

GREEN SEED CONSULTANTS LTD

Rotokauri North Sub-catchment ICMP

Water and Wastewater System Report

30 July 2021





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Project identification	
Client	Green Seed Consultants Ltd
Client representative	Gary Noland
BBO details	Bloxam Burnett & Olliver (BBO) Level 4, 18 London Street, Hamilton 3240
BBO representative	Jarred Stent
BBO rep. contact details	027 477 1134   jstent@bbo.co.nz
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# 1. Introduction

Green Seed Consultants Limited ("GSCL") requests a private plan change to enable the re-zoning and future development of land located in Rotokauri North for medium density housing.

The private plan change (PPC) relates to approximately 140 hectares of land. The PPC area is bounded to the north by Te Kowhai Road (SH39) and to the west by Exelby Road. The majority (approximately 133 ha) of the area, falls within land holdings under the GSCL umbrella.

To align with catchment boundaries, the water and wastewater management planning also includes 63.5 hectares of land within Rotokauri falling outside of the PPC area.

A comprehensive outline and description of the site and its characteristics is provided in the Sub-Catchment ICMP Report (to which this document forms a technical appendix) prepared by Tollemache Consultants.

This report sets out the water and wastewater management planning for the Rotokauri North PPC area (and land falling in the wider catchment).

## 1.1 Project Overview

The Rotokauri North PPC comprises approximately 140ha of land proposed to be zoned for urban activities, specifically:

- 137.6 hectares is proposed as a Medium Density Residential zone ("MDRZ");
- 1.2 hectares is proposed as a Business 6 zone (Neighbourhood) ("B6Z");
- 0.5 hectares will retain its current zone as a Significant Natural Area ("SNA"), i.e. no change from the operative provisions.

Based on the PPC area, the development is expected to yield 1,600- 2,000 dwellings, however factors such as a future purchase of a sports park by HCC and purchase of land by the Ministry of Education for schooling (neither of which have been confirmed) may reduce this yield.

## 1.2 Purpose and Scope of this Report

The purpose of this report is to inform the water and wastewater opportunities, constraints and issues to inform a Best Practicable Option for water and wastewater management solutions for Rotokauri North.

Although some of the catchments extend beyond the HCC territorial boundary, this ICMP only covers land within the HCC territorial boundary (although some other technical assessments have covered the catchments as a whole).

As development at Rotokauri North has been anticipated and envisaged for some time, the land was included in the adopted Rotokauri Integrated Catchment Management Plan ("Rotokauri ICMP"), which covers the Rotokauri Structure Plan area identified in Chapter 3 of the HCDP (approximately 196 hectares) and within the Mangaheka ICMP (approximately 15 hectares identified as area "G" within the Mangaheka ICMP).

The Rotokauri North area, therefore, constitutes a "sub-catchment" within the wider Rotokauri area, and as such, this document is prepared as a "Sub-Catchment ICMP" to be read as part of the Rotokauri ICMP and the Mangaheka ICMP with its primary purpose of providing water and wastewater guidance and solutions to support the PPC request for Rotokauri North.



### 1.3 References

1. Hamilton City Council (2017) Rotokauri – Integrated Catchment Management Plan. Hamilton, New Zealand
2. Hamilton City Council (2019) Mangaheka – Integrated Catchment Management Plan. Hamilton, New Zealand
3. Rotokauri North Tangata Whenua Working Group (2020) Rotokauri North Private Plan Change – Cultural Impact Assessment
4. Waikato Local Authority Shared Services (2018) Regional Infrastructure Technical Specifications (RITS)





## 2. Catchment Objectives, Constraints and Design Parameters

The objectives within the catchment are documented in Section 1.7 (Objectives and Targets) of the Rotokauri Integrated Catchment Management Plan (RICMP) (Hamilton City Council, 2017) and Section 1.7 (Strategic Objectives) of the Mangaheka Integrated Catchment Management Plan (MICMP) (Hamilton City Council, 2019). The key design outcomes for wastewater are documented in Sections 3.3 of the RICMP and MICMP, and for water supply are documented in Sections 3.4. Design parameters for wastewater and water supply are documented in Chapter 5 of the two ICMPs. Relevant recommendations by the Rotokauri North Tangata Whenua Working Group are documented in Section 14.0 of the Rotokauri North Private Plan Change - Cultural Impact Assessment (Rotokauri North Tangata Whenua Working Group, 2010).

The water and wastewater networks have been designed in compliance with RITS (Waikato Local Authority Shared Services, 2018). The key wastewater design parameters are shown in Table 2.1. The key design assumptions and considerations were as follows:

- Existing downstream wastewater network has sufficient capacity to manage the flow generated in the Rotokauri North ICMP area.
- Wastewater from the eastern subcatchments is conveyed using gravity only to the wastewater discharge manholes.
- Use a maximum of two pumpstations to convey wastewater from the remaining parts of the Rotokauri North development to the wastewater discharge manhole.
- Incorporate options for the wastewater management of areas that align with the catchment boundaries, but fall outside of the Rotokauri North development.

Table 2-1 – Key Wastewater Design Parameters

Design Parameter	Value
Population Equivalent per Lot	2.7
Average daily flow per population equivalent per day	200 litres
Infiltration allowance per serviced hectare per day	2,250 litres
Surface water ingress per serviced hectares per day	16,500 litres

The key water design parameters are shown in Table 2.2. The key design assumptions and considerations were as follows:

- Tie into the existing water network at a minimum of two suitable locations.
- Existing upstream water supply network has sufficient capacity to service the area covered by the sub-catchment ICMP, based on implementing network upgrades as per the HCC Water Supply Master Plan.
- Design to include linked or looped mains to avoid dead end water mains.
- Design to meet the FW2 firefighting requirements at the street boundary for residential areas and FW3 requirements for other zones.

Table 2-2 – Key Water Supply Design Parameters

Design Parameter	Value
Domestic demand per person per day	260 litres
Peak flow rate factor	5
Minimum residual pressure	200 kPa
Minimum flow rate at point of supply	25 l/min



## 3. Wastewater Sub-Catchment Layouts

### 3.1 Wastewater Discharge Location

To connect future developments west of SH 1, including Rotokauri North, to the existing HCC wastewater network on the east side of SH 1, two 1050mm wastewater pipelines with associated upstream manholes were installed underneath SH 1 at the time of its construction. The manholes, ID WWL09002 and ID WWK09003 were both investigated as possible wastewater discharge locations from the Rotokauri North development.

