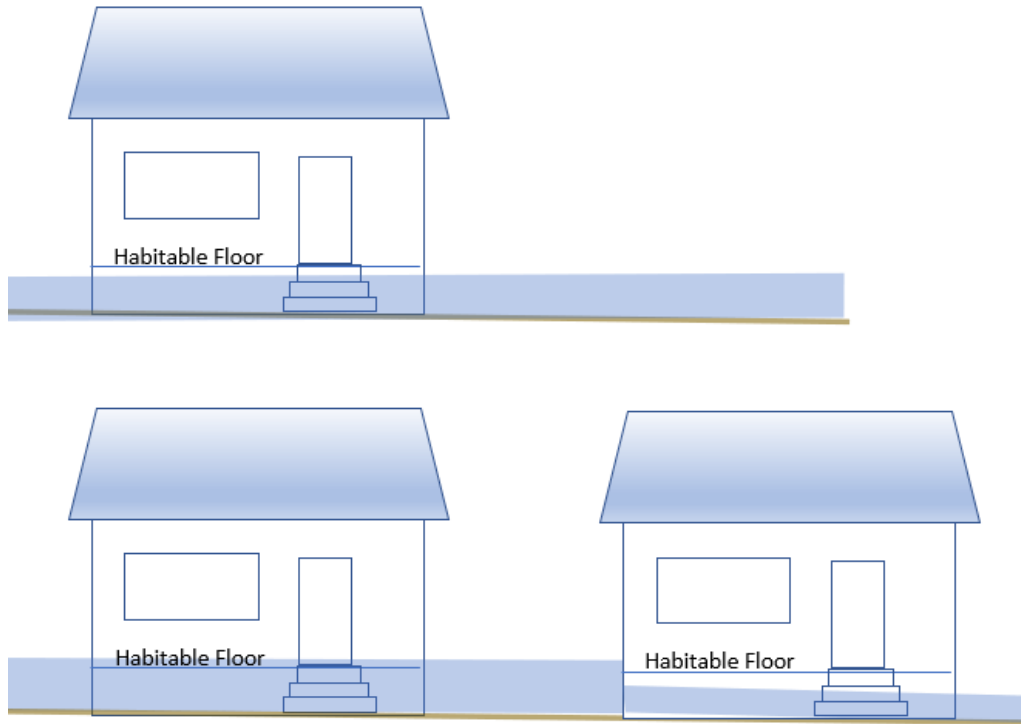


Ground Works Considerations



Offsite Effects Considerations

Original Assumptions:



Investigation into trigger velocity revealed many exceptions even for velocity as low as 0.1 m/s

From the point of view of a modelling consultant, this kind of work is not ideal as it is tricky from technical perspective and challenging with respect to client management.

Conclusion

The evolution of flood hazard advice is a good case study of process optimisation and automation -

- Initial measures address the need but at the same time, impose significant challenges and limitations.
- It takes time to connect the dots and understand the situation in its entirety.
- Once quantity of experience reaches a certain threshold, a qualitative change occurs revolutionising the process and produces leap in productivity.
- The development of the App required stakeholder input which led to more frequent communication and better goal alignment.

When operational, the App will empower all the stakeholders to access all the necessary flood modelling information independently and significantly reduce assessment requests for the Modelling Team, freeing critically needed resources for the dozens of projects in need of modelling.

Thank you!
Questions? Patai?