



4 August 2021

Grant Puddicombe
Orewa, Box 474
Auckland

Quote Request - Mangawhai Water Reuse Project

1-14129.20

Dear Grant,

This letter is to request a quote for your design services as outlined in the sections below

Mangawhai Effluent Reuse, Golf Course Irrigation

As part of a long-term strategy for sustainable water in the Kaipara District, Kaipara District Council (KDC) have engaged with Mangawhai Golf Club (MGC) to develop a mutually beneficial solution for the use of treated wastewater from the Mangawhai CWWTP for irrigation of the Golf Course. A meeting was held on the 15 July 2021 including WSP, KDC, Mike Howard (MGC representative) and yourself to discuss about the project and the business case.

Project Details

Water Quality

The reuse water will be compliant with Australian Standards, (state of Victoria Effluent Reuse Standard) Class C suitable for use on recreational areas. This will guarantee a low level of suspended solids, low levels of organic material and < 1000 E coli/100ml.

At times the effluent may deteriorate, and some measures will be in place to monitor this, and if poor inhibit transfer to the storage tank.

Some regrowth of bacteria may occur in the tank and pipeline, but it is expected that solids formed in the tank will settle and be removed periodically by cleaning of the tank, whereas the irrigation network will be self-cleansing velocity.

Volume

It is anticipated that there will be up to 500 m³/d available for irrigation. This water will be stored in a holding tank of 500m³ for use by the MGC, and automatically topped up if used, when water becomes available.

The Standards for reuse are clear that the effluent shall not be used when it is raining, has recently rained, or at times of high humidity. Usually this is no issue as irrigation is not usually needed when raining, but controls are needed in the irrigation system.

To meet the criteria for reuse, there must be a period after irrigation to allow drying off of the area after application before any public access is permitted. This means that if the course is played 06:00 to 21:00 all irrigation is expected between 22:00 and 02:00 to provide the required buffers.

In future it is intended to upgrade the WWTP and Class A water will be available, suitable for irrigation at any time. Greater volumes will become available in future years as the population grows giving more water, if wanted.

It is not a requirement that irrigation must occur, as this is a reuse scheme not a disposal field. The focus is to provide water for irrigation if and when it is wanted.

Restrictions

The MGC has a significant wetland on the course that is located on the edges of Holes 2 to 8, approximated in the figure below.



Figure 1 - Golf Course Layout

In this area the system shall be designed so that soil moisture deficit is managed, and no runoff occurs. It is not permitted to put effluent directly or indirectly into the wetland.

In this region all spray systems shall be aligned so that spray does not enter the wetland.

Wind must be considered either by spacing or, with potential wind gauging, to prevent spray to the wetland by shutting some areas if the wind is unfavourable. Eg > 10km from S may inhibit irrigation on hole 5 and green of 6, but not the other holes.

The reuse water will contain some nitrogen and phosphorous, which is at fairly low levels, which should offset use of fertiliser on the course.

At current the effluent is chlorinated, so potential presence chlorine may be contained within the applied effluent to the golf course.

All other areas of the course can be irrigated without these restrictions.

In addition to this course plan is a practice area and green. The green is seen in the aerial below with the practice area going to the west.

Location

The following show the proposed location of the storage tank. It is expected that there shall be a pipe from the tank at low level into a shed. Within the shed there will be a manual isolation valve. Scope for irrigation supply starts within this shed from the outlet of this valve.



Figure 2 - Proposed tank location

The proposed location of the Golf course tank is at the end of the overflow carpark, shown as a blue circle. This area is elevated over much of the course, but we are informed gravity system is not possible as Hole 12 and some of 11 are at a higher elevation. It is assumed that the system will be pumped.

Scope of the services

As discussed during the meeting at the Mangawhi Golf Course, the effluent will be pumped from the Mangawhai WWTP to the balance tank (figure 2). The outlet from the tank and the downstream infrastructure is considered to be the “irrigation system”. This may include the following components

- Duty Standby Pumps for irrigation.
- All control valves, pipework and irrigators



- Irrigation layout (a layout plan is already available to the GC from Toro Services)
- SMD monitoring, and other instrumentation needed
- Control panel including HV incoming isolation and meter,
- Secure shed with lighting
- Installation of this system
- Reinstatement of course if required.
- Power from grid to the system will be provided by others.

There are areas of course with irrigation currently, fed from the supply bore pump located to the south of the Tee for the 11th Hole. We recognise that at this stage without detailed information, it cannot be determined what equipment and pipework may be reused, so costs are for a new system at this time.

