BEFORE THE HEARINGS COMMISSIONERS FOR THE WAIKATO DISTRICT COUNCIL

UNDER

the Resource Management Act 1991

AND IN THE MATTER

of hearing submissions and further submissions on the Proposed Waikato District Plan

Hearing 25 – Zoning Extent Hearing

PARTIES REPRESENTED (97)

ANNIE CHEN SHIU/POKENO WEST LTD

STATEMENT OF GEOTECHNICAL EVIDENCE FROM FRASER NILE DEANE WALSH FOR CHEN/POKENO WEST LTD

11 NOVEMBER 2020

Counsel Instructed:

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QUALIFICATION AND EXPERIENCE

- 1. My name is FRASER NILE DEANE WALSH. I am a Consulting Geologist in the field of engineering geology and the Director of Ground Consulting Ltd.
- My professional qualifications are a Bachelor of Science Degree in Geology and a Masters of Science Degree with Honours in Geology from the University of Auckland. I also am a chartered member of Engineering New Zealand (PEngGeol).
- 3. I have 21 years experience working in the field of engineering geology within the Auckland District. This includes the preparation of over 1,000 geotechnical reports for commercial, industrial and residential developments. The geotechnical reports provide detailed information for structural engineering design in regards to slope stability, foundation conditions, site earthworks and stormwater disposal.

CODE OF CONDUCT FOR EXPERT WITNESSES

4. I have read, understood, and have prepared this statement of evidence in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court's Practice Note. I also confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions I express.

PROJECT INVOLVEMENT

- I was engaged to carry out a geotechnical feasibility assessment for the proposed development including 53 & 53A Munro Road during December 2017.
- 6. The majority of the investigations including a site walkover were carried out during December 2017.

SCOPE OF MY EVIDENCE

7. This geotechnical feasibility assessment has been prepared for the purpose of providing sufficient geotechnical information in order to develop and progress a proposed plan change to allow subdivision for residential purposes.

SITE INVESTIGATIONS

- 8. The investigations undertaken as part of this feasibility assessment have consisted of:
 - (a) Desktop study of the site including:
 - (i) Published Geology.

(ii) Historic Aerial Photographs.

- (iii) Google Earth Imagery.
- (iv) Waikato Regional Council GIS Viewer.
- (b) Site mapping and reconnaissance
- (C) Previous Investigations
- 9. I consider that the site investigations undertaken have provided a sufficient assessment of the existing geological conditions.
- 10. I personally oversaw the site investigations, field mapping, analysis, and reporting associated with the site investigations.
- 11. I am unaware of any publicly available geotechnical investigations which have been undertaken within the proposed subdivision.

PROPOSED SITE DEVELOPMENT

- 12. Plan change development plans have been provided by Birch Surveyors Ltd. The plans in summary show the following with relevance to geotechnical aspects of this assessment:
 - (a) The majority of the subdivision consists of medium density residential housing which is accessed via. a series of new public roads off Helenslee Road to the east, Munro Road to the south-east and Huia Road to the south. Larger sections are located within the southwestern portion of the subdivision.

- (b) Significant subdivision watercourses, overland flowpaths and native bush areas are to remain and will be planted with suitable varieties where appropriate.
- (C) The subdivision will be progressively constructed in stages principally from east to west.
- (d) Stormwater will be managed by the existing significant watercourses and overland flowpaths.
- (e) Wastewater will be managed by a connection to the Pokeno reticulated wastewater system.

SITE CONDITIONS

Site Location

- 13. The subdivision is situated within Pokeno of the Waikato Region, located 10kms south east of Pukekohe town centre and 5km north of the Waikato River. The subdivision is accessible off Helenslee Road, Munro Road and Huia Road.
- 14. The subdivision is currently surrounded by farmland and rural lifestyle development.
- 15. A site location map is presented on Drawing 001.