The first alternative discharge location and alignment of the pipeline was from the northern manhole (ID WWK09003) directly across to the Rotokauri North development (Figure 3-1). This alignment currently crosses privately owned land used for agricultural purposes, as well as the floodplain of the Mangaheka. As no details are currently available on the possible development of this land, the alignment has been assumed to be a straight line from the discharge manhole to the north-eastern corner of the Rotokauri North development next to the Mangaheka Stream. At that point, the alignment turns south alongside the proposed minor north-south arterial and it enters the development alongside the major east-west road.

An alternative alignment of the pipeline from the northern manhole to the Rotokauri North development was along the existing Te Kowhai Road, entering the development at the existing SH39 roundabout, and continuing along the northern boundary of the development in the space available between proposed property boundaries and SH39.

The investigated alignment of the pipeline from the southern manhole, ID WWL09002, was alongside the proposed minor east-west arterial road referred to as Te Kowhai Road West Extension to the south-eastern corner of the Rotokauri North development. At that point the alignment turned north alongside the proposed minor north-south arterial. The wastewater main entered the development at the intersection of the proposed minor north-south arterial and the proposed major east-west road.

The northern manhole is proposed to be the main discharge manhole (Figure 3-1). Firstly, the invert level of the northern manhole, ID WWK09003, is 0.68m lower than the invert of the southern manhole, ID WWL09002 and the alignment results in the shortest distance and hence smallest reduction in elevation between the development and the discharge manhole. Secondly, the limited number of pumpstations means that these have to be located centrally within the development which ties in well with the alignment of the wastewater main alongside the major east-west road. And thirdly, this alignment is close to the areas immediately south of the Rotokauri North development. These areas align with the catchment boundaries but are outside of the PPC and therefore, when these areas are developed, wastewater from these areas will have to be conveyed through the Rotokauri North wastewater main.

To service the area south of the Rotokauri North development, a 1050mm wastewater main is proposed alongside the minor east-west arterial road. This southern wastewater main is planned to be constructed first and therefore will also temporarily service Rotokauri North during the initial stages of the development. To enable use of the southern wastewater main, a 375mm pipeline is proposed alongside the minor north-south arterial as the temporary connection. When the northern wastewater main is constructed, the majority of the wastewater flow from Rotokauri North will be diverted to the northern discharge manhole. However, it is proposed that wastewater from the area referred to as Rotokauri South WW (Figure 3-1) will not be diverted. The proposed 375mm pipeline will permanently be utilized to service lots in the Rotokauri South WW catchment. The lots will drain via gravity only into the southern wastewater main along the minor east-west arterial.



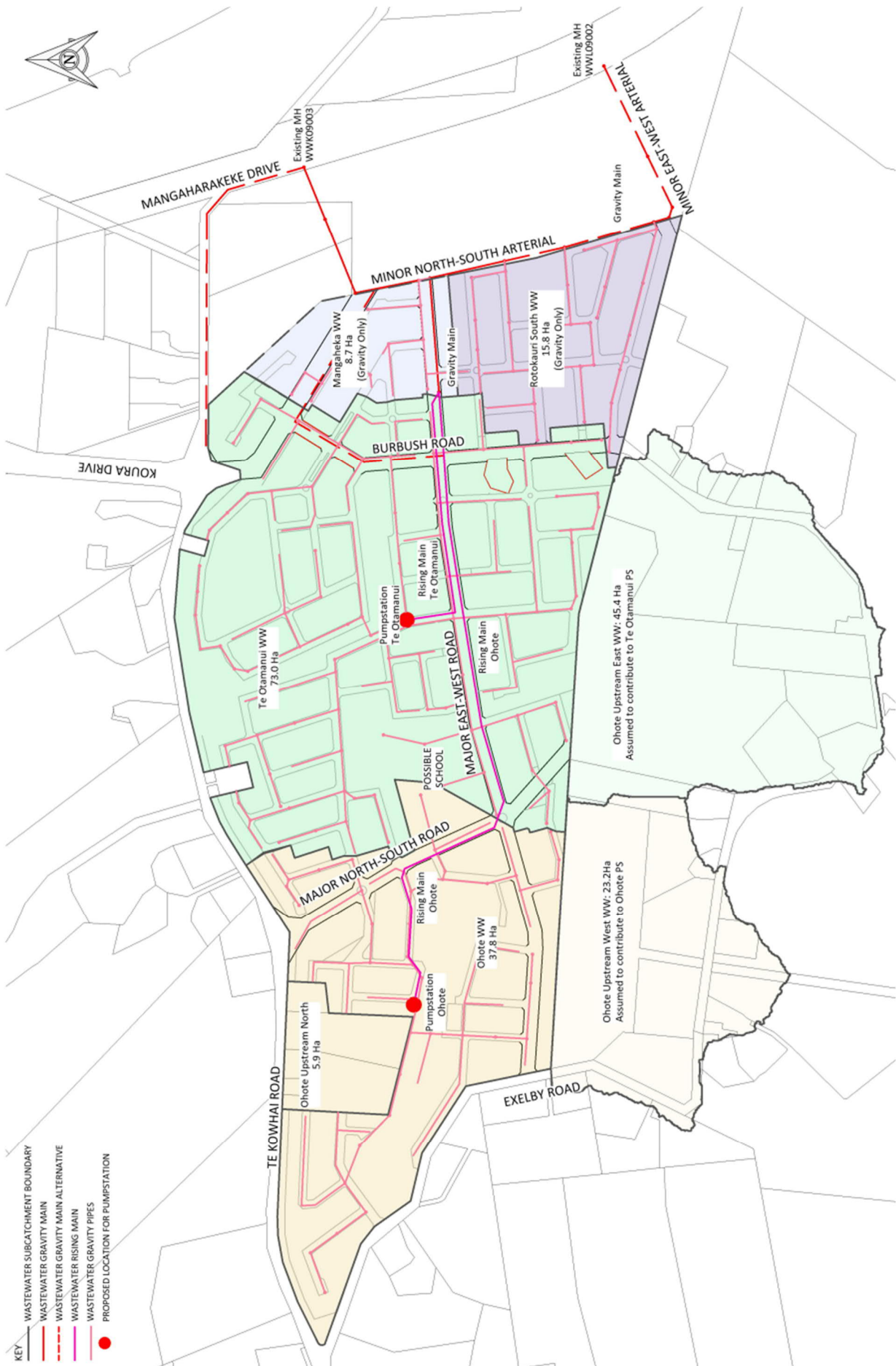


Figure 3-1 - Concept Layout Plan for Wastewater Conveyance



Based on the proposed alignment of the wastewater main and the number of pumpstations, the Rotokauri North development was divided into four wastewater sub-catchments. These are Rotokauri South WW, Mangaheka WW, Te Otamanui WW and Ohote WW and are shown in Figure 3-1.

