Malcolm's Rest

# Wallace Road Growth Cell

# Water and Waste Capacity Study

23 May 2022







## **Document control**

Project identification		
Client	Company name	
<b>Client representative</b>	Name and role, e.g. Snoopy Dog, Team Lead	
BBO details	Bloxam Burnett & Olliver (BBO) Level 4, 18 London Street, Hamilton 3240	
<b>BBO</b> representative	Bernie Milne	
BBO rep. contact details	s 9(2)(a)	s 9(2)(a)
Job number/s	147570	
Job name	Wallace Road Growth Cell	
Report name and number	Water and Waste Water Capacity Study	
Date	March 2022	
File path	WA Growth Cell Proposal.docx	

Report status			
Status	Name	Signature	Date
Report prepared by	Bernie Milne	Bfmb	23/05/2022
Checked by	Cameron Inder		24/05/2022
Approved for issue (V1)			

Document history			
Version	Changes	Signature	Issue date
V2			
V3			
V4			





## **Table of contents**

1.	Introduction	.1
1.1	Existing Situation	2
2.	Wastewater Infrastructure	.2
2.1	Direct Catchment – Served by Bremworth Park tanks	2
2.2	Wider Catchment – Served by main Dinsdale pumpstation	2
3.	Water Infrastructure	.3
4.	Conclusion	.4
5.	References	.5
Append	dix A – Plans	





### 1. Introduction

The Wallace Road, or WA, Growth Cell is approximately 27.5ha in size and is located adjacent to Wallace Road to the west of Hamilton City. The land is currently within the Waikato District, but a plan change is in process to bring this area into Hamilton City. To enable the rezoning to occur, it must be demonstrated that the site can be serviced by the city's infrastructure. This report looks at water and waste-water issues in Hamilton City and looks at options to service the growth cell.

It is proposed that around 1,000 household units will be created across the site developed in several stages. The density proposed anticipates the outcomes of the National Policy Statement on Urban Development (NPS UD). 1,000 units across the site equates to 36-37 units per ha, this is on the basis that flatter land could achieve 40-50 units per ha and the density in the hill areas would reduce to 20-30, therefore the proposed density is considered realistic.

Development will be staged with the initial stage comprising 200 units with a similar number proposed every year following. If the plan change is successful the first houses could be complete in 3 years, approximately mid-2025.



Figure 1 – Growth cell location (brown hatch). Refer to drawing 0701 in appendix A for complete plan



#### 1.1 Existing wastewater situation

Hamilton City has existing capacity issues within its wastewater infrastructure that affect several areas of the city, in particular in rain events where the system can become overwhelmed resulting in untreated waste water overflow (spills). The wider catchment suffers with a high level of ground water infiltration and ingress due to large areas of soft soils that are prone to settlement and subsequently compromise the integrity of wastewater pipes. A lot of pipes in these areas are older earthenware pipes which can crack and leak allowing water to enter the sewerage system.

The capacity of the system is driven by the large increase in volumes during rain events due to infiltration and ingress, opposed to the more consistent flows produced by the population.

In addition to a programme to repair old pipes, Council has proposed the installation of large attenuation devices to hold back flows during large rain events then spreading the flows over a longer period of time so that the system is not overwhelmed. The reticulation that would service the WA Growth Cell would connect to a attenuation tank located underneath Bremworth Park.

### 2. Wastewater Catchment Assessment

#### 2.1 Direct Catchment – Served by proposed Bremworth Park attenuation tank

The current housing density of the Bremworth Park catchment is approximately 11.5 household units per hectare. This was calculated using the number of addresses within the catchment registered in the LINZ database and dividing by the area of the catchment less the area of Parks including Bremworth Park, refer to drawing 0701 in Appendix A. The resulting catchment area is 103ha.

Proposed changes in density driven by the NPS UD will increase the density of dwellings over time to a level comparable with the proposed density within the WA growth cell or 36 houses per ha. On this basis the WA growth cell contributes an additional 21.2% of flows to the Bremworth catchment.