Site Topography

- The subdivision is located on two predominant landforms as shown on Drawing 002. The landforms are described as follows:
 - (a) Low Lying Slopes and Flats: Extensive low lying slopes and flats are located within the central and eastern portion of the subdivision. The flats are utilized for cropping and pastureland and are drained via. a series of ditch drains and overland flowpaths. The eastern edges of the flats contain some farm buildings which are accessed via. farm tracks.

(b) Gentle to Moderately Rolling Slopes: The majority of the subdivision contains gentle to moderately rolling slopes forming a series of ridge crests and intermediary gullies which extend down to the flow lying flats. The ridge crests are typically gently sloping and utilized as pastureland. The gullies and gully side slopes are typically moderately steep and utilized as pastureland. The gully bases contain swampy ground in places. The contact between the rolling slopes to the low lying flats is typically gradual.

Site Surface Features

- 17. The low lying flats contain a series of ditch drain and overland flowpaths which drain down to the south-eastern edge of the site. The ditch drains contained minor flows on inspection and may dry up in part over the summer months.
- 18. The series of gullies which extend down to the low lying flats contain watercourses of various sizes. The majority of catchments which feed the watercourses are small to moderate in size. It appears from the subdivision scheme plan provided, the watercourses will remain.

Slope Instability Features

- 19. The low lying slopes and flats contain no observed slope instability features.
- 20. The steeper portions of the moderately steep gully side slopes and ridge crest side slopes contain regolith type slope instability features associated with shallow soil creep and slumping ground. The steeper slopes also contain semi-circular shaped gully head formations in places which may represent the remnants of old highly eroded landslides. Further investigation of these features is warranted for subdivision consent given the potential impact on subdivision development. Otherwise, the moderately steep slopes do not contain any deep-seated and/or large-scale slope instability features.

Aerial Photographs

21. Aerial photographs available from the Auckland Council GIS Viewer and Google Earth dating from 2004 to 2015 were studied to observe the site over time and assess the geomorphological setting. The review of historic aerial photography indicates that there has been no significant modification of the subdivision over this time period.

GROUND CONDITIONS

Published Geology

22. The Geological Map of New Zealand, Sheet 3, at a scale of 1:250,000 maps the low lying flats as being underlain by Holocene alluvial deposits. The lower foothills within the western portion of the subdivision are underlain by Mercer Sandstone consisting typically of massive sandstone. The remainder of the subdivision is mapped as the Kerikeri Volcanic Group of the South Auckland Volcanic Field. The South Auckland Volcanic Field consists of basalt lava, scoria, ash, lapilli and lithic tuff.

Sub-surface Conditions Inferred from Site Mapping

- 23. Sub-surface investigations have not been undertaken as part of this feasibility assessment, however, from site mapping undertaken we note the following with respect to ground conditions:
 - (a) The low lying slopes and flats are likely underlain by alluvial deposits which typically consist of SILT and PEAT based soil. Alluvial soil can be weak, especially when combined with shallow groundwater levels as is likely the case across the majority of the flats.
 - (b) The gentle to moderately rolling slopes are likely mantled with volcanic deposits associated with numerous volcanic centres located to the immediate west of the subdivision. The deposits likely consist of weathered volcanic ash with possible weathered volcanic tuff in the upper reaches.
 - (C) The gently to moderately rolling slopes are likely underlain by the Waitemata Group at depth. This locally consists of Mercer Sandstone.

GROUNDWATER CONDITIONS

- 24. Sub-surface investigations have not been undertaken as part of this feasibility assessment, however, from site mapping undertaken we note the following with respect to groundwater conditions:
 - (a) The low lying slopes and flats likely contain shallow groundwater levels. The groundwater table appears to be partially controlled by a series of ditch drains which extend through the flats. The groundwater table may reach the ground surface within the flats for periods during the winter months.
 - (b) The gentle to moderately rolling slopes likely contain depressed groundwater levels given the more elevated nature of the topography. Shallow groundwater levels are expected along the base of the gullies.

