ENGINEERING ASSESSMENT

Project Name:	Pokeno Housing and Tourism Project
Client:	Pokeno Developments NZ Limited
CP Project No:	2405-03
CP Document No:	2405-03-ER01 Engineering Report-scp-rjp-Staged-Final 251107
Date of Issue:	7 November 2025 (FINAL)
Originator:	Shane Piper and Ryan Pitkethley
Reviewer:	Ryan Pitkethley

1. Introduction

This technical report has been prepared to support fast track referral application for the proposed Pokeno Housing and Tourism Project.

Pokeno Developments NZ Limited proposes development across its landholdings for the Pokeno Housing and Tourism Project using the Fast Track Approvals Act 2024 ("FTAA").

The development across the landholding will be staged with the first being the establishment of the Waste Water Treatment Plant ("WWTP"), followed by the residential developments at Pokeno West and Pokeno South and the Yes Valley tourism Project.

If accepted, formal reporting on the above matters would accompany the "substantive application". This letter provides a high-level consideration of the anticipated and potential effects arising from the proposed development in respect of the following matters:

- Stormwater,
- Potable water; and
- General engineering (earthworks etc).

Overall there will be no significant adverse effects related to the above matters.

2. Project Description

The Project is proposed to encompass the following Precincts and activities:

Yes Valley

(a) A tourism resort including a range of activities such as hotel accommodation (200 room hotel), glamping/motorhome areas, a conference centre, spa and restaurant facilities;

(b) A farm showground and NZ Made Hub (to provide local New Zealand brands with the opportunity to showcase their products);

(c) Enhancement of ecological areas, streams and wetlands;

(d) Infrastructure including, new roads, water supply network, stormwater management devices and wastewater discharging from a new centralised WWTP system for all land holdings.

Pokeno West

(a) Vacant lot residential subdivision in stages for approximately 1,500 dwellings plus a superlot for the future neighbourhood centre;

(b) Infrastructure including, new roads, water supply network, stormwater management devices and network, reserves, recreation trails;

(c) Wastewater infrastructure and any bulk "main" to connect to wider solution (outlined further below).

(d) Enhancement of streams and wetlands.

Pokeno South / Havelock Village

(a) Vacant lot residential subdivision in stages for approximately 750 dwellings;

(b) Infrastructure including, new roads, water supply network, stormwater management devices and network, reserves, recreation trails;

(c) Wastewater infrastructure and any bulk "main" to connect to wider solution (outlined further below); and

(d) Enhancement of ecological areas, streams and wetlands.

Centralised Infrastructure

A centralised wastewater infrastructure solution is proposed which would service all of the Yes Valley Resort/Urban development activities. This includes the following activities which would be located at Yes Valley:

(a) Wastewater treatment plant;

(b) Treated wastewater disposal areas;

(c) Treated wastewater disposal "land contact device" and associated "outfall";

(d) Re-use options for treated wastewater.

3. Earthworks

Bulk earthworks operations are required to ease the site's slopes, allowing for the construction of more favourable terrain, including suitable building platforms, public roads, and private accessways etc .

We anticipate that adherence to the Waikato Regional Council Technical Publications as relevant to sediment and erosion control, will provide for effective mitigation for erosion and sediment control potential effects.

High level details relating to each Precinct are outlined below.

3.1 Yes Valley

Earthworks are likely to be required over an area of up to 30 hectares. These operations will form building platforms and accesses and provide slope stabilisation and drainage.

The earthworks volumes are likely to be approximately 350,000m3 of cut to fill to facilitate the hotel, farm and tourist buildings and access. The earthworks for the finished platforms and accesses will ease and buttress slopes for a geotechnically stable site.

3.2 Pokeno West

Earthworks are likely to be required over an area of up to 85 hectares. These operations will form building platforms, roading, and other infrastructure.

The earthworks volumes are likely to be approximately 2,000,000m3 of cut to fill (approximately 1,000,000m3 of cut and a total fill of 1,000,000m3). This volume of earthworks is to be expected for a residential development given the size and topography of the land.

