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Ed Hardy
22 Abernathy Street,
Seaforth, NSW 2092

Preliminary Landslip Assessment for 22 Abernathy Street, Seaforth, NSW.

This letter report details the results of a preliminary landslip assessment required by Northern Beaches Council as per Manly Councils DCP 2013 requirements to accompany all new Development or Building Certificate Applications. It is a review of the design plans followed by a walk over visual assessment of the stability of the existing property, no in-situ testing was undertaken. The assessment follows the guidelines as set out in the preliminary assessment checklist and a landslide Risk Assessment has been undertaken as part of the works.

1. Landslip Risk Class:

The site is located within Landslip Risk Class "G1" as identified within Northern Beaches (Manly) Councils, Development Control Plan 2013 – Schedule 1, Map 'C', being 'Steeper Slopes generally near coastal or harbourside areas typically >25°' (See Figure 1).

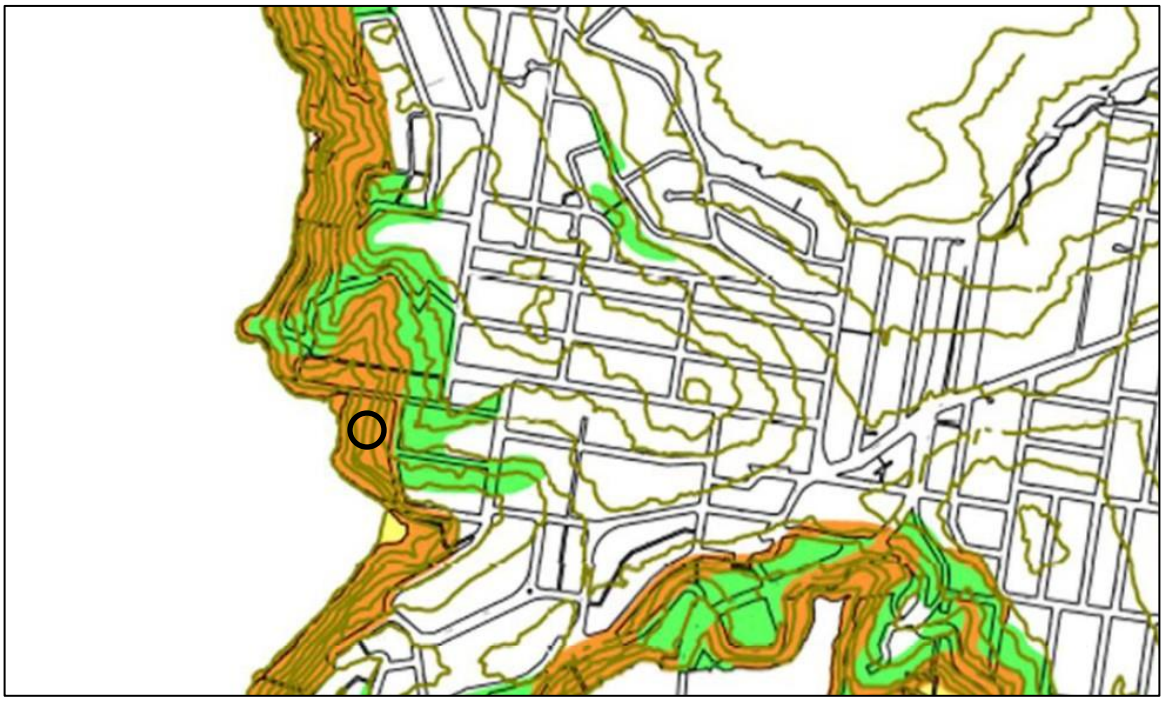

Figure 1: Landslip Risk within Site location (outlined black)

2. Site Location:

The site is located on the west side of the road within moderately west dipping topography. It is a broadly rectangular in shape with an irregular west boundary as defined by the Mean High-Water Mark. The site has north, east, south and west (approximate) boundaries of 122.2m, 14.5m, 120.4m and 14.6m respectively as referenced from the supplied survey drawing.

3. Proposed Development:

It is understood that the proposed works involve the construction of a covered walkway which includes the excavation for a lift shaft directly adjacent to an existing garage within the front (east side) of the site. Excavation to approximately 1.5m depth appears required to allow the construction of the lift/covered walkway. The proposed excavation within the site is located approximately 5.5m from north and south shared boundaries and approximately 20.0m from the east shared boundary adjacent to Abernathy Street.

