QUEENSTOWN LAKES DISTRICT COUNCIL

**QLDC Council**
**30 June 2015**

**Report for Agenda Item: 7**

**Department: Infrastructure**

# Glenorchy Community Sewerage Scheme Report

## Purpose

1 The purpose of this report is to confirm the best way forward to develop a community wastewater scheme for the Glenorchy Township.

## Executive Summary

2 QLDC has assessed a number of options relating to the possible implementation of a Community Sewerage Scheme for the Glenorchy Township. This recent work has expanded on previous work. A number of possible options have been considered for reticulation concepts, treatment systems and treatment plant and land disposal locations.

3 The key drivers for the project are to minimise the environmental impact and associated health risks with uncontrolled wastewater discharge, improve levels of service provided to the community and the changes to the Otago Regional Council Water Plan. The key risks to the project are associated with insufficient funding and the affordability of a sewerage scheme to the community.

## Recommendation

4 That Council:

1. Note the contents of this report and in particular:

    a. Status quo is not an option going forward.

    b. The final project plan and costings will need to go to the Glenorchy Community for a vote of support.

    c. The recommendations to move this project forward to detail design, assessment of environmental effects and resource consent.

2. Approve Concept Option B – Glenorchy Sewerage Scheme for the Glenorchy Township using a hybrid gravity/pressure sewer system reticulation combined with a package treatment plant and land application area located at the Peninsula Site.

3. Authorise staff to initiate the re-designation process for the Peninsula Site.

4. Authorise staff to initiate the assessment of environmental effects and to prepare and lodge the resource consent application for the discharge of wastewater to land with the Otago Regional Council.

5. Authorise staff to undertake the detailed design as required and prepare more detailed costings for the project.

6. Authorise staff to continue to consult with the Glenorchy community over the scheme costs and resident cost contributions.

7. Take the final project plan to the community for a vote of support.

8. Direct staff to report back to the Council over the outcome of the re-designation, assessment of environmental effects, resource consent application, community consultation/vote and project costings to get approval to proceed with the tender process.

| Prepared by: | Reviewed and Authorised by: |
|---|---|
|  |  |
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| 11/06/2015 | 15/06/2015 |

**Background**

5 For natural hazard and water quality reasons the Otago Regional Council (ORC) has advocated for some time that Council should consider installing a reticulated community scheme for Glenorchy. Similarly, the Glenorchy community has sought some certainty and clear direction regarding the costs of a reticulated scheme and whether the Council would proceed with a scheme. With the development of the ORC Water Plan Change 6A and the expected follow-on to Plan Change 6B which will deal with urban areas and the associated increased focus on water quality issues, ORC has elevated its advocacy for a reticulated sewerage scheme for Glenorchy.

6 A reticulated sewerage scheme for the Glenorchy Community has been discussed by QLDC over the last ten years.

7 During 2013, Council commissioned some limited desktop feasibility work by Rationale and Harrison Grierson. This desktop work considered possible flows and treatment methods, however it did not specifically examine wastewater treatment sites or disposal to land sites. Similarly, there was no consideration given to the likely treatment standards required by ORC in terms of treated effluent quality.

8 In May 2014 QLDC undertook further examination of the Glenorchy Sewerage Scheme (GSS) options to include consideration of the following factors:

- QLDC acquiring reserve land to the south side of the Buckler Burn River. This land is an elevated gravel terrace known as the “Peninsula” and appeared potentially suitable for the location of a wastewater treatment plant and more specifically for use as a disposal to land area. A suitable treatment and disposal site had previously been a limiting factor for any GSS.

- The potential for a significant investment in a commercial activity at the Glenorchy campground site.

- QLDC reviewing its planning policy for Glenorchy Township as part of the District Plan Review process.

- Joint motivation by both QLDC and ORC to implement a long term wastewater solution for Glenorchy which will;

    i. Improve levels of service to the community, and

    ii. Improve environmental conditions in terms of water quality and risks to water supplies.

9 Council commissioned more detailed assessment work to scope potential solutions adequately for a community GSS. This current work has considered various reticulation types, treatment methods and treatment plant/disposal sites to identify the preferred option for the GSS.

**Comment**

10 The decision by QLDC to proceed with scoping solutions for the GSS required the project team to further consider and address a range of issues including:

- Establishing with the ORC ahead of time, the likely treatment standards to be required by any discharge consent. This related to both disposal method and treated effluent chemical properties.

- Correctly identifying potential wastewater treatment plant sites and disposal to land sites. These sites needed to be assessed in terms of both land ownership and their ability to accommodate consent requirements at acceptable risk levels.

- Consideration of the natural hazard risks which impact Glenorchy (flooding and alluvial fan hazard) and how these issues are managed and mitigated by the proposed solutions.