### 3.2 Rotokauri South WW

Upstream of the existing manhole WWL09002, the proposed southern wastewater main is a 1050mm gravity main with an assumed gradient of 0.05%. It will be constructed along the proposed minor east-west arterial. At the intersection with the minor north-south arterial, the wastewater main will turn south as its primary purpose is to service the areas south of the Rotokauri North.

It is proposed that the southern wastewater main also services a small part of the Rotokauri North development. These lots fall within the Rotokauri South WW catchment (Figure 3-1) which has an area of approximately 15.8 Ha. Wastewater from these lots will be conveyed using gravity only to the proposed 375mm main along the minor north-south arterial which at the south-eastern corner of the development will be connected to the southern wastewater main.

The western boundary of the sub-catchments closely follows the ridgeline of the hill that crosses the Rotokauri North development. The northern boundary of the sub-catchment follows the gravity main from the northern discharge manhole as it enters the development. Lots to the north drain under gravity directly into the northern wastewater main.

Catchment boundaries, and therefore the catchment area, are indicative only. These will be refined during detailed design.

### 3.3 Mangaheka WW

Upstream of the existing manhole WWK09003, the proposed northern wastewater main is a 1050mm gravity main with an assumed gradient of 0.05%. The alignment has been assumed to be a straight line from the discharge manhole to the north-eastern corner of the development next to the Mangaheka Stream. Then, the alignment turns south alongside the proposed minor north-south arterial and it enters the development alongside the major east-west road. The alignment of the proposed major east-west road has a point of maximum elevation of approximately 42.8m R.L. Upstream of this point, the wastewater main is a rising main.

Lots serviced by wastewater pipes that drain under gravity directly into the northern wastewater main, fall within the Mangaheka WW sub-catchments. The western boundary of the sub-catchments closely follows the ridgeline of the hill that crosses the Rotokauri North development. Along the north-western boundary, the pipelines are extended from the gravity main until the cover of the pipeline with the existing surface or the surface required as part of the proposed stormwater concept layout plan is less than 1 m. The southern boundary of the sub-catchment follows the gravity main as it enters the development. Lots to the south of the boundary drain under gravity directly into the southern wastewater main. The total area of this gravity only sub-catchment is 8.7 Ha.

Catchment boundaries, and therefore the catchment area, are indicative only. These will be refined during detailed design.

### 3.4 Te Otamanui WW

The Te Otamanui wastewater pumpstation is proposed to be located next to the proposed stormwater wetland Te Otamanui 4. A 120 m long section of rising main conveys the wastewater to the major east-west



road and a further 470 m long section of rising main conveys the wastewater to the upstream manhole of the gravity main.

The central location of the pumpstation allows it to service 73.0 Ha of the proposed development when the invert level of the incoming pipes at the pumpstation is at 26.1m R.L. This is approximately 4m below the existing surface and just under 5m below the required surface for the stormwater management.

The eastern, northern and western boundaries extend as far away from the pumpstation as possible without the cover of the pipeline with the existing surface or the surface required as part of the proposed stormwater concept layout plan becoming less than 1 m.

The southern boundary of the sub-catchment is the boundary of the Rotokauri North development. Therefore, there is the possibility of extending the gravity pipes further south into the Ohote Upstream east catchment. During detailed design, the location and the depth of Te Otamanui WW pumpstation will be refined to ensure future lots in the Ohote Upstream East WW catchment, based on the current surface elevation, will be able to drain under gravity to the pumpstation.

The subcatchment includes most of the area currently allocated for a possible school with the remaining area covered by the Ohote WW sub-catchments. Details of the wastewater connections on the schoolgrounds will require details on the proposed locations of the ablution blocks of the school.

Catchment boundaries, and therefore the catchment area, and pumpstation location are indicative only. These will be refined during detailed design.

### 3.5 Ohote WW

The Ohote wastewater pumpstation is proposed to be located west of the wetland Ohote 2. A 1450 m long section of rising main conveys the wastewater to the upstream manhole of the gravity main. For the final 470 m, this rising main will run parallel to the rising main from the Te Otamanui pumpstation. An alternative is to pump from the Ohote WW pumpstation into the wet well of the Te Otamanui pumpstation. This requires a rising main length of approximately 300 m and gravity main of 800 m at a slope of 0.002.

The pumpstation services the remaining 37.8 Ha of the Rotokauri North development with an invert level of the incoming pipes at the pumpstation at 26.0m R.L. This is approximately 4.2m below the existing surface and the surface required for the stormwater management.

The pumpstation and associated rising main will be designed to also service the future development within the Ohote Upstream North sub-catchment. The north-western and eastern boundaries extend as far away from the pumpstation as possible without the cover of the pipeline with the existing surface or the surface required as part of the proposed stormwater concept layout plan becoming less than 1 m.

The southern boundary of the sub-catchment is the boundary of the Rotokauri North development. Therefore, there is the possibility of extending the gravity pipes further south into the Ohote Upstream west catchment. During detailed design, the location and the depth of Ohote WW pumpstation will be refined to ensure future lots in the Ohote Upstream West WW catchment, based on the current surface elevation, will be able to drain under gravity to the pumpstation. This is also possible for some areas located immediately north and west of the pump-station. As these areas are not part of the sub-catchment, this has not been investigated further.

Catchment boundaries, and therefore the catchment area, and pumpstation location are indicative only. These will be refined during detailed design.





### 3.6 Alternative Gravity Main Alignment

The proposed wastewater sub-catchments presented above are partly a consequence of the chosen alignment for the gravity main to the discharge manhole (and therefore the upstream alignments for the rising mains). The alignment along the major east-west road results in the shortest alignment that goes through the centre of the development.