4. Existing Site Description:

The site is located within moderately west dipping topography and has a slope fall from RL54.50m adjacent to the front east boundary to a low of approximately RL0.0m within the west adjacent to Middle Harbour. The existing site dwelling comprises a one, two and three storey weatherboard and clad residence with a separate rendered garage within the east of the site.

Abernethy Street is formed with bitumen pavement that is in good condition and is slightly south dipping where it passes the site. The road is formed with a concrete gutter and kerb.

The front of the site contains a concrete driveway, gardens, access path, tress and bedrock outcrops.

Inspection of the garage and site residence did not reveal any significant signs of cracking to indicate potential movement. The building appeared in good condition and the roof is guttered with down pipes.

The rear of the site contains garden with mature trees throughout.

Bedrock outcrops were observed within the front of the site and comprised low to medium strength sandstone which did not display adverse defects or clay seams (See Photograph 1).

Photograph 1: Bedrock outcrop within the site

5. Neighbouring Property Conditions:

The properties to the north and south of the site (No.24 and No.20 Abernethy Street respectively) contain one, two and three storey rendered and weatherboard residences which did not display potential signs of instability. The ground surface elevation within the surrounding properties was at a broadly similar to the site immediately adjacent to the shared boundaries.

A limited inspection of these neighbouring properties from within the site and public roadway/reserves did not identify any signs of previous or impending landslip instability.

6. Preliminary Assessment:

Based on the above items and on Councils requirements – does the present site or proposed development contain:

- History of Landslip No
- Proposed Excavation/Fill >2m No
- Site developed Yes
- Existing Fill >1m No
- Site Steeper than 1V:4H No
- Existing Excavation >2m No
- Natural Cliffs >3m No

Based on the above checklist it is considered that a detailed Site Stability (Geotechnical) Report is not required for this Development. However, care is required for any excavation works within bedrock as potential damage can result from excavation machinery therefore it is recommended that geotechnical inspection occur prior to bulk excavation.

7. Site Specific Risk Assessment:

The site contains two potential landslip hazards relating to the proposed excavation in the event of excavation failure and/or insufficient excavation support methods being used, namely the excavation for the proposed lift shaft adjacent to the existing site garage. No credible risk to adjacent properties was identified due to the depth and location of the proposed excavation.

A. Landslip (soil slide <1m^3) of fill/natural soils from excavation works.

B. Landslip (Rock fall/side <1m^3) of rock within excavation.

The hazards have been assessed in accordance with the methods of the Australian Geomechanics Society (Landslide Risk Management, AGS Subcommittee, May 2002 and March 2007), see Tables: A and B, Appendix: 3 The Australian Geomechanics Society Qualitative Risk Analysis Matrix is enclosed in Appendix: 4 along with relevant AGS notes and figures. The frequency of failure was interpreted from existing site conditions and previous experience in these geological units.

Hazard A was assessed as having a potential **Risk to Life of < 5.21 x 10^{-8}** for occupants of the excavation. A risk to people in adjacent properties could not be identified. When assessed against the AGS and Council Policy guidelines for residential developments the **Risk to Life** is 'Acceptable'**.** **Risk to Property** was considered to be very low, this is also 'Acceptable'.

Hazard B was assessed as having a potential **Risk to Life of < 1.04 x 10^{-7}** for occupants of the excavation during construction. A risk to people in adjacent properties could not be identified. When assessed against the AGS and Council policy guidelines for residential developments the **Risk to Life** is 'Acceptable'**.** **Risk to Property** was considered to be very low, this is also 'Acceptable'.

It should be noted that no investigation has been undertaken to determine founding conditions of the existing garage and it is considered critical to ensure the existing footings for the garage are not undermined through the lift shaft excavation. Where footings are undermined, underpinning may be necessary to prevent damage to the garage structure. **The founding conditions of the existing garage should be determined prior to bulk excavation to determine what measures may be required to prevent potential damage.**

8. **Date of Assessment:** 24 June 2024.

