

Memorandum



To: Andrew Mead
From: Jon Fields – Planning Engineer- Waters
Subject: **KEENAN ROAD GROWTH AREA WATERS ASSESMENT.**
Date: 12 May 2016

Purpose of report

The purpose of this report is to consider the feasibility of providing waters infrastructure to service the Keenan road growth area identified by Smart Growth.

Scope of report.

To undertake a desktop feasibility analysis of waste water , water supply and storm water and provision of these services from the existing Tauranga City (TCC) reticulation. Analysis is based around a concept development plan provided by H&G consultants (15th August 2015).

Background

‘Smart growth’ identified areas in the Tauranga City (TCC) and adjacent Western Bay as having potential to accommodate TCC growth. The ‘Keenan road’ area was identified as having potential to be developed before others due to its proximity to the city. Harrison and Grierson Consultants (H&G) prepared a concept (Objective reference A????) providing dwelling yield and development pattern from which servicing of the three waters has been considered. The expected yield for the Keenan block is approximately 2500 housing units

The Keenan block is currently predominately rural land consisting of steep incised gullies and plateaus, rising to the south. The area is not currently serviced with public waters reticulation. The logical development into the “Merrick” block to the south would not necessarily be fully serviced through the Keenan area, it may be reticulated towards the east, along Pyes Pa Road for Water and Waste water. The majority of the Keenan area is outside the TCC urban area.

The H&G concept is to extensively contour the land to achieve a viable yield and road form to TCC development code requirements. The development covers two main gully systems, one in the main Keenan catchment consisting of two sub gullies and a small yield area to the west(Dunstun block). An assumption is that public water service will generally follow the road pattern.

To achieve a viable yield up to 8m of fill is needed to a large section of the land over several properties. The existing storm water system is proposed to be piped under this fill. It is not considered good practice to have reticulated services over 4m deep as maintenance and replacement is an issue. Earth works over the entire area would need to be completed before any yield is realised. This is a critical matter that will need careful consideration in order for the construction and phasing to be effective. Should development proceed in a none sequential pattern the provisions of infrastructure and roads will be challenging, if not impractical to achieve. This matter may require TCC to consider the management and funding options for development ie TCC vs Developer led and funded.