- Addressing the consenting and designation risk with any proposed treatment and disposal site.

- Acknowledging the clear political brief that any solution “must not be gold plated”.

- The need for initial consultation with the community over the costs of implementation of the GSS.

11 It is important to note some key parameters which have been adopted which influence design provisions when considering options. These are:

a) The use of a minimum treated effluent standard of:

- Total Nitrogen less 25 mg/L
- Biological Oxygen Demand (BOD) 25 mg/L
- Total Suspended Solids (TSS) 25 mg/L
- E Coli 1000 CFU/100mL

combined with no annual limit on Nitrogen as being the consenting standard which ORC will accept.

b) Use of the lower NZS4404:2010 wastewater generation figures rather than the higher figures stipulated in QLDC amendments to NZS4404:2004.

c) The initial scheme construction is based on predicted 2020 population and scheme flows.

d) The cost contribution from commercial operators will be based on their peak daily flow volume measured against the flow volume from an equivalent number of dwellings.

12 The process highlighted that reticulation solutions must be considered separately to the treatment options. Further, different reticulation and treatment options combine to provide differing levels of service, cost and risk. This necessitated consideration of each combined reticulation plus treatment option in detail. This primarily relates to some level of pre-treatment being achieved with Septic Tank Effluent Pumped (STEP) and Pressure Reticulation options which in turn reduces some Treatment Option CAPEX.

13 The initial scheme costings of the various options were shown to be relatively similar. However, some key factors which have dictated preferred options, were revealed as;

a) The consenting risk associated with different treatment options. For the GSS there is significant additional risk associated with Pond Based Treatment. The stability of the ponds during cold weather and their ability to achieve discharge consent treated effluent standards means Pond Based Treatment is high risk from both an operating and compliance perspective.

b) Odour and nuisance risk to neighbours associated with Pond Based Treatment. These factors influence the selection of the viable treatment method for certain sites.

c) The ability to positively separate wastewater discharges from groundwater and water supply bores. This consideration is relevant to selection of the preferred treatment and disposal site.

d) The ability to stage expansion of the treatment plant to cater for future growth as required while deferring capital costs.

e) The risk of exposure of new infrastructure to natural hazards. Again, this consideration influenced selection of preferred treatment and disposal sites.

f) The ability to minimise inflow and infiltration which can lead to significant increases in design flows and hence treatment plant size and cost if not appropriately managed.

g) The desire to utilise a treatment system that is proven in New Zealand conditions, is able to provide a high degree of confidence regarding treatment quality compliance and has the ability to be upgraded or staged in the future.

h) The funding risk associated with different reticulation options. It was found that construction of the full scheme gravity reticulation during the initial scheme implementation phase provided a lower per dwelling connection cost solution when compared to both Pressure and STEP reticulation options. Both the Pressure and STEP reticulation options will require significant additional future capital expenditure by Council to cater for future growth. These additional future costs primarily relate to the provision of the individual Pressure or STEP units that are required to be installed on each property.

14 When the risk associated with the above factors is quantified and priced, the preferred option became very clear.

***Options***

15 This report identifies and assesses the following reasonably practicable options for assessing the matter as required by section 77 of the Local Government Act 2002:

16 The first step is to identify all "reasonably practicable" options. If an option is not reasonably practicable, then it will not require consultation. One option that should always be considered is the option of doing nothing – the status quo.

17 All options considered beyond long list assessment are subject to preliminary design and potential variation in costs. Project costings may increase or decrease subject to detailed design. Key risks affecting recommendations in this report are addressed in later sections.

18 Concept Option A - Do nothing. This option maintains the status quo whereby no community sewerage scheme is developed and all Glenorchy residents remain individually responsible for treatment and disposal of wastewater on-site.

19 Advantages: The advantages of this are the lack of CAPEX cost and associated risks to Council due to all property owners continuing to be responsible for their own on-site wastewater disposal.

20 Disadvantages: The primary disadvantages associated with this include the risk of continued degradation of groundwater quality; the lack of resiliency during lake flood events and associated health risks; and the inability of some current property owners to meet current and future regional (ORC) standards for on-site wastewater disposal. There is also an ongoing compliance risk and cost for QLDC as they endeavour to respond and rebut regional policy requirements of the ORC.

21 Concept Option B – Glenorchy Sewerage Scheme (GSS). This option involves Council developing a community wastewater scheme to serve the Glenorchy township. The scheme would consist of wastewater reticulation, a wastewater treatment plant and an effluent disposal system. A number of more detailed options have been considered for the GSS and they are outlined in more detail below.