Direct Catchment – Future Density (36 household units/Ha and (2.7 people per unit)			
Zone	Contribution (RITS standard)	Population Equivalent	
Existing HCC residential catchment	103 Ha = 3708 household units	10,012	
WA Growth Cell	1,000 household units	2,700	
Total population		12,712	
WA contribution		21.2%	

#### 2.2 Wider Catchment – Served by main Dinsdale pumpstation

Drawing 0700 shows the wider Growth Cell catchment, this catchment contributes to the Dinsdale pump station which is understood to be a major constraint on the waste water capacity.

The table below accesses the proposed population in the WA growth cell against the wider catchment using both densities within the RITS for the exiting catchment as well as anticipated densities allowed for in the NPS UD. For this comparison only residential densities have been altered between the 2 scenarios.



Wider Catchment			
Zone	Contribution	Population Equivalent using RITS values for existing catchments 45 people, 16.6 dwellings per ha (16.6 dwellings per ha	Population Equivalent using NPS UD values 97 people, 36 dwellings per ha
Residential	929 Ha	41,805	90,113
Industrial	118 Ha	5,310	5,310
Community	30 Ha	900	900
Facilities	Schools, churches (30 persons per Ha)		
Hospitals	673 Beds (Waikato Hospital) 83 Beds (Braemar Hospital) 3.5 persons per bed	2,655	2,655
WA Growth Cell	1,000 household units 2.7 persons per unit	2,700	2,700
Total		53,370	101.678
WA Percentage of TOTAL		5.1%	2.7%

#### 2.3 Wastewater Discussion

There is an existing wastewater capacity issue within Hamilton City, there is also a proposed solution to this by way of attenuation tanks, one of which is proposed to be within Bremworth Park. The proposed densities in the growth cell are higher than the existing densities in the city, however the NPS UD densities will apply equally to the existing areas as they do to the new areas so the attenuation and sewerage system should be designed to anticipate this growth. Using the anticipated densities, the WA growth cell increases the flows to the Bremworth catchment by 21.2% and the wider catchment by 2.7%. As the reticulation in the growth cell will be new it will not be subject to the same level of infiltration and ingress as the existing network, council may progressively replace the existing network which may bring the proposed catchments into line, however if council do not intend to undertake this work the contribution of the WA growth cell to peak wet weather flows, which are the ones causing the overflows, are far lower than represented in the tables.

Council have indicated that centralised attenuation is their preferred outcome, therefore it follows that the Bremworth attenuation system is upsized to accommodate flows from the WA growth cell. Costs for this work could be paid as a targeted development contribution by the WA growth cell based on the cost split of total cost proportional to flows.

It is recognised that the installation of the storage tank in Bremworth Park may be well into the future while the Growth Cell development is likely to be much sooner. To ease the transition period between developing the Growth Cell and installing the full storage tank system, the development may be staged. It is currently proposed to undertake the development in 200 unit stages. This staging creates an opportunity for some form of interim servicing that could be agreed with Council.

### 3. Water Infrastructure

The existing water network in Hamilton City presents less risk, compared with waste water, as pipes are generally located in the road reserve berms and leaks are far easier to detect than waste water pipes.



The WA growth cell is located near to the New Castle reservoir

To meet the water volume requirements for the Growth Cell, onsite water reuse is proposed in accordance with the proposed district plan. This will supplement dwellings with a supply of water, therefore reducing the demand of these households for water main supply.

Based on an annual rainfall of 1200mm [3], a house in Hamilton with a roof area of 200m<sup>2</sup> has the potential to collect 240,000L of water annually for its occupants. Considering the RITS demand for a house of 2.7 occupants is approximately 200,000L per year, the potential collection of rainwater for use in the home could provide a significant amount of the household's water needs. Mains supply would then only be required for meeting the needs of the occupants during periods of little rainfall where the stored water in the tank is insufficient to meet the needs of the household. It is proposed that supply from the mains is provided at a controlled rate (trickle feed) that does not greatly impact the system at peak demand times. This will lessen the impact of the WA Growth Cell on the city's current water infrastructure. Modelling of the water network has not been undertaken, however, it is anticipated that due to the proximity of the proposed site to the Newcastle reservoir, the development can be serviced at an adequate pressure.

### 4. Conclusion

There is a city-wide issue with the capacity of existing wastewater infrastructure. Hamilton City Council has proposed the installation of storage devices across the city to mitigate these issues.