The services required include for: the preparation of a short letter including

- A high-level layout plan: the plan shall be on A3 pdf format including the main irrigation system components. It is envisaged for the irrigation system to be same or close to the Toro layout previously provided to the MGC and attached to this quote
- Rough order of cost (+/- 30%) of the overall system, split into main system elements; This include listing of the key assumption made in the costing exercise;
- Main assumptions adopted for the preparation of the layout plan;
- List of potential project risks;

Please allow in your price for 2-hours online meeting to discuss on the deliverables above

Programme

It is expected for the above deliverable to be prepared within 2 weeks of acceptance of the quote

Condition of Engagement

Should the quote be accepted, we propose to undertake the work based on a Short Form Agreement (Feb 2019)

Quote

Please complete the following table with

Item	Fee type	Amount (excl. GST)
Short Letter Preparation (as per scope section)	Lump sum	\$ _____
Hourly Rate (for work outside the above scope)		_____ \$/hr



Assumption and exclusion

Please state below any assumption and exclusion made in the quote above:

...

Regards

A handwritten signature in blue ink, appearing to read 'Eros Foschieri'.

Eros Foschieri
Work Group Manager - 3 Waters, Whangarei

11th August 2020

Mr M Howard
Mangawhai Golf Club
Molesworth Drive
MANGAWHAI 0583

Dear Mike

Irrigation with Treated Wastewater

Thank you for your recent visit to discuss waste-water irrigation. We have reviewed the plan and information provided in July 2009 with the objective of updating budget costs and components. This update assumes the same routing as detailed in the plan provided in 2009.

As proposed at that time, the system will irrigate fairways and approach areas of the course, utilising treated wastewater pumped from the local treatment plant. The system will connect to this pressurised supply at the end of the practice fairway, on the course boundary. It is assumed that the supplied water will be of sufficient quality for irrigation purposes (i.e. filtered, non-corrosive, non-precipitative).

The fairway irrigation system needs to be completely independent of the existing greens and tees irrigation system.

We recommend that the fairways be irrigated with a 2 wire system using TORO Flex 800 electric valve-in-head sprinklers (approximately 240 required). The recommended mainline pipe is uPVC & PN12 Polyethylene with fairway laterals being MDPE (approximately 8,500 metres in total). Critical mainline sections, along with each fairway lateral, must be capable of isolation from the mainline for maintenance by way of gate or sluice valves. In addition, combination air / vacuum relief valves will be placed at 8 locations, to be determined on site.

This estimate is based on the system being connected to a TORO Smart Hub, centrally controlled using the TORO Lynx system. The computer will be located in the maintenance complex. If flow monitoring is required on a zone-by-zone basis, a Motorola IRRInet control system may be a better choice. The cost is similar.



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Originally, the system has been designed to apply 4mm of water per day to the fairways and approaches on the course (although the pipe network will be capable of applying 5mm of water within a 9 hour watering window). A 4mm application will use approximately 510 cubic metres of water per day. The peak duty required at the connection point to the water supply is 20.5 litres per second at 7.2 bar.

The updated design applies 8mm per day during peak summer periods in a 6 hour window. While there is no change to the TORO control system, wire and sprinklers, pipe sizing and quantities increase. Heavier duty mainline fittings are also needed. 48 litres per hour is required at the connection point. The 8mm application uses approximately 1,000 cubic metres per day.

Budget pricing for the system is as follows:

Materials	\$480,000
Installation	<u>\$195,000</u>
TOTAL SYSTEM ESTIMATE	<u>\$675,000</u>

Please note that prices are for budget purposes only and exclude GST.

The estimate above excludes pumps and related infrastructure costs. From experience, between \$120,000 and \$170,000 + GST is a very rough estimate of typical, top end Grundfos pumping system delivering the volume required.

There is no allowance for filtration equipment.

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TORO Product Information

Information on the various TORO items mentioned in this proposal can be found at these web addresses.

TORO Flex 800 Sprinklers

<https://www.toro.com/en/golf/irrigation-sprinklers-subsurface-drip/flx35-6-flx55-6-series>

TORO Smart Hub

<https://www.toro.com/en/golf/irrigation-field-controllers/lynx-smart-module>

Parkland Services

As you know, we offer a full design, build service. Alternatively, we can undertake full design and specification for any combination of material and labour supply that you want.

I hope that this gives you enough information to work with KDC on agreement to investigate further.

Your faithfully,

Parkland Products Limited



Chris Todd
Managing Director

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- MD50 PN10 PE100
- MD63 PN10 PE100
- 80mm Class C PVC (RRJ)
- 100mm PN12 PVC (RRJ)
- 150mm PN9 PVC (RRJ)
- 2-core 1.5mm Wire
- 2-Core 2.5mm Wire

- 50mm Ball Valve HBV50
- 50mm Ball Valve HBV50
- 80mm Isolation Valve
- 100mm Sluice Valve (RRJ)
- 150mm Sluice Valve DI (RRJ)
- Toro Flex 34 VIH FC Nozzle FC #33
- Toro Flex 54 VIH FC Nozzle FC #54
- Water Supply

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Parkland Products Ltd

Fairway Irrigation System - Wastewater

Mangawhai Golf Club

Designer: BFR / BCG Update

Date: 10.07.2009 **Scale:** approx 1:1600