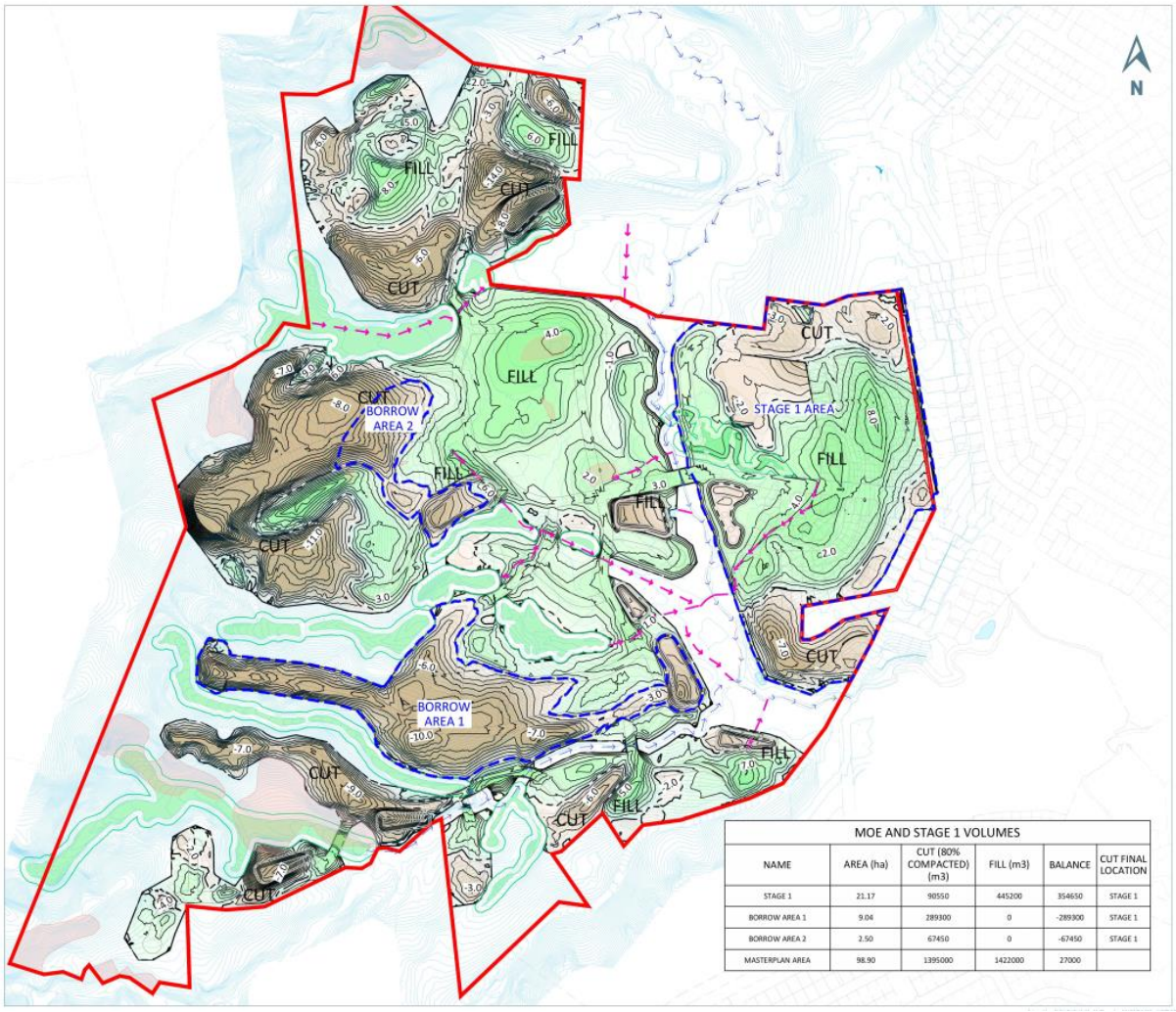

Figure 1: Pokeno West – Preliminary Earthworks

3.3 Pokeno South / Havelock

Earthworks are likely to be required over an area of up to 60 hectares.

The earthworks volumes are likely to be approximately 2,000,000m3 of cut to fill (approximately 1,000,000m3 of cut and a total fill of 1,000,000m3) to achieve viable building platforms and achieve compliant road gradients.