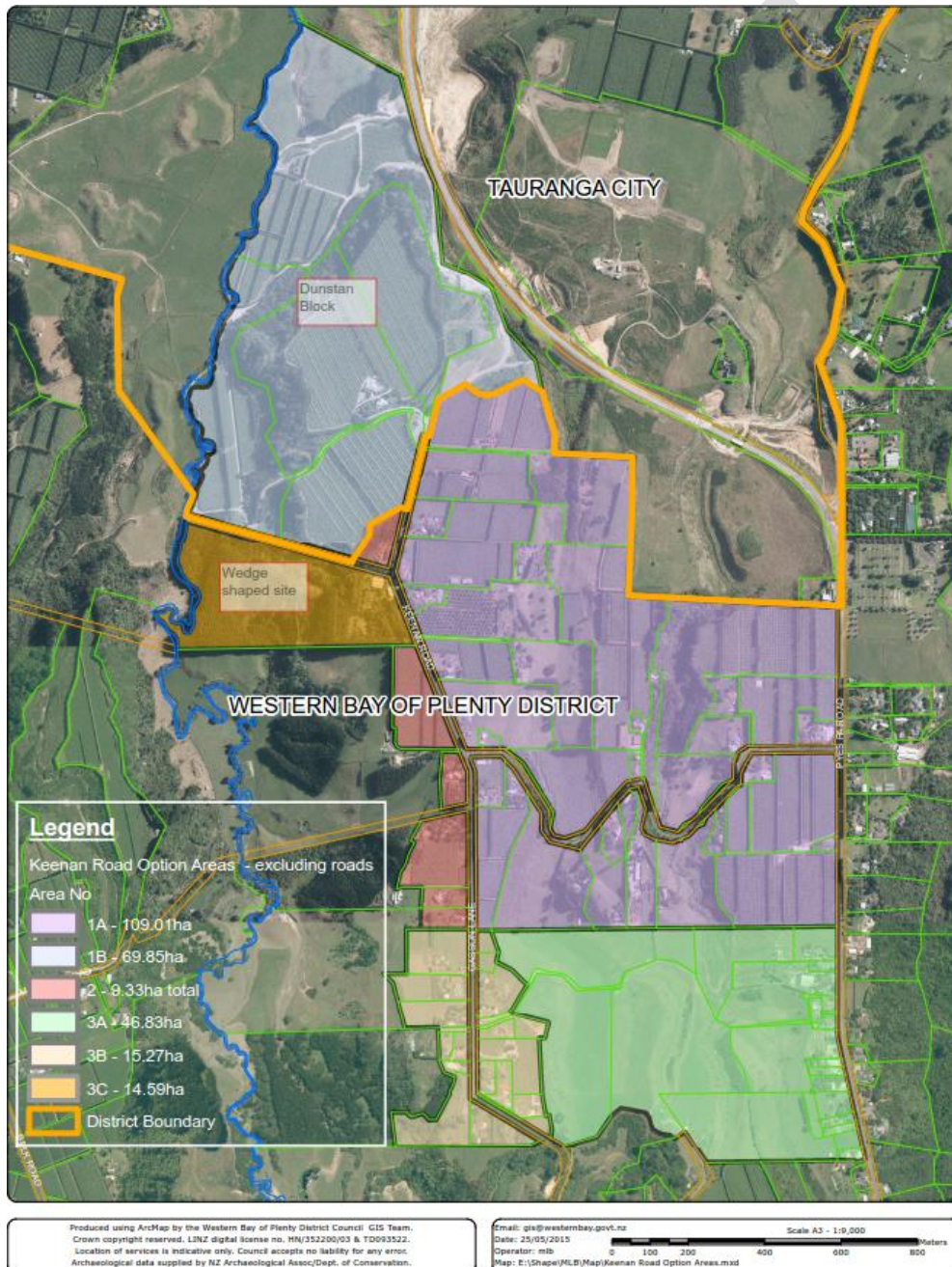


Figure 1. Keenan Road Growth Area

Wastewater

Waste water was identified as a key, possibly limiting service due to the topography and known network constraints. Keenan represent around 8.7% of the western growth area. Modelling was developed by AECOM (appendix 1- Keenan road growth area options assessment October 2015) based on the existing model and predicted flows.

The model results indicate that a new trunk main would be required to service the Keenan block (two distinct catchments). This would feed into the TCC system at the 'lakes'. From there the existing system is constrained by pipe size and grade. The construction of the new trunk main and Keenan reticulation would be challenging due to land form (swamp, slope etc.). The estimate to install the new trunk main to service the area is \$4.5m. Upgrades to the Lakes pump station and downstream to Maleme st is estimated at \$3.03m. It is noted that costs for this portion of the mains upgrade may be proportioned over other areas that would also be serviced by this upgrade.

The area to the south of SH36 within the current TCC urban area have been catered for in current planning and mains, this will yield approximate 450 lots.

An option for servicing the Upper Keenan and Merrick area is the introduction of a new trunk main on the eastern side of Pyes Pa road into the city. This option would require some pump stations and main upgrades and has not been explored.

Gravity reticulation is considered the most efficient where possible; however some areas may require either pressure pumping, or very deep/expensive services.

Table 1: Estimated Costs to provide waste water mains to Keenan area.

Keenan Road .Sewer Trunk Main and Pump Station upgrade estimate.*		
Upgrade mains. 350 to 525mm & grade	2500m @ 970/m	\$2.43m
Pump station upgrades	LS	\$600,000
Trunk main Upgrade	AECOM Estimate	\$4.5m
Estimated Total to Service Keenan excluding service mains		<u>\$7.53m</u>

**Subject to detailed design, high level estimate only.*

Water

TCC have scoped the future water needs for the city. Holistically with the implementation of the Waiari supply and retention of the current supplies, TCC believe they will be able to provide for the proposed growth areas including Keenan. The design and provision of water to any one cell is not a good approach, the system should be design holistically- city wide.

Approximately half of Keenan road can be serviced from the existing system. The higher areas above 70m RL will need pressure augmentation as they are above the pressure system available. The existing line feeding into the Lakes area is high risk as a single feed supply. Investment in an alternative feed is recommended.

The logical extension of Keenan into Merrick will necessitate new reservoirs and pumps .

Estimating the cost of water infrastructure is challenging without design. The road layout is not resolved however minimum costs as per the table2 below could be used as a starting point before design.