22 Advantages: The GSS would increase the level of service provided for residents; improve resiliency of the Glenorchy community during periods of high lake levels and reduction in associated health risks; reduce environmental effects and improve outcomes for shallow groundwater beneath the township.

23 Disadvantages: These primarily relate to the financial risks and increased costs to the existing Glenorchy residents.

24 Following long list evaluation Concept Option B has been advanced for further consideration. The following sections outline the Service Solution Options considered. The Service Solution Options involve evaluation of 3 separate components;

i. Treatment/Disposal Site Options,

ii. Reticulation Options, and

iii. Treatment Process Options.

25 **The Treatment/Disposal Site Options are outlined as follows;**

26 Treatment/Disposal Site Option 1 – Rosie Grant Block, Glenorchy Paradise Road. This option was the subject of previous studies undertaken by others in 2013 which did not consider land acquisition cost or natural hazard risk. This previous work considered the development of a pond based treatment on private land located north of the township.

27 Advantages: No advantages were apparent with this option.

28 The primary disadvantages of this location are the proximity to the Rees River; a portion of the site being flood plain and the resultant relatively limited area of suitable land for the construction of pond based treatment disposal; the need to acquire private land; and the significant reticulation distance from the township.

29 Treatment/Disposal Site Option 2 – Peninsula Site. This option involves the development of a treatment plant and land disposal system on the QLDC Reserve land known as the Peninsula located on the south side of the Buckler Burn.

30 Advantages: Land ownership recently transferred to QLDC; large area of land available for land disposal and future expansion; elevation and significant vertical and horizontal separation distance to groundwater as a sensitive receiver;

31 Disadvantages: Site is located on the south side of the Buckler Burn which will require an engineered river crossing; the site whilst being a reserve in the ownership of Council, is not appropriately designated for use as a Treatment/Disposal site and will need to go through a re-designation process; the site needs to consider neighbour issues with regard to odour and nuisance and this reduces the likelihood of Pond Based Treatment.

32 Treatment/Disposal Site Option 3 – Glenorchy Cemetery/Sheil Street Reserve Site. This option involves establishing a treatment plant and land disposal system on the reserve.

33 Advantages: The primary advantage is the close proximity to the township and the associated reduction in trunk reticulation costs compared to other site options.

34 Disadvantages: The limited site size would restrict future expansion and ability to accommodate land disposal for the fully developed township; location within the Bible Terrace alluvial fan hazard area; lack of separation (<10m) to groundwater; proximity to residential areas and associated odour risks; location upstream from the township water supply bore; opportunity costs associated with using relatively valuable land within the township area which Council may choose to redevelop for income; and the need for a further re-designation process.

35 **The Service Solution Reticulation Options are outlined as follows:**

36 Reticulation Option 1 – Hybrid Gravity/Pressure Sewer Reticulation. This option involves traditional gravity reticulation to serve the majority of the township combined with a section of Pressure Sewer System (PSS) developed to serve the low lying properties around the lakefront which are subject to flood hazard.

37 The initial capital cost associated with this option has been estimated to be $2.74M. This option would provide capacity for the fully developed township as part of the initial implementation of the GSS and this cost would be shared amongst all properties, both current and future connections.

38 Advantages: Gravity system can easily accommodate the ultimate flows expected from the fully developed township with only relatively minor incremental upgrades; lowest cost per property option; PSS system will provide a fully sealed system in low lying areas allowing system to continue to operate during periods of high lake level while limiting

infiltration; PSS system will allow individual properties to be isolated as they become inundated during periods of high lake level.

39 Disadvantages: Treatment options are more expensive due to higher inflow and infiltration and lack of pre-treatment in gravity pipe network, less resistant to damage due to ground settlement; installation of pipework more difficult compared to other options

40 Reticulation Option 2 – Full Pressure Sewer System (PSS) Reticulation. This option involves the development of a complete township pressure sewer system where every property has a small individual pump station that pumps wastewater into small diameter pressure mains which convey wastewater to the treatment plant.

41 The initial capital cost associated with this option has been estimated to be $2.73M. This option requires significant additional capital expenditure and upgrades to cater for growth within the township as undeveloped land is serviced, primarily relating to the supply and installation of additional pump stations to provide additional capacity for the fully developed township.

42 Advantages: Lowest initial capital cost option; improved resilience to ground settlement; sealed system will limit inflow and infiltration.

43 Disadvantages: Higher cost per property than option 1 due to future CAPEX by QLDC associated with provision of additional PSS systems to cater for growth.

44 Reticulation Option 3 – Septic Tank Effluent Pumping (STEP) Reticulation. This option is similar to the PSS option above, but each individual pump station also includes a septic tank which provides on-site pre-treatment of wastewater prior to conveyance to the treatment plant.