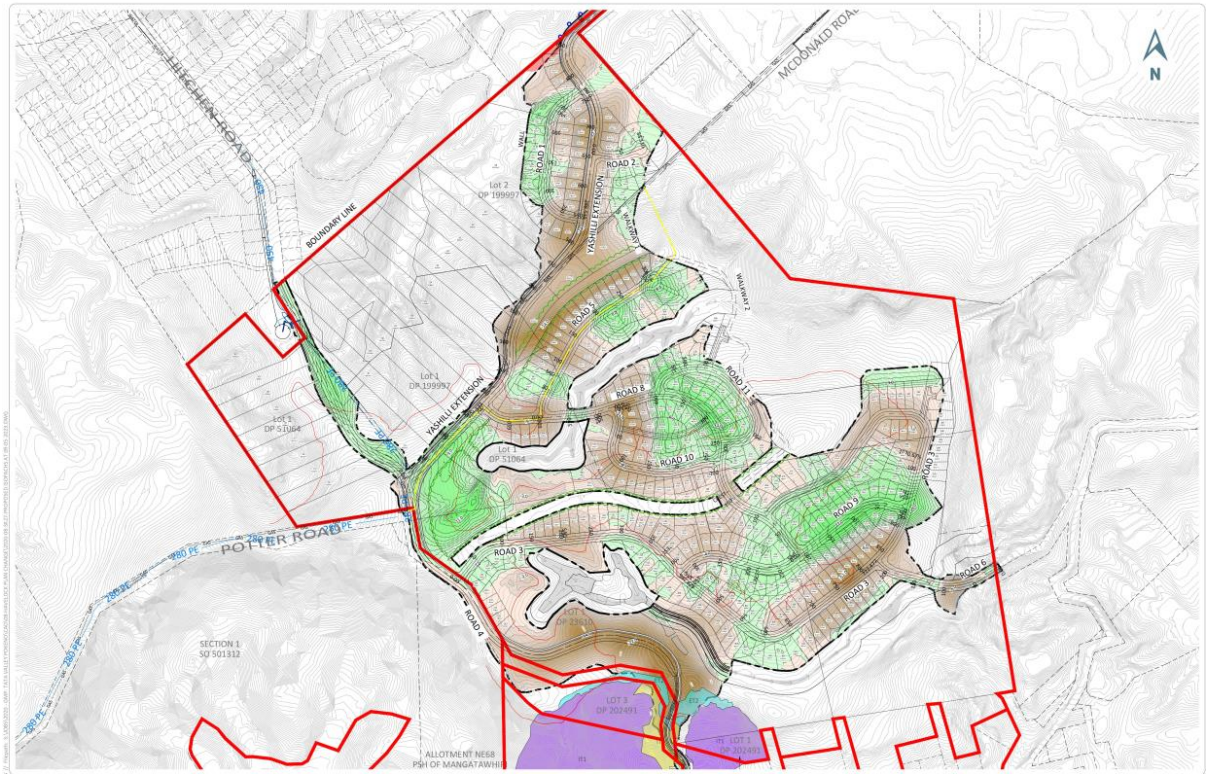

Figure 2: Pokeno South – Preliminary Earthworks (Drawing 2020-08-SK27-1)

3.4 Sediment and Erosion Controls

A number of erosion and sediment controls will be employed for the duration of the site to accord with the Waikato Regional Council's TR2009/02 (Erosion and sediment control: guidelines for soil disturbing activities).

These measures include:

- Rapid stabilisation of earthworks surfaces.
- Sediment Retention Ponds.
- Decanting Earth Bunds
- Stabilised construction entrances to allow access from Main roads.
- Silt fences along the site boundary with regular returns.
- Clean water diversion where no earthworks are taking place.
- Dirty water diversion to take runoff from Haul roads to Decant Earth Bunds.
- Dirty water diversions dividing the catchments taking run-off to relevant treatment devices.

Earthworks methodologies will be provided for each Precinct and earthworks area that will address sequence of works and sediment and erosion control monitoring.

3.5 Wind and Dust Monitoring

If earthworks are undertaken during dry periods there may be the potential for dust generation and erosion by wind from un-stabilised site areas. Accordingly, it is proposed to implement measures to control wind erosion and to minimise the spread of airborne dust, and any nuisance created by it through construction management plans to be prepared as conditions of consent to any substantive application.

4. Roads

High level details relating to each Precinct are outlined below.

4.1 Yes Valley

Yes Valley farm is located at 42A and 42B Potter Road, Pokeno. The site is on the northern bank of the Waikato River, roughly 4 km from Mercer and 5 km from Tuakau, and about 2 km southwest of Pokeno. The primary access is currently through 42A Potter Road to the north, via a farm road which is covered by an existing accessway easement over 42A Potter Road.

The existing farm road through the site will be upgraded and new roads constructed to provide access to the site facilities.

A loop road will service the hotel from the lower central access. Roading to the east of the valley include roads servicing the farm showground and New Zealand showcase agricultural buildings and provide access to the east of the site.

The network will be provided to cater for private bus/tour coaches for visitors, and trucks and semi-trailers for deliveries to the hotel and farm buildings.

The proposed internal site roads will all remain under private ownership and maintenance.

4.2 Pokeno West

The proposed development is well serviced off 750m of existing road frontage, being Helenslee Road as a collector road and Munro Road as a local road. It is proposed to upgrade these existing road berms and add a kerb line to the western side of Helenslee Road and Munro Road to comply with urban standards.

The internal proposed road cross-sections will be able to vary as part of detailed design to accord with RITS and other engineering standards. The road reserve widths have been tested as 20m for collector roads and 18m for local roads which will have approximately 5m wide berms - enough space for standard requirements for utilities, water supply, wastewater, and stormwater treatment/drainage features.

Pokeno West will be served internally by a central collector road (which partly being constructed by the Stage 1 area which is currently underway) and multiple local roads traversing the site and providing adequate access and movement functions. The roading design is to provide access for the public to the development and will be designed in accordance with the Regional Infrastructure Technical Specifications ("RITS") standard for public roads.

4.3 Pokeno South / Havelock Village

It is proposed to provide key public road connections to accord with the RITS gradients, connecting to the existing Hitchen Road, Yashili Drive, Cole Road, Bluff Road and Potter Road.