However, the wastewater main is buried underneath a small hill. At the upstream manhole of the gravity main, and therefore the discharge manhole of the rising main, the invert level is more than 15 m below the existing surface. It is understood that as part of the development, the surface level will be cut to flatten the land. There are currently no details available on the extents of these cuts, but if the extents of the cuts are not sufficient to make the alignment underneath the hill viable, then the alternative is as follows (Figure 3.1).

From the discharge manhole, the alignment has been assumed to be a straight line from the discharge manhole to the north-eastern corner of the development next to the Mangaheka Stream. At that point, the alignment turns north-east alongside the proposed minor north-south arterial until the intersection with Burbush road. The alignment then follows Burbush road south until the intersection with the major east-west road from where it will follow the road east.

This alignment circumvents the majority of the small hill and the stormwater infrastructure (e.g. wetland Te Otamanui 3) will require the existing surface to be cut along Burbush road, removing any remaining hill along the alignment. This alternative alignment increases the length of the wastewater main by 130m but would enable the Mangaheka WW sub-catchment to be increased, thereby reducing the flow rates to Te Otamanui pumpstation and the associated local pipelines. The maximum invert elevation of the rising main would also reduce significantly, thereby reducing the static head requirement of the pumps.



## 4. Wastewater Infrastructure

Based on the wastewater catchment delineations as proposed above, the following concept design calculations have been carried to yield indications for the wastewater infrastructure required.

### 4.1 Proposed Pumping Scenario

#### 4.1.1 Ohote Pumpstation

Three proposed wastewater sub-catchments may discharge into the Ohote pumpstation. These are the Ohote WW, the Ohote Upstream North WW and the Ohote Upstream West WW (gravity). Based on the key design parameters as shown in Table 2.1, the details of these sub-catchments are presented in Table 4.1.

When the catchments are fully developed, the combined peak wet weather flow from the three sub-catchments is approximately 36 l/s. A proposed rising main with an internal diameter of 200 mm yields a velocity of 1.1 m/s during the peak wet weather flow rate. This size rising main therefore allows for additional future developments north of the current development, that may use the pumpstation and rising main.

The pumpstation will be designed using two pumps with a duty/standby pump arrangement. The wet-well will be designed so that during peak wet weather flow, the pumps do not turn on more than 12 times per hour, while ensuring that during the initial phases of the development, the pumps do turn on at least once per hour. The storage capacity will be a minimum of nine hours average daily flow. Pump selection will take into account the system curve and the pump curve to ensure that the operating point of the pump is close to the point of maximum efficiency of the pump.

Table 4-1 - Ohote Pumpstation Design Details

	Ohote WW	Ohote Upstream North WW	Ohote Upstream West WW (gravity)
Area (Ha)	37.8	5.9	23.2
Equivalent Population (People)	1705	270	1045
Peaking Factor	2.9	4.0	3.0
Infiltration (l/s)	0.98	0.15	0.60
Surface Water Ingress (l/s)	7.2	1.1	4.4
Average Daily Flow – ADF (l/s)	4.93	0.78	3.02
Peak Daily Flow – PDF (l/s)	12.43	2.65	7.86
Peak Wet Weather Flow – PWWF (l/s)	19.65	3.78	12.29

#### 4.1.2 Te Otamanui Pumpstation

Two proposed wastewater sub-catchments may discharge into the Te Otamanui pumpstation. These are the Te Otamanui WW and Ohoto Upstream East WW (gravity). Design details are presented in Table 4.2.

When the catchments are fully developed, the combined peak wet weather flow from the two sub-catchments is approximately 60 l/s. A proposed rising main with an internal diameter of 250 mm yields a velocity of 1.2 m/s during the peak wet weather flow rate. This size rising main therefore allows for additional future developments north of the current development, that may use the pumpstation and rising main.

Pumpstation design will be similar to the Ohote Pumpstation.



Table 4-2 – Te Otamanui Pumpstation Design Details

	Te Otamanui WW	Ohote Upstream East WW (gravity)
Area (Ha)	73.0	45.4
Equivalent Population (People)	3285	2045
Peaking Factor	2.7	2.8
Infiltration (l/s)	1.9	1.2
Surface Water Ingress (l/s)	13.9	8.7
Average Daily Flow – ADF (l/s)	9.51	5.92
Peak Daily Flow – PDF (l/s)	22.43	14.44
Peak Wet Weather Flow – PWWF (l/s)	36.37	23.11

## 4.2 Alternative Pumping Scenario

The proposed scenario, presented above, includes two rising mains that run from the pumpstation to the upstream manhole of the gravity main and therefore run parallel to each other for the final 470 m along the major east-west road. In the alternative scenario, the Ohote pumpstation discharges into a gravity pipe that end at the Te Otamanui pumpstation. The Te Otamanui pumpstation pumps the wastewater into the upstream manhole of the gravity main, hence there is only a single rising main discharging into the gravity main.

The flow rates at the Ohote pumpstation are the same as for the proposed scenario, and therefore the proposed pipe size for the associated rising main remain the same as well. The flow rate at Te Otamanui pumpstation is the combined flow rate from all sub-catchments and is therefore approximately 100 l/s. A rising main with an internal diameter of 350 mm is therefore proposed downstream of Te Otamanui pumpstation.





## 5. Water Supply Layout

### 5.1 Water Supply Network Connections

The Rotokauri development is a greenfield development and hence there is currently very little water supply infrastructure throughout the catchment. The infrastructure that is present is not suitable for servicing the development. The Rotokauri ICMP (HCC, 2017) describes the plans to incorporate the majority of the Rotokauri development into the Pukete Water Supply Zone. Once the Pukete zone is closed, the pressures throughout Rotokauri are expected to exceed 200kPa at all times.

The ICMP also included a staged plan to service the Rotokauri area from the Pukete reservoir. Stage 1 referred to the required infrastructure for the development that occurred prior to the completion of the Stage 2 bulk main supply. Stage 2 is the construction of the 520mm bulk main supply link between Pukete reservoir and the Rotokauri area at Te Wetini Drive. This services predominantly the south-eastern part of Rotokauri. Stage 3 are the connections to service the north-western part of Rotokauri. These include a 450mm bulk main across SH1 as well as a network of 250mm trunk mains west of SH1.