9. **Assessment by:**

Kieron Nicholson
Senior Engineering Geologist

10. **References:**
    - Architectural Drawings – Designed 2 You, Job No.: 23031, Drawing No.: DA00 – DA01, DA02.1 – DA02.2, DA03.1 – DA03.2, DA04 – DA18, Dated: 04/04/2024
    - Survey Drawing – Hill & Blume Consulting Surveyors, Drawing No.: 65287001A, Dated: 12/03/2024
    - Return of Application – Northern Beaches Council, Application No.: DA2024/0447 – PAN-427844, Dated: 19/04/2024

TABLE : A

Landslide risk assessment for Risk to life

HAZARD	Description	Impacting	Likelihood of Slide	Spatial Impact of Slide		Occupancy	Evacuation	Vulnerability	Risk to Life
A	Landslip (earth slide <1m³) from soils at crest of excavation from lift shaft excavation		Potentially 1.5m of residual/colluvial soils within excavtion.	a) Garage directly adjacent to 1.5m deep excavation, impact corner only		a) Person in garage 1hr/day avge.	a) Possible to not evacuate	a) Person in building, minor damage only	
			Possible	**Prob. of Impact**	**Impacted**				
		a) Existing garage within No.22	0.001	0.50	0.10	0.0417	0.5	0.1	**5.21E-08**
B	Landslip-rock topple/slide <1m³		1.5m deep excavation potentially within bedrock, adverse defects potentially present	a) Garage directly adjacent to 1.5m deep excavation, impact corner only		a) Person in garage 1hr/day avge.	a) Possible to not evacuate	a) Person in building, minor damage only	
			Possible	**Prob. of Impact**	**Impacted**				
		a) Existing garage within No.22	0.001	0.50	0.10	0.0417	0.5	0.10	**1.04E-07**

* hazards considered in current condition and/or without remedial/stabilisation measures or poor support systems

* likelihood of occurrence for design life of 100 years

* Spatial Impact - Probaility of Impact refers to slide impacting structure/area expressed as a % (i.e. 1.00 = 100% probability of slide impacting area if slide occurs).
Impacted refers to expected % of area/structure damaged if slide impacts (i.e. small, slow earth slide will damage small portion of house structure such as 1 bedroom (5%), where as large boulder roll may damage/destroy >50%)

* neighbouring houses considered for impact of slide to bedroom unless specified, due to high occupancy and lower potential for evacuation.

* considered for person most at risk, where multiple people occupy area then increased risk levels

* for excavation induced landslip then considered for adjacent premises/buildings founded off shallow footings, unless indicated

* evacuation scale from Almost Certain to not evacuate (1.0), Likely (0.75), Possible (0.5), Unlikely (0.25), Rare to not evacuate (0.01). Based on likelihood of person knowing of landslide and completely evacuating area prior to landslide impact.

* vulnerability assessed using Appendix F - AGS Practice Note Guidelines for Landslide Risk Management 2007

TABLE : B

Landslide risk assessment for Risk to Property

HAZARD	Description	Impacting	Likelihood		Consequences		Risk to Property
A	Landslip (earth slide <1m³) from soils at crest of excavation from lift shaft excavation	a) Existing garage within No.22	Possible	The event could occur under adverse conditions over the design life.	Insignificant	Little Damageor no impact to neighbouring properties, no significant stabilising required .	Very Low
B	Landslip-rock topple/slide <1m³	a) Existing garage within No.22	Possible	The event could occur under adverse conditions over the design life.	Insignificant	Little Damageor no impact to neighbouring properties, no significant stabilising required .	Very Low

* hazards considered in current condition, without remedial/stabilisation measures and during construction works.
* qualitative expression of likelihood incorporates both frequency analysis estimate and spatial impact probability estimate as per AGS guidelines.
* qualitative measures of consequences to property assessed per Appendix C in AGS Guidelines for Landslide Risk Management.
* Indicative cost of damage expressed as cost of site development with respect to consequence values: Catastrophic : 200%, Major: 60%, Medium: 20%, Minor: 5%, Insignificant: 0.5%.
* Cost of site development estimated at $50,000

TABLE: 2

Recommended Maintenance and Inspection Program

Structure	Maintenance/ Inspection Item	Frequency
Stormwater drains.	Owner to inspect to ensure that the open drains, and pipes are free of debris & sediment build-up. Clear surface grates and litter. Owner to check and flush retaining wall drainage pipes/systems	Every year or following each major rainfall event. Every 7 years or where dampness/moisture
Retaining Walls. or remedial measures	Owner to inspect walls for deveation from as constructed condition and repair/replace. Replace non engineered rock/timber walls prior to collapse	Every two years or following major rainfall event. As soon as practicable
Large Trees on or adjacent to site	Arborist to check condition of trees and remove as required. Where tree within steep slopes (>18°) or adjacent to structures requires geotechincal inspection prior to removal	Every five years
Slope Stability	Geotechnical Engineering Consultant to check on site stability and maintenance	Five years after construction is completed.

N.B. Provided the above shedule is maintained the design life of the property should conform with Councils Risk Management Policy.