The internal road cross-sections will be able to vary as part of detailed design to accord with RITS and other engineering standards. The road reserve widths have been tested as 20m for collector roads and 18m for local roads which will have approximately 5m wide berms - enough space for standard requirements for utilities, water supply, wastewater, and stormwater treatment/drainage features.

Pokeno South will be served by a collector road network and multiple local roads traversing the site and providing adequate access and movement functions. The roading design is to provide access for the public to the development and will be designed in accordance with the RITS standard for public roads.

5. Flood Assessment

5.1 Overview

The design in each Precinct will ensure that:

- The proposed activities are protected from flooding in storms up to the 1 in 100 year event, including climate change, and
- The development does not increase flood levels or alter overland flow paths either upstream or downstream of the site.
- As a result all flood hazards relating to the Project can be fully addressed.

Typically this means locating activities outside the floodplain extent, ensuring culverts are large enough to convey flood flows, and designing for overland flows from the 100 year storm to be conveyed safely to the stream network, via roads or engineered overland flow paths.

Details relating to each Precinct are outlined below.

5.2 Yes Valley

Yes Valley consists of a flat and low-lying central valley discharging to the Waikato River to the south, and bounded by steep slopes on all other sides. The valley floor is subject to inundation, particularly during winter, due to high tailwater levels in the Waikato River, backflow through existing stopbank culverts, and overtopping of the stopbank during extreme events.

The proposal will seek to reduce the impacts of flooding within the Valley by:

- Raising the stopbank to RL5.7m and installing culvert non-return valves/flood gates to protect the valley from inundation by the Waikato River in the 100 year river/tidal flood event.
- Upgrading the stopbank culverts to increase capacity, and installing a pump system to maintain normal wetland levels when the river levels are high. This will improve the health of the wetland ecosystem and increase the volume of flood storage that is available when river levels are high. As a result, the valley will be less susceptible to flooding.
- Upgrading the low-lying farm roads and farm culverts and raising the roads above the level of the 100 year flood, ensuring access is maintained during a 100 year storm.

Detailed design will include flood modelling, and will:

- ensure the design complies with all current Council standards including updated allowances for climate change and any new Waikato River flow data.
- provide for fish passage through culverts and flood gates and ensure the use of a fish friendly pump system such as an Archimedes screw pump.

5.3 Pokeno West

This Precinct is located on the Pokeno Stream, upstream of the existing Pokeno. The eastern part of the site is comparatively flat and low-lying, and has already been consented as Stage 1 of the development, including earthworks in the floodplain.

The remainder of the site covers several ridgelines separated by gulleys with tributary streams flowing into the Pokeno Stream. Development will follow the ridgelines so that all properties are above the floodplain. Ten box culverts are proposed where proposed roads will cross the gulleys and the main stream, ranging from 2mx2m to 5mx3m.

Similar to works undertaken for Stage 1, flood modelling has been undertaken to assess the effects of floodplain earthworks, to ensure proposed levels are suitable, and assist with sizing the culverts. The modelling used runoff curve numbers based on site-specific geotechnical investigations, which result in higher flood flows and depths than Council's Pokeno flood modelling (completed by Te Miro Water in 2023), which means that the design is more conservative.

This Precinct is subject to the 2010 Pokeno Catchment Management Plan ("CMP"), and the 2021 Addendum to the CMP, which included updated flood modelling (included allowance for residential zoning of the Pokeno West site), and increased the requirements for flood attenuation, requiring post development stormwater flows (including climate change) to be attenuated to no more than 70% of predevelopment flows (excluding climate change). Council's flood modelling was subsequently updated further as part of the process for Variation 3 to the Waikato District Plan.

The flood modelling shows that the Project will not increase flood levels either upstream or downstream of the site, taking into account both the consented Stage 1 earthworks and the remaining proposed earthworks.

Detailed design will include any required updates to the flood modelling, and full details of the proposed culverts, including allowance for fish passage.

5.4 Pokeno South / Havelock Village

The stormwater management philosophy at Pokeno South is to address both runoff quality and quantity at the time of subdivision and development. A key principle of the stormwater design is to attenuate post development peak flows up to and including the 1% AEP to 80% of pre development peak flows. As such the existing downstream network can remain as the status quo without need for upgrades.

This Precinct covers several ridges and gulleys that fall to Yes Valley to the west, the Pokeno industrial area to the northeast, and Bluff Road to the east. The site includes tributaries of the Waikato and Mangatawhiri Rivers, but is elevated well above the floodplains of both rivers. The development will retain "green" corridors along each gulley, so that all properties are above the floodplain.

Detailed design will likely include box culverts or arch culverts where proposed roads cross the gulley, and will provide for fish passage. As there are no upstream neighbours and the development is above the floodplain, flood modelling will only be necessary to ensure flows within the development are conveyed safely and assist with culvert sizing.

5.5 Centralised Infrastructure

The proposed centralised WWTP and land-contact system will likely be located within the Yes Valley site. Detailed design will ensure it is located out of the floodplain and overland flow paths.