Waste water flows into the western interceptor are expected to increase by 2.7% with full buildout of WA with approximately 1000 households. At a local level this represents an increase into the Bremworth catchment of 21.2%. It is suggested that the proposed Bremworth Park storage system can be increased in size to accommodate the WA Growth Cell flows with the apportionment of costs to be agreed via a process undertaken in consultation with HCC.

The water infrastructure has not been modelled but may have a similar peak flow capacity issue due to the increase in housing density within the city allowed for by the NZP UD. To address this, it is recommended to use rain collection tanks to supplement the demand on the water mains and allow for "trickle feed" style connections to reduce the on peak demand on the system. Water pressure is not anticipated to be an issue for the proposed development due to its proximity to the Newcastle water reservoir.

Water and waste water demands from the WA Growth Cell do not significant enough to alter the proposed system upgrades proposed by HCC to alleviate existing issues and provide capacity for further intensification. As such the development can be serviced by HCCwater and waste water infrastructure.



#### 5. References

- [1] Ministry of Health, "Waikato Hospital," n.d.. [Online]. Available: https://www.health.govt.nz/your-health/certified-providers/public-hospital/waikato-hospital. [Accessed 23 February 2022].
- [2] Braemar Hospital, "Registered Nurses Inpatient Ward," Braemar Hospital, n.d.. [Online]. Available: https://www.braemarhospital.co.nz/registered-nurses-inpatient-ward/. [Accessed 23 February 2022].
- [3] NIWA, "The Climate and Weather of Waikato," NIWA Science and Technology Series, n.d..





# Appendix A – Plans







+64 7 838 0144 consultants@bbo.co.nz www.bbo.co.nz

# Memo

То	Malcom's Rest
From	Bernie Milne
Date	23 May 202223 May 2022
Job No.	147570
Job name	WA Growth Cell
Subject	Provision of services to site – meeting with Jackie Collier – 11 March 2022

This memo covers the discussion held with Jackie Collier (Hamilton City Council) online on the 11<sup>th</sup> of March 2022. The meeting was to discuss the capacity of water and waste-water services and possible interim options. The message from Jackie was consistent with comments she made at the previous group meeting earlier in the year.

#### **Regulatory challenges**

The discussion commenced with a summary of the regulatory situation that HCC are currently facing, being both the likely increase in housing density required under the Nation Policy Statement – Urban Design (NPS-UD) and the 3 waters reforms where HCC may lose control of the prioritisation and delivery of projects. Both changes are significant and are being forced on council by central government. There is a considerable level of uncertainty as to what the outcome of these processes will be, and uncertainty on the resulting demands on services city wide and uncertainty on how upgrades will be delivered.

#### **Current HCC Solution**

The proposed solution that HCC are investigating to alleviate wastewater capacity issues is a series of large underground storage tanks at various locations across the city to attenuate peak flows. They have recently released a package of work to determine the system requirements and prepare a consenting package. The study is expected to take 12 months to complete, then the storage tank sites need to be designated and consented before construction can commence, this could take 2 years. There is money in the LTP for this work, but it is not specific on what sites this funding is for and exactly when it will be spent.

HCC indicated that the storage tank at Bremworth Park could cost in the order of \$15-20 million, however their pricing was based on Pre NPS\_UD predicted density's and was prior to recent cost escalation, so costs are likely to be higher.

Council did confirm that the duplication of the western interceptor meant that there were no downstream pipe capacity issues. The issues are in the local reticulation and the capacity of the treatment plant at Pukete.

#### **Interim Solution**

Several interim servicing solutions (discussed further below) were suggested but Jackie was not supportive of any of them. Her preference is for the site to be served via the first stage of council's permanent capacity solution.



**Onsite attenuation** was not supported as this is against council policy, and it would utilise capacity in their system that they currently rely on to manage flows in rain events, increasing the chances of a waste water spill. I feel they want to keep this reserve capacity to buy them time for increased flows coming from increased housing density before the tanks are installed.

**Individual grinder pumps** were not supported by HCC and would not be allowed unless the site was under comprehensive management such as a retirement village or similar, ie not private individual ownership. This is consistent with other sites I have been involved with in Hamilton. Council do not want the public being responsible for their own pumps.