Stage 2 has been completed using a 560mm bulk supply main while construction of stage 3 has not yet started. The water supply point at the end of Te Wetini Drive is therefore currently the only major water supply point in Rotokauri. However, this is in the south-western corner of Rotokauri. To service Rotokauri North development from this supply point will require the construction of the planned trunk main that follows the minor north-south arterial that is to end at the Te Wetini Drive roundabout. However, if this is the primary trunk main it is proposed to be constructed as a 450mm pipeline. The distance of this trunk main is approximately 2km.

The 450mm bulk main that is to be constructed as part of Stage 3 also ends at the minor north-south arterial (Figure 5-1). Its alignment follows the minor east-west arterial referred to as Te Kowhai Road West Extension. The bulk main therefore ends at the south-eastern corner of the Rotokauri North development. Upstream, the 450mm bulk main is connected to an existing 250mm trunk main at the Tasman Road/Te Kowhai Road East intersection. It is approximately 1km from the intersection to the 520mm bulk main at Te Rapa Road, but it is not known whether an upgrade of this line section of trunk main is planned. It is also not known what the expected completion date is for the 450mm bulk main to Rotokauri North. In addition to the proposed 450mm bulk main, a secondary 250mm trunk main may be constructed along the same alignment. This would increase the resilience of the water supply to the north-western part of Rotokauri until the construction of the network of 250mm trunk mains west of SH1 has been completed.

There is an existing 150mm/100mm water main along the northern boundary of Rotokauri North that follows Te Kowhai Road and SH39 (Figure 5-1). To service the Rotokauri North area, this pipe will need to be upgraded/duplicated to 250mm and connected to the existing 250mm trunk main at the Ruffel Road/Arthur Porter Drive roundabout. The length of pipeline to be upgraded/duplicated is approximately 1km.

Based on the information provided above, it is proposed that the 450mm bulk main along the minor east-west arterial will be used as the primary water main to service Rotokauri North, while an additional 250mm trunk main along the same alignment is used as the secondary water main. This eliminates the need to construct the trunk line along the north-south arterial as a 450mm pipeline which instead can be constructed as a 250mm pipeline when the development south of Rotokauri North requires it and eliminates a second separate water supply main crossing of SH1.

The water supply network connections are therefore at the south-eastern corner of the Rotokauri North development.





Figure 5-1 – Proposed Water Supply Network Connections



## 5.2 Water Supply Networks

The 450mm bulk main that is to end at the south-eastern corner of Rotokauri North development is proposed to be extended north along the minor north-south arterial and then east along the major east-west road into the development (Figure 5-2). The bulk main will terminate at Exelby Road. At various locations along the major east-west road, the bulk main splits into multiple 250mm trunk lines. Together with the 250mm trunk line, that comes into the development at the south-eastern corner of Rotokauri North and is proposed to be extended in an easterly direction to Burbush Road, the trunk mains will form the major water supply networks within the development.

### 5.2.1 Rotokauri South Water Network

The Rotokauri South Water Network has an area of 32.3 Ha (Figure 5-2). The area will be serviced via the 450mm bulk main along the major east-west road and the 250mm trunk mains along Burbush Road and the minor north-south arterial. High level flow rate calculations, based on the currently proposed housing density, indicate that the southern half of the network will require a flow rate of approximately 7.1 l/s and the northern half approximately 4.1 l/s.

### 5.2.2 Te Otamanui Water Network

The Te Otamanui Water Network has an area of 70.0 Ha (Figure 5-2). The area will be serviced via the 450mm bulk main along the major east-west road and trunk mains along Burbush Road, the major north-south road and the trunk main that follows proposed local roads in an east-west direction between the major north-south road and SH39. High level flow rate calculations, based on the currently proposed housing density, indicate that the southern half of the network will require a flow rate of approximately 11.5 l/s and the northern half approximately 9.0 l/s.

### 5.2.3 Ohote Water Network

The Ohote Water Network has an area of 33.8 Ha (Figure 5-2) and in the future will include the water supply network in the Ohoto Upstream North area as well. The area will be serviced via the 450mm bulk main along the major north-south road and 250mm trunk mains along the major east-west road, Exelby Road, as well as the trunk main that follows the proposed local road in an east-west direction between the Ohote Stream and SH39. High level flow rate calculations, based on the currently proposed housing density, indicate that the southern half of the network will require a flow rate of approximately 6.6 l/s and the northern half approximately 5.6 l/s. The latter does not include the water supply to Ohote Upstream North as no details of a proposed development are available at this time.