6. Stormwater

6.1 Overview

CivilPlan has previously completed a number of design reports to support each Precinct. These outline how each Precinct can be serviced using common stormwater management practices and in accordance with all relevant Council standards. An updated report will be completed for each Precinct as part of any substantive application.

The design in each Precinct will comply with Council standards including Waikato regional Council ("WRC") stormwater guidelines TR2020/06 and TR2020/07, the RITS, and current requirements for climate change allowance. Each design will include:

- Pipe networks sized in accordance with the RITS to convey the 10 year storm peak rainfall, including allowance for climate change.
- Design to safely convey the 100 year storm safely to the stream network, via roads or engineered overland flow paths.
- Culvert design in accordance with Austroads and RITS requirements.
- Stormwater quality treatment for 1/3 of the 2 year storm, in accordance with TR2020/07 and RITS requirements. This ensures that the development does not cause or increase contaminants in waterways. These are typically provided by constructed wetlands or rain gardens.
- Attenuation storage to reduce peak flows discharged from the site to no more than predevelopment peak flows (or less where required by Council) of the site, in up to the 100 year storm. This ensures that increased runoff from the development does not increase flood levels downstream. Typically to be provided within treatment wetlands.
- Hydrology mitigation – retention (equal to the predevelopment initial abstraction, to be typically provided by rainwater reuse tanks, and rain gardens), and extended detention (for 1.2x the water quality storm, to be typically provided within treatment wetlands) in accordance with TR2020/07 and RITS requirements. This reduces stream flows in small, frequent storm events, so that the development does not increase stream erosion, and promotes groundwater recharge, to maintain stream base flows.

Details relating to each Precinct are outlined below.

6.2 Yes Valley

Stormwater management required for this Precinct generally includes rainwater reuse from roof areas, hydrology mitigation (except where discharging directly to the Waikato River), and quality treatment – peak flow attenuation is not required as the Waikato River is immediately downstream of the site. The current design includes:

- Rainwater tanks incorporating reuse and extended detention
- Treatment swales
- Extended Detention basins incorporated in the swale at discharge points

- Rain gardens incorporating extended detention
- A constructed wetland to treat runoff.

Additionally, the low-lying area behind the stopbank at the bottom of the site is to be reshaped and restored as a planted wetland, and on-line "forebays" will be constructed upstream of the wetland to provide additional treatment.

6.3 Pokeno West

The Stormwater Management Plan completed for Stage 1 also outlined preliminary design for the remainder of the site, including sizing ten box culverts where the proposed roads cross a number of gulleys and small streams, and sizing a constructed wetland to provide treatment and attenuation for each sub catchment, as shown below.

Retention requirements are proposed to be met by a combination of on-lot rainwater reuse tanks, and rain gardens, which will be located at end-of-pipe (immediately upstream of the wetlands) to minimise maintenance requirements. Extended detention will be incorporated in the on-lot tanks and the wetlands.