Holistically Keenan could be split into two areas-

1. Lower Keenan/Dunstun feed from exist TCC system up to 70mRL
2. Upper Keenan and Merrick feed from new main. Tap into line on Pyes Pa road feeding the lakes feed the lakes area and boost to reservoir and gravity to upper Keenan

The above approach builds resilience into the system and reduces risk on the existing lakes area. It is expected that trunk mains will need to be installed to service the wider area. The cost could be spread city wide and are rough order costs only for consideration and further investigation.

Table 2: Estimate cost to provide water to Keenan and Merrick area

Keenan growth area. Estimated water costs*		
Lower Keenan-		
Trunk mains 200mm dia	2.9km at \$275/m	\$800,000
150mm mains	3.1km at \$112/m	\$350,000
Upper Keenan/Merrick Trunk main 250mm dia, booster and Reservoir. 150/200 Gravity mains	4.3km \$375/m	\$1.62m
	Booster pump	\$700,000
	Reservoir (6ML)	\$3m
	200mm, 2km @\$275/m	\$514,000
	150mm, 6km @ \$112/m	\$672,000
Estimate Total		<u>\$ 7.7m</u>

**Subject to detailed design, high level estimate only.*

Storm Water

The management of storm water in the Keenan growth area is complicated and dependant on the road form, consents and earthworks. Recent TCC experience in similar marginal catchments (Hastings road- pond 11, 11a,25) indicates that without detailed design, 'Master planning' and possibly amalgamation of blocks, the implementation of Keenan block is fraught with risk and additional cost to TCC.

It is not practical to expect individual developers to liaise and negotiate with none related parties to deliver a storm water system. By default TCC will be tasked with achieving the aspiration of the Structure plan and consents.

A storm water solution for the Keenan area can be delivered however it will need greater consideration than adjacent structure plans(SP13)structure .

Lower areas like Dunstan blocks may have lower yield due to flood and storage issue. Geotechnical constraints(steepest gullies, fill) will effect yield and make management of stormwater (reticulated and overland) a challenge.

The current rule for discharge in the lower catchment is flow restricted to 150% of pre development flow. This design parameter is restrictive and necessitates large storm water mitigation devices often located in marginal land forms or taking valuable house sites. Alternatively a significant area of Keenan is not currently covered by the City Plan or TCC comprehensive discharge consent. There is a possibility of reassessing the mitigation and discharge for new storm water consents. Modelling continues in the two main catchments that may assist with an alternative approach.

At this time and without design it is not possible to estimate a cost for storm water management or how it would be funded.

Integration with Western Corridor study '3b'.

Keenan road is a key area of a wider '3b' Western Corridor development study by Smart Growth. This wider study will guide the infrastructure planning and sequencing of the growth cells in the area

Keenan present a viable growth area however in terms of infrastructure servicing other blocks can be integrated with increased efficiency.

Summary

The proposed Keenan growth cell offers a logical progression of development in the western Corridor area. Holistically waters servicing of the area can be accommodated with upgrades to existing infrastructure and new reticulation.

The challenge to service this area and provide a sustainable yield lies in the ability to manage the earthworks and infrastructure installation. A cohesive and continuous development will require careful strategic planning and coordination of multiple parties. Significant unbudgeted funds will be required for infrastructure upgrades for this and adjacent areas. These include trunk mains reservoirs and pump stations.

The final road/State Highways pattern will have an effect on the sequencing and alignment of infrastructure.

Waste water modelling indicates the existing infrastructure between 'The Lakes' to the gravity section of the Southern Pipe line will require upgrading. A proposed option of a central trunk main 2900m long at 375/450mm diameter connecting the Keenan area to the 'Lakes' Pump station is considered appropriate. The Southern pipe line will have the capacity to take the increased flow with introduction of retention within new reticulation to reduce peak loading on the system.

Storm water is dependent on development design and consent conditions that are not able to be fully assessed at this time.

Water supply will require modelling and planning. A significant portion of the block will require pumping, reservoir(s) and main upgrades. The proposed Waiari water supply will be needed to supply the area effectively in combination with the existing plants.

Structure planning of the services shall be closely linked to the road pattern and earthworks. A holistic approach to servicing this cell is required due to the correlation with other city infrastructure. The structure plan will need to be detailed to reduce risk of inappropriate development costs and time constraints.

Jon Fields
Planning Engineer- Waters
Tauranga City Council

Appendix 1 – Keenan Growth



Keenan Wastewater Residential Servicing - Report FINAL DRAFT.pdf

DRAFT