SUBDIVISION DEVELOPMENT FEASIBILITY

General

25. The subdivision has been divided into subdivision development zones as shown on Drawings 003 & 004. The subdivision development zones are based on the site mapping undertaken. The subdivision development zones provide general recommendations on allowable subdivision development and constraints which can be utilised to provide a subdivision scheme plan. The subdivision development zones are summarized as follows:

Development Zone A

- 26. Zone A is land is considered to be suitable for residential development and should provide safe and stable conditions. Zone A land is typically associated with:
 - (a) Gently sloping topography with slope angles of no steeper than 1(v) on 4(h).
 - (b) Topography which is not associated with high groundwater levels.

- (C) Topography which is not associated with surface water flows and/or ponding.
- 27. The extent of Zone A land is shown on Drawings 003 & 004.
- 28. Zone A land is likely underlain by competent ground conditions which are expected to provide "good ground" according to NZS 3604:2011.
- 29. Zone A is not expected to provide significant constraints on subdivision development earthworks.
- 30. Zone A is expected to provide suitable conditions for the disposal of stormwater generated from impervious surfaces. This can be accommodated by soakage structures and/or detention and slow release structures.

Development Zone B

- 31. Zone B land is not suitable for residential development under existing conditions and includes the steeper portions of the gentle to moderately rolling slopes. Zone B land, however, can provide suitable subdivision development conditions with appropriate remedial measures. Zone B land is typically associated with:
 - (a) Moderately steep to steep topography with slope angles of steeper than 1(v) on 4(h).
 - (b) Topography which is associated with surface water flows and/or ponding.
 - (C) Topography which is associated with slope instability features.
- 32. The extent of Zone B land is shown on Drawings 003 & 004.
- 33. Zone B land can provide suitable subdivision development conditions with appropriate remedial measures. Such measures include:
 - (a) Structural in-filling or re-grading of steep slopes in order to provide acceptable overall slope grades, that being slope angles of < 1(v) on 4(h).

- (b) Engineered retaining along the edge of the gullies. This enables development to at least the edge of the gully features.
- (C) Structural in-filling and diversion of the site overland flowpaths.

Development Zone C

- 34. Zone C land may not be suitable for residential development under existing conditions and includes the low lying slopes and flats. The suitability of building within Zone C is dependant on the strength and saturation of the alluvial deposits which likely underlie this zone. Zone C land, however, can provide suitable subdivision development conditions with appropriate remedial measures.
- 35. The extent of Zone C land is shown on Drawings 003 & 004.
- 36. Zone C land can provide suitable subdivision development conditions with appropriate remedial measures. Such measures include:
 - Structural in-filling, draining or re-grading of low-lying areas to provide acceptable groundwater table clearances.
 - (b) Structural in-filling and diversion of the site overland flowpaths.
 - (C) Removal of alluvial deposits and replacement with engineered fill.
 - (d) Pre-loading of alluvial deposits to provide engineered building platforms.
 - (e) Engineered foundation design to accommodate low bearing capacity soils.

ATTACHED DRAWINGS

- Drawing 001 Location Plan
- Drawing 002 Site Plan: Landforms
- Drawing 003 Site Plan: Southern Zone
- Drawing 004 Site Plan: Northern Zone

Local Context

- 1. Existing Pokeno residential
- Existing Pokeno resident growth area
 Pokeno Town Centre
 Market Square
 On-going residential earthworks for future
- development5. Quarry bounded by Ridge Road
- 6. Prominent ridge line





CHENSHUI 53 MUNRO ROAD, POKENO LOCATION PLAN

Rev	Date	Status	Drafted	Reviewer	File Ref. MAC:\Projects_3500\3726\R3726-1\R37	26-1A-Dwg001.cdr
A	20/12/2017	Issued	FW	PF	Scale (A3) NTS	
					Project No. 3726 Report Ref. R3726-1A	Drawing No.

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CHENSHUI 53 MUNRO ROAD, POKENO SITE PLAN: LANDFORMS

Rev	Date
А	20/12/20

Status 17 Issued	Drafted FW	Reviewer PF	File Ref. MAC-IProjects_350013726/R3726-11/R37 Scale (A3) 1:8000 0 160	26-1A-Dwg002.cdr 320m
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