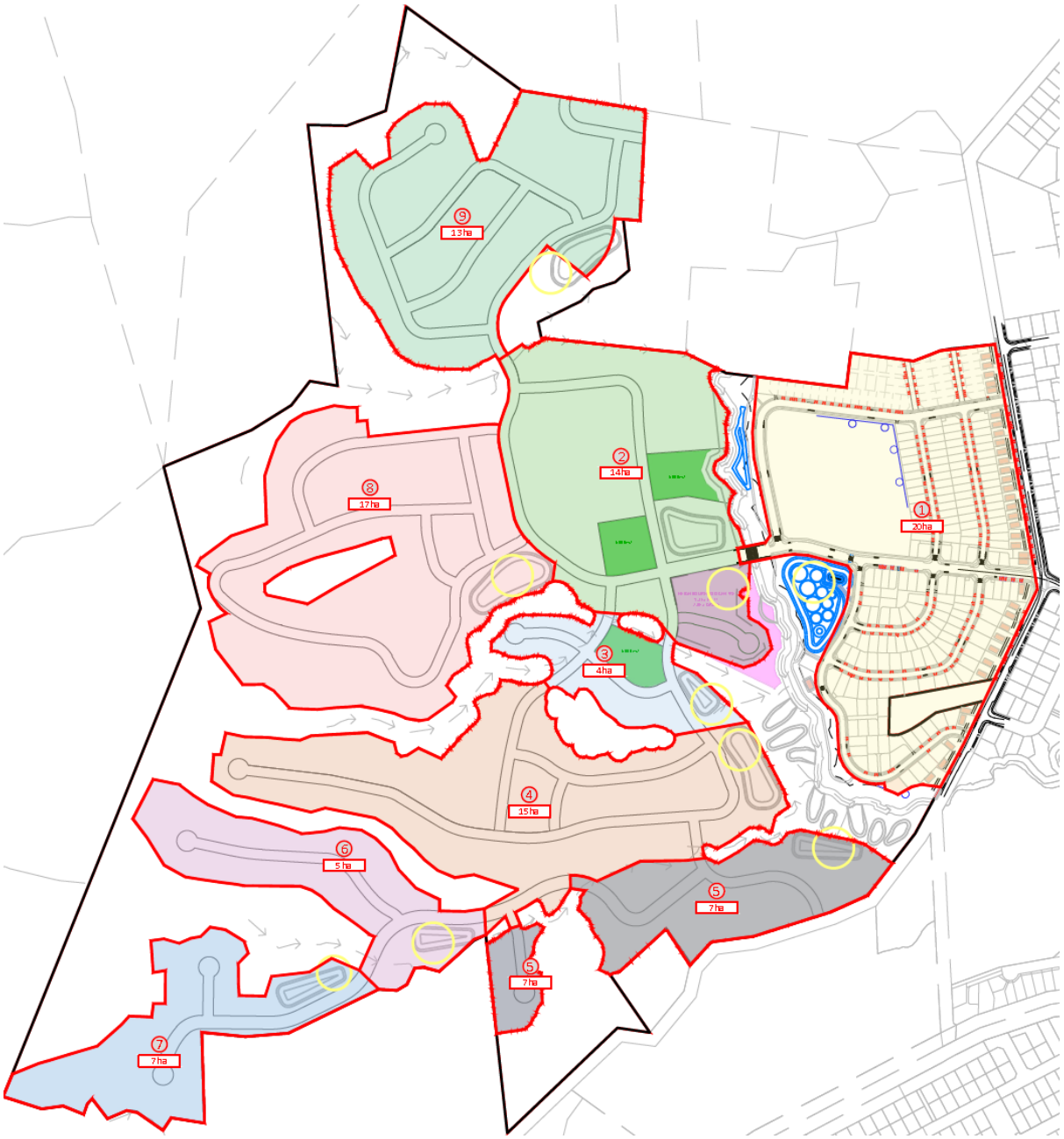

Figure 3: Pokeno West - Preliminary Constructed Wetland Catchments. Yellow circles represent approximate device locations for each catchment (Drawing 2405-01-SK50-1)

6.4 Pokeno South / Havelock Village

The proposed stormwater management comprises:

- Retention and extended detention to be provided by a combination of on-lot rainwater reuse tanks, and rain gardens (subject to confirmation of geotechnical suitability).
- Quality treatment, to be provided by rain gardens.
- Peak flow attenuation to be provided either "offline" by tanks and possibly additional rain garden storage, or "online" as dry detention within the stream floodplains, created by constructing a

series of bunds across the gulleys. Both iwi and WRC have indicated a preference for offline storage based on previous consultation, however TR2020/07 does allow for online storage to be considered on a case-by-case basis.

The design will be finalised at detailed design stage and will require updates to comply with current Council standards such as increased allowance for climate change.

7. Wastewater

Wastewater is covered by other specialist reporting.

8. Water Supply

Waikato District Council has confirmed that both the Precincts can be serviced for potable water.

An existing DN280 PE bulk supply/distribution main runs along Potter Road to a reservoir at the northwest corner of the Pokeno South site at 88 Bluff Road, which provides supply to the north as shown in Figure 5. The water supply to all of Pokeno including all of the Precincts (Yes Valley, South Pokeno and West Pokeno) will come from this reservoir site.