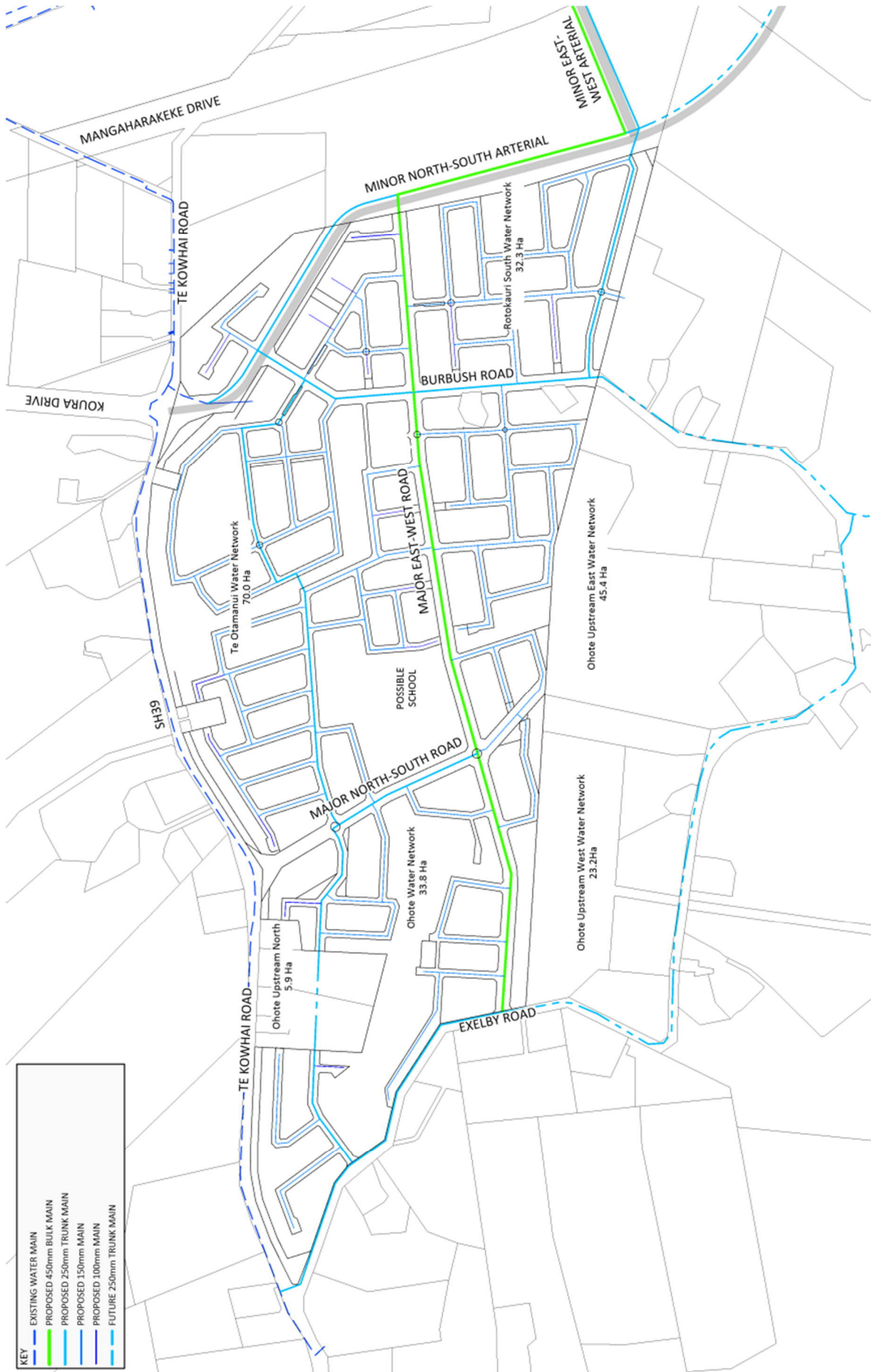


Figure 5-2 - Concept Layout Plan for Water Supply



## 6. Conclusion

The proposed wastewater management approach is based on local gravity networks that transport the wastewater from all properties to two new wastewater pumpstations, that are located within the Rotokauri North development, and associated rising mains. Each rising main discharges into a single gravity main that transport the wastewater to the connecting manhole with the existing HCC wastewater network. The gravity main collects additional wastewater from local gravity networks that are north-east of the ridgeline of the hill that crosses the Rotokauri North development. Local gravity networks that are south-east of the ridgeline of the hill that crosses the Rotokauri North development discharge into a separate wastewater main located at the south-eastern corner of the development.

The proposed water supply management approach is based on the construction of a new bulk and trunk main to service the Rotokauri North development. These primary and secondary mains are proposed to be aligned with the new minor east-west arterial. Within the development looped trunk mains will ensure an appropriate level of service and resilience for the water supply.

As proposed, the wastewater and water supply systems in Rotokauri North meet the requirements of the Waikato RITS and include relevant recommendations that work toward meeting the key objective Ngaa Wai Ora, the protection and enhancement of freshwater, waterways, springs and wetlands, as set out in the Cultural Impact Assessment documentation for Rotokauri North. At the same time, the systems set out to keep operational requirements of the systems fairly simple and cost efficient.

Concept design layouts for the wastewater and water supply networks are attached in Appendix A.



## Appendix A – Concept Design Layouts

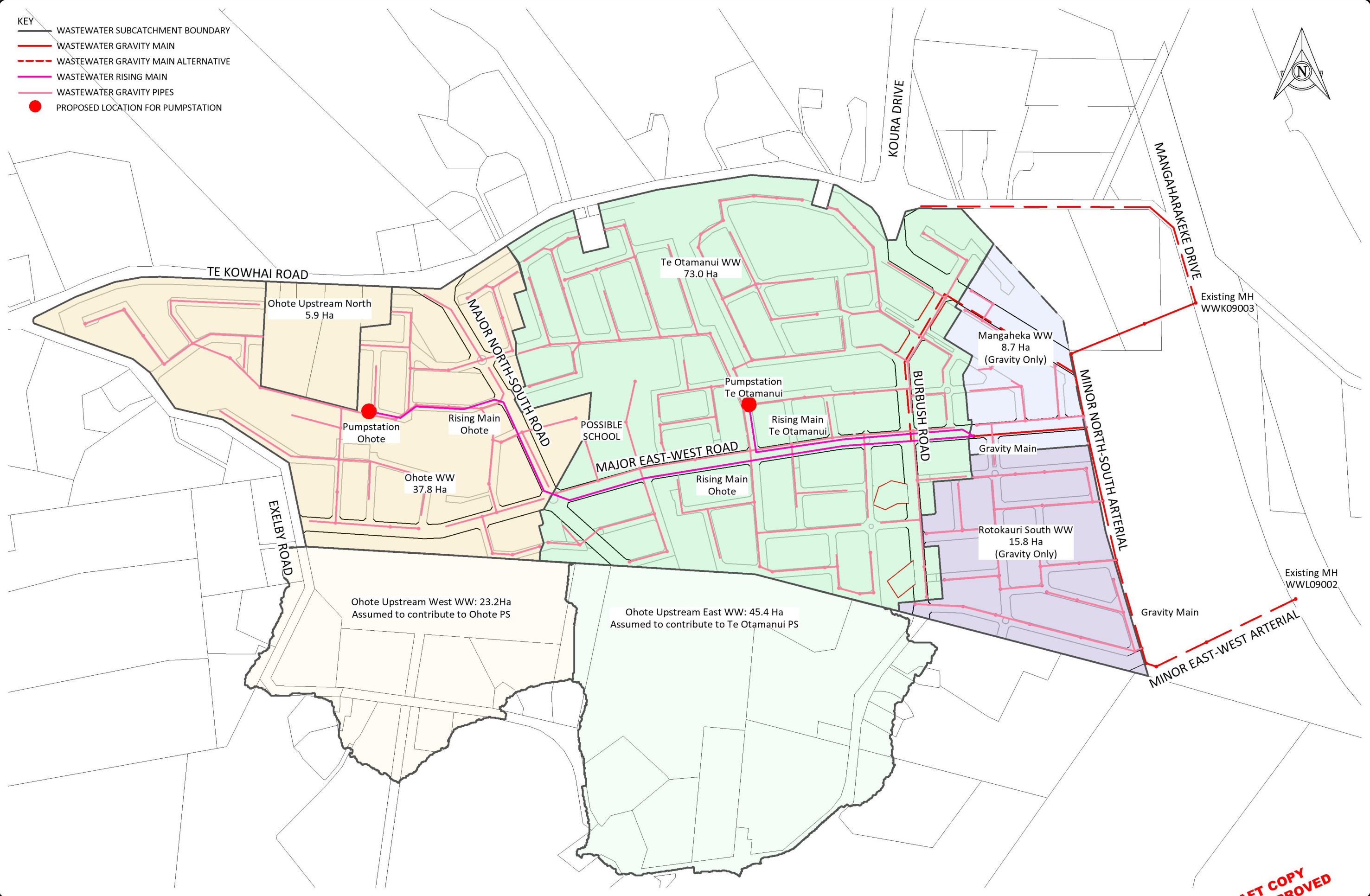
The concept design drawings include the following:

- 147090-00-0009 – Concept Layout Plan – Wastewater Conveyance
- 147090-00-0012 – Concept Layout Plan – Water Distribution
- 147090-00-0013 – Concept Layout Plan – Water Network Connections



100mm  
 SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY  
 0  
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- KEY**
- WASTEWATER SUBCATCHMENT BOUNDARY
  - WASTEWATER GRAVITY MAIN
  - WASTEWATER GRAVITY MAIN ALTERNATIVE
  - WASTEWATER RISING MAIN
  - WASTEWATER GRAVITY PIPES
  - PROPOSED LOCATION FOR PUMPSTATION








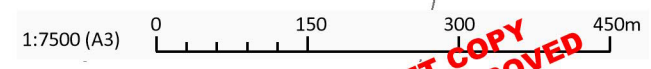
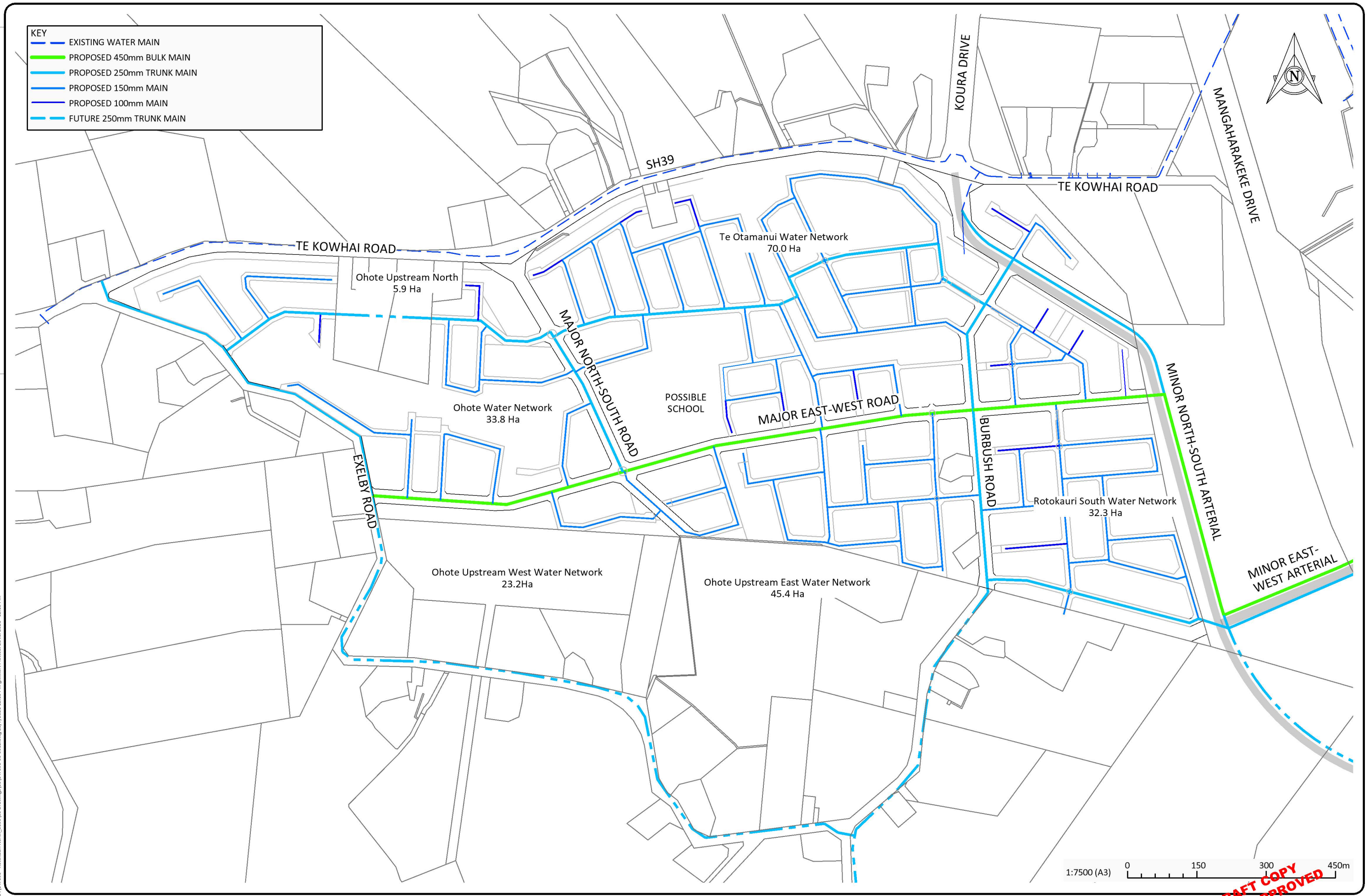
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 NOT APPROVED  
 SKETCH