**A pump station with rising main to the western Interceptor** is a solution that Council could potentially accept. This involves a pressure rising main of approximately 1,500m in length being installed along Whatawhat road to the Western Interceptor on Rifle Range Road.

Jackie made it clear that the ultimate wastewater solution for the area will be via the proposed storage tanks therefore any interim system would need to be removed or abandoned when the final solution was available. The financial contribution to the ultimate solution would remain the same, regardless of the interim solution as there is little or no overlap in the systems. This means that costs associated with any interim option are additional to the permanent solution and could be sacrificial within 5-7 years.

#### **Further Considerations**

The 3 waters reforms may work in favour of the WA growth cell as one of the core principals of the change is to support growth. As NPS-UD is also an aspiration of central government, so they will be motivated to "make it happen". HCC are conservative and want to keep any reserve capacity in the system for use within the city boundary, as it has been funded by rate payers in Hamilton. This makes approval of any interim solution, particularly one for an area of land not currently within Hamilton City boundary, a challenge.

Council is presently committed to the attenuation tank solution. This will be tested over the planning phase of the project, which Council are involved in now. Significantly, Council have indicated they will agree to an upsize of the proposed system to accommodate the WA land, subject to agreement of cost contribution and the land being successfully transferred into Hamilton City.

The BBO memo on capacity looks at the calculated waste-water flows for WA developed to a density supported by the NPS UD. This calculation helps to determine the likely impact of the WA flows on the HCC system. It finds that at a local level, WA with 1000 households would contribute around 21% additional waste water to the Bremworth catchment on the basis of that too being developed to maximum practical density permitted by the NPS UD. Effectively this means the storage facility needs to be enlarged to 121% of the original calculated size.

I believe that the best approach is to enter into a Memorandum of Agreement (MoA) with HCC on the upsize of the storage system for the purposes of accommodating WA growth area in the final solution, including an agreement for how costs will be apportioned. This may be sufficient for the land to be rezoned as "Future Residential" and bought into the city boundary, as it demonstrates that there is a solution for future servicing. Following rezoning, you could then lobby council to bring forward funding for the construction, provided the planning and consenting processes currently being undertaken have been completed. If the land is already within HCC then council's 3 waters department will be more open to discussions on interim servicing options for staged development. For example, Jackie suggested that you could forward fund the construction of stage 1 of the attenuation system, however Stage 1 will be the most complex and costly stage as it contains the head works and pumping infrastructure. Subject to the MoA clearly detailing cost apportionment for the infrastructure, you could then expect to receive rebate over time from council for the extra-over you funded.

The only other acceptable interim solution to Council is a new pumpstation and rising main feeding to the western interceptor on Rifle Range Road. I have not done a detailed cost breakdown, but based on a rough



order estimate, I expect costs for this to exceed \$1 million even if it served only 200 houses as it would require a full sized pumpstation and rising main.

The BBO services memo states that the WA growth cell contributes an increase of 21.2% to the Bremwoth catchment, so if the system cost \$15-20 million the upsize contribution would be between \$3.18 and \$4.24 million using a simple percentage basis (as an example). The cost of the interim solution is significant relative to the cost for the final solution. Since it would be sacrificial when council implements the final solution and expected timeframe for the final solution is 5-7 years, it appears prudent to avoid the sunk cost of the interim solution if possible and concentrate on lobbying Council for the final solution to be bought forward (once WA is bought into the city boundary).

It could be argued that the upsize of the Bremworth storage facility should relate to the extra storage requirement only as the rest of the system is required regardless of whether the WA growth cell is included or not. This would reduce the cost significantly (compared to the simple contribution example calculated above). By the same token council may wish to apportion the cost of the new infrastructure onto new builds only via development contributions, this would work against the WA growth area and would be unfair as you would effectively be funding the solution to an existing problem (rather than an upsize to an existing solution)

I trust this helps provide clarity and strategic direction to your plans going forward.

Yours sincerely Bloxam Burnett & Olliver

s finite

Bernie Milne Principal Civil Engineer s 9(2)(a)

WA Summary of discussions with Council and suggested approach.docx