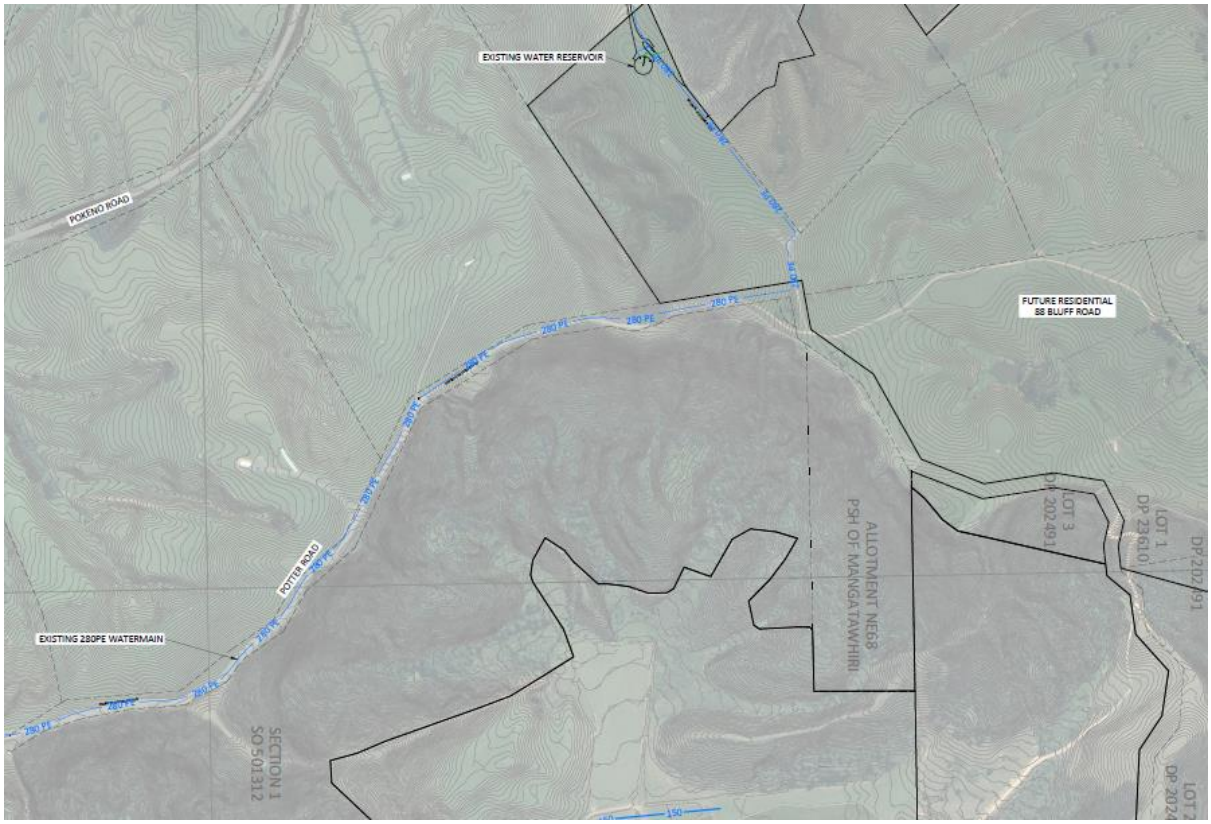

Figure 4: Bulk supply and reservoir at 88 Bluff Road site

Waikato District Council ("WDC") is currently updating the Pokeno Water Supply hydraulic model and this proposal will be included in that modelling exercise.

It is understood that the existing singular reservoir will be undersized for all of Pokeno's projected future growth. There is space on the existing WDC site to locate a second reservoir, which will likely

be installed at the same site to service the proposed growth, subject to confirmation from WDC's modelling.

The water supply demand for each location at full build out is shown in the table below.

Water Demand at Full Build Out Total	West Pokeno	Havelock Village	Yes Valley - high estimate	Yes Valley - low estimate
Daily Demand (m^3)	1,053	527	1,166	612
Peak flow rate (l/s)	61	30	40	21
Equivalent Population (260 l/p/d)	4,050	2,025	4,484	2,354
Equivalent Dwellings (2.7 ppl/dwelling)	1,500	750	1,661	872

The WDC modelling will determine any required "internal staging" sequence for the Project to match any required reservoir upgrades. These upgrades are planned to occur as demand requires it, and ongoing discussion with WDC will ensure coordination and continued progress for the Project. Although the funding and implementation of the reservoir upgrade is currently planned to be completed by WDC, the funding and upgrade works can also be delivered privately (and vested to council) as a part of the subdivision works requiring it.

Details relating to each Precinct are outlined below.

8.1 Yes Valley

Yes Valley will be serviced from one of or a combination of the following three solutions to match with the progressive roll out of development.

1) Initially, supply could be made by upgrading the existing water supply bore located on site to treated drinking standards, and pumped to development areas within the valley.

2) This could be supplemented by connecting to the existing DN280 PE bulk supply main in Potter Road with a 24hr low flow take off which would supply private reservoir tanks located at the elevated Potter Road.

3) Finally, potable water supply could be taken via new mains installed in new roads from the reservoir(s) located on 88 Bluff Road

As required, storage tanks will be provided near to the site entrance and at the highest site elevation, to ensure adequate firefighting storage in accordance with SNZ PAS 4509:2008.

The future buildings will likely have rainwater reuse tanks for non-potable supply.

8.2 Pokeno West

Waikato District Council GIS mapping currently shows there are existing DN150mm water supply mains running on both Helenslee Road and Munro Road. However, a new 315OD PE water main was installed by Watercare to the West Pokeno Stage 1 site boundary in early 2025.

Figure 5: Existing Public Water Supply (Source: Waikato District Council)

It is proposed to connect to the OD 315mm PE water main and extend through the West Pokeno development with a series of OD 250mm PE, OD 180mm, and OD 63mm PE mains. This is sufficient for the full build out of Pokeno West.

8.3 Pokeno South / Havelock Village

Potable water supply would be taken via new mains installed in new roads from the reservoir(s) located on 88 Bluff Road

Part of the Precinct includes the existing reservoir site, which has space to add a second reservoir of the same size.

The WDC modelling will determine any required "internal staging" sequence for the Project to match any required reservoir upgrades. These upgrades are planned to occur as demand requires it, and ongoing discussion with WDC will ensure coordination and continued progress for the Project. Although the funding and implementation of the reservoir upgrade is currently planned to be completed by WDC, the funding and upgrade works can also be delivered privately (and vested to Council) as a part of the subdivision works requiring it.