	DESIGNED GK/EV DRAWN GK	CHECKED - APPROVED JS	 <b>BLOXAM BURNETT &amp; OLLIVER</b>	CLIENT <b>GREEN SEED CONSULTANTS LIMITED</b>	PROJECT <b>ROKOKAURI NORTH DEVELOPMENT</b>	DRAWING <b>CONCEPT LAYOUT PLAN WASTEWATER CONVEYANCE</b>	STATUS <b>DRAFT COPY NOT APPROVED SKETCH</b>
A 18.06.2021 INITIAL ISSUE DATE ISSUE/REVISION DETAIL	GK EV JS BY CHK APPR	mx model version:	Version 4.0 - March 2020	DATE 30-07-2021 DRAWING NUMBER 147090-00-0009	SCALE (ORIGINAL SIZE A3) 1:7500 REVISION -		



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Version 4.0 - March 2020

KEY	
	EXISTING WATER MAIN
	PROPOSED 450mm BULK MAIN
	PROPOSED 250mm TRUNK MAIN
	PROPOSED 150mm MAIN
	PROPOSED 100mm MAIN
	FUTURE 250mm TRUNK MAIN



DRAFT COPY  
NOT APPROVED

DATE	ISSUE/REVISION DETAIL	GK	EV	JS
BY	CHK	APP		
18.06.2021	INITIAL ISSUE	GK	EV	JS

DESIGNED	CHECKED
GK/EV	-
DRAWN	APPROVED
GK	JS



CLIENT  
**GREEN SEED CONSULTANTS LIMITED**

PROJECT  
**ROKOKAURI NORTH DEVELOPMENT**

DRAWING  
**CONCEPT LAYOUT PLAN WATER DISTRIBUTION**

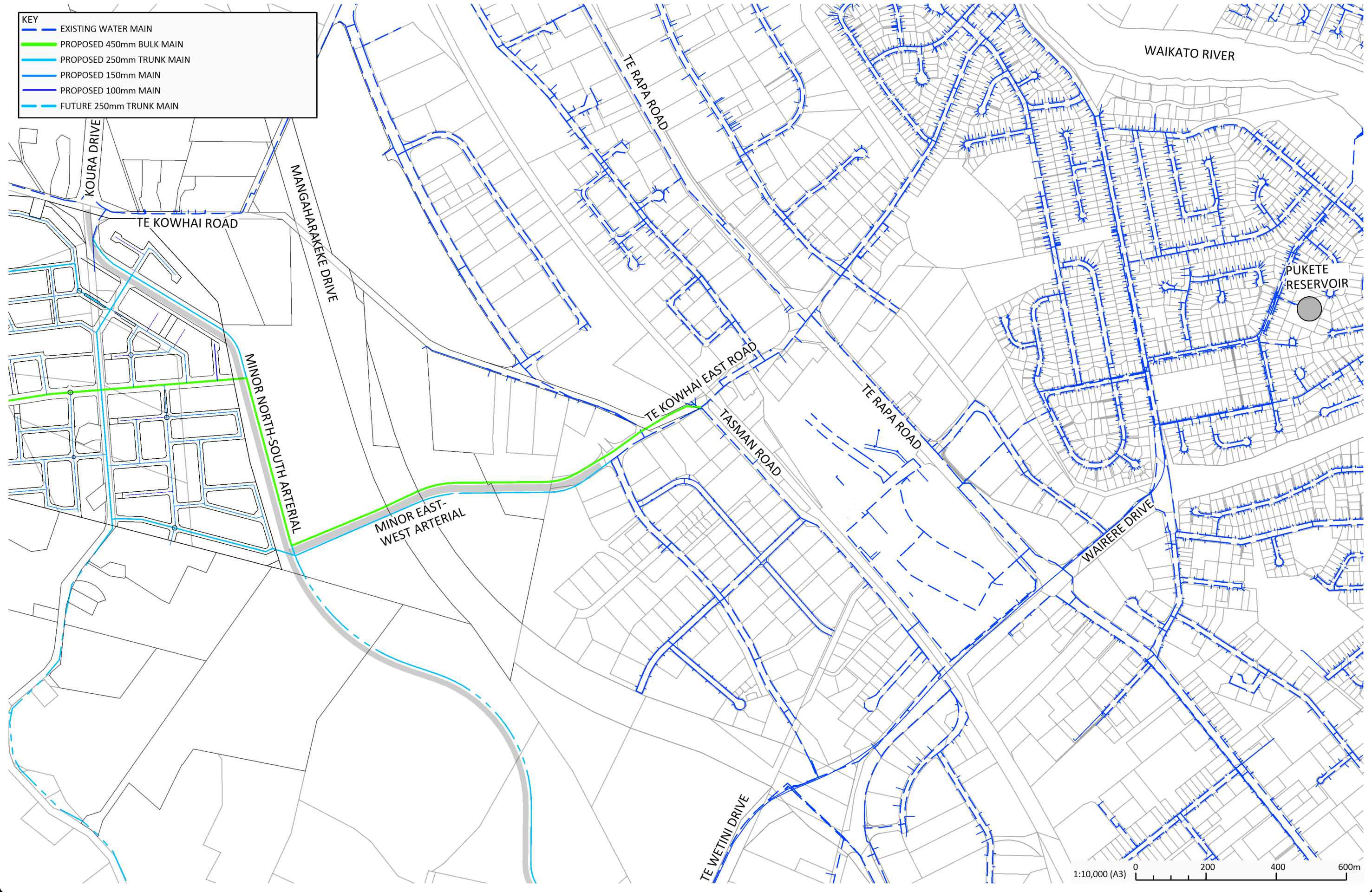
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DRAWING NUMBER	REVISION
147090-00-0012	A



100mm  
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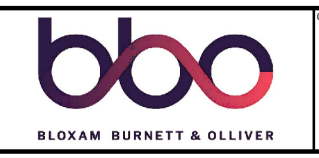
- EXISTING WATER MAIN
- PROPOSED 450mm BULK MAIN
- PROPOSED 250mm TRUNK MAIN
- PROPOSED 150mm MAIN
- PROPOSED 100mm MAIN
- - - FUTURE 250mm TRUNK MAIN



1:10,000 (A3) 0 200 400 600m

DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

DESIGNED	CHECKED
-	-
DRAWN	APPROVED
-	-



CLIENT

PROJECT  
**ROTOKAURI NORTH DEVELOPMENT**

DRAWING  
**CONCEPT LAYOUT PLAN  
WATER NETWORK CONNECTIONS**

STATUS	
<b>SKETCH</b>	
DATE	SCALE (ORIGINAL SIZE A3)
18-06-2021	AS SHOWN
DRAWING NUMBER	REVISION
147090-00-0013	-