This will be provided as part of the development works (including new roading connections which intersect with the existing reservoir site).

It is understood from preliminary conversations with WDC that parts of the development below RL55 will be in a separate pressure zone. Pressure zones and storage increases etc can be confirmed as and when the layout of the Precinct progresses during the substantive application. Infrastructure and pipe networks within the Precinct will be public to vest, in accordance with the RITS for water supply and firefighting requirements in accordance with SNZ PAS 4509:2008.

9. Utilities

Electricity and telecommunication services will be extended underground along all roads at the time of construction. Each of the proposed development areas can then be provided with an underground connection to the reticulated electricity and telecommunication networks.

There is an existing Vector gas main installed in Potter Road, running through the Havelock/South Pokeno site and connecting to the Pokeno industrial area. Initial discussions with Vector have confirmed that this main can be relocated to be in the final road locations. This can be completed as a part of the detailed design.

10. Conclusion

In summary, we consider that effects from earthworks can be appropriately managed and mitigated through the comprehensive application and implementation of a Management Plans (e.g Dust), and that appropriate provision for drainage, water and other utilities can be provided to support the Project.

Please refer to Appendix 1 to show the writer's qualifications and experience.

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APPENDIX 1
QUALIFICATIONS AND EXPERIENCE

Ryan James Pitkethley - Senior Civil Engineer, Director and Engineering Manager at CivilPlan Consultants Limited.

Ryan James Pitkethley holds a Bachelor of Engineering (Civil, Hons) and has been a Chartered Professional Engineer (CPEng) as well as a Chartered Member of Engineering NZ (CMEngNZ) since 2008.

His professional experience encompasses project management and active participation in multi-disciplinary infrastructure and land development projects, collaborating with clients, local authorities, and contractor organisations. He possesses expertise in the planning, design, co-ordination, and delivery of projects covering earthworks, erosion and sediment control, roading, three waters, and utilities infrastructure related to land development.

Employed by CivilPlan Consultants Limited since February 2015, Ryan serves as the Engineering Manager and Director at the Manukau, Auckland office.

His previous involvement at the Yes Valley, Pokeno West, and Havelock sites includes advising on infrastructure development and design from 2018 onwards. He has also provided expert witness evidence on utilities, three waters, roading, and earthworks design and upgrades necessary to support development and proposed rezoning sought by HVL as part of the Proposed District Plan hearings. His evidence addressed infrastructure concepts and constraints as they specifically relate to the site and its servicing potential.

Ryan's previous experience includes:

- Providing land development and infrastructure evidence, which included preparing a Stormwater Management Plan, to support the rezoning of approximately 50 hectares of the Clarks Beach Special Housing Area from rural to urban and securing Stormwater Discharge Consents.

- Contributing to the large-scale residential land development project known as Riverside Grove, Escotts Road, Tuakau, where he undertook the design to obtain resource consent and engineering plan approval, and managed the implementation through to title issuance.

- Working on the large-scale residential development of over 380 lots at Pokeno, including preparing Stormwater Management Plans (used as the basis for Stormwater Discharge Consents) for various stormwater catchments in Pokeno.

- Delivering land development and infrastructure services, including the preparation of a Stormwater Management Plan, to support the rezoning of approximately 36 hectares known as the "Graham Block" from rural to urban (about 150 lots) and obtaining Stormwater Discharge Consents.

Shane Piper - Senior Land Development Engineer and Associate at CivilPlan Consultants Limited.

Shane holds a NZCE (Civil) since 1998 and is a Member of Engineering NZ (MEngNZ).

Shane is an experienced Senior Land Development Engineer with a demonstrated history of working in the civil engineering industry. Skilled in Land Development design, construction observation and contract management across Roading, Earthworks, Sediment and Erosion Control, Drainage and Water Supply disciplines.

Shane oversees and manages a team of technicians and engineers to deliver a range of small and large scale commercial and residential land development projects both green and brown fields scenarios.

Shane's areas of expertise includes:

- Commercial/industrial/residential civil, subdivision & infrastructure design
- Civil engineering design software, namely 12d Model and AutoCAD
- Roading and pavement design
- Construction observation and contract management
- NZS3910:2013 condition of contract
- Council compliance and 224c applications

Shane has been involved in the Pokeno Countdown Supermarket Development where he project managed the redevelopment of the 1.4ha site for a full sized supermarket and car parking. The project was managed from conception through to completion including design, coordination with adjacent developers, consultation and consenting through with Council organizations. Shane was the project engineer for all site and contract management including tendering, contract management, engineer's representation roles, compliance and completion documentation.

His previous involvement in the Pokeno West site includes advising on infrastructure development and design at Pokeno West since 2023, taking Stage 1 of the development through Resource Consent and Engineering Plan Approval designs. This included design for a new MOE school site, and over 200 residential lots in challenging topography.