45 The initial capital costs associated with this option have been estimated to be $3.37M. This option also requires significant additional capital expenditure and upgrades to cater for growth within the township primarily relating to the supply and installation of additional STEP systems to provide additional capacity for the fully developed township (as vacant and undeveloped land is brought on line).

46 Advantages: STEP systems would provide significant on-site pre-treatment which reduces treatment plant and ongoing operations and maintenance costs; improved resiliency to ground settlement; sealed system will limit inflow and infiltration.

47 Disadvantages: These are similar to option 2 with higher cost per property than option 1 due to future CAPEX by QLDC associated with provision for additional STEP systems to cater for growth.

48 **The Service Solution Treatment Process options are outlined as follows;**

Treatment Process Option 1 – Pond Based Treatment System. This option involves the construction of a pond based treatment system likely to consist of a two stage pond for primary settlement and oxidation. It is anticipated that pre-

screening of incoming wastewater and chemical dosing to promote separation and settlement of solids would also be provided. The initial capital costs associated with this option have been estimated to range from $1.40M to $1.81M depending on the reticulation option considered as detailed within table 1 below. The costs for the treatment process vary due to the changes in influent quality and volumes associated with each reticulation option. Additional capital expenditure would also be required in the future in order to provide capacity to cater for growth.

49 Advantages: Lowest cost treatment option; relatively simple treatment process/technology.

50 Disadvantages: Unlikely to meet expected treatment standards as indicated by Otago Regional Council; high risk of odour issues; high risk of opposition from adjacent landowners at each of the Treatment/Disposal site options; more difficult to stage future expansions to cater for growth than package plant options.

51 Treatment Process Option 2 – Package Treatment Plant. This option involves the construction of a package treatment plant from a proprietary manufacturer/supplier. The actual process adopted will be the subject of detailed design and procurement evaluation.

52 The initial capital costs associated with this option have been estimated to range from $2.26M to $3.17M as shown in the following table for reticulation option 1. Future capital expenditure post 2020 population and flow will be required to provide additional capacity in order to cater for ongoing future growth.

53 Advantages: A number of different suppliers and treatment processes are currently available; a number of proven systems exist that are able to meet the likely treatment standards; most systems are fully sealed and have a low risk of odour; treatment processes can be adjusted relatively easily to meet possible future increases in treatment standards; treatment plants can readily be staged and scaled to suit growth.

54 Disadvantages: Higher cost treatment option when compared to Pond Based Treatment.

55 Table 1: Treatment Option Cost Estimates for various reticulation options.

| **Treatment Option** | **Reticulation Option 1 Hybrid Gravity/Pressure** | **Reticulation Option 2 Pressure Sewer System** | **Reticulation Option 3 STEP system** |
|---|---|---|---|
| **1 - Pond Based Treatment Plant** | $1.40M | $1.65M | $1.81M |
| **2 - Package Treatment Plant** | **$3.17M** | $2.85M | $2.26M |

56 Table 2: Total Initial Stage Project Cost Estimates for various options

| | **Reticulation Option 1 Hybrid Gravity/Pressure** | **Reticulation Option 2 Pressure Sewer System** | **Reticulation Option 3 STEP system** |
|---|---|---|---|
| **Treatment Option 1 Pond Based Treatment Plant** | $4.55M | $4.38M | $4.77M |
| **Treatment Option 2 Package Treatment Plant** | **$5.91M** | $5.58M | $5.63M |

57 Table 3: Connection Charge Cost Estimates for various options.

| | **Reticulation Option 1 Hybrid Gravity/Pressure** | **Reticulation Option 2 Pressure Sewer System** | **Reticulation Option 3 STEP system** |
|---|---|---|---|
| **Treatment Option 2 Package Treatment Plant** | **$15,750** | $18,250 | $17,750 |

58 The preferred option is shown underlined and bold in the tables above. All figures are in current values and exclude GST. Pond based treatment options have not been assessed in the financial model as they are disqualified from further assessment due to the inability to meet the expected treatment standards.

59 Despite the preferred option having the highest initial stage capital cost as shown in Table 2, this option actually represents the lowest per dwelling connection charge option of the package treatment reticulation options considered. This is due to the fact that this option provides the greatest initial benefit for future connectors and also has the lowest costs associated with future upgrades to cater for ongoing growth.

60 This report recommends that Concept Option B – Glenorchy Sewerage Scheme be advanced using Treatment/Disposal Site Option 2 – Peninsula Site combined with Reticulation Option 1 – Hybrid Gravity/Pressure Sewer Reticulation and the Treatment Process Option 2 – Package Treatment Plant. The associated connection charge is estimated to be $15,750 + GST per residential dwelling/Dwelling Equivalent. As noted above this represents the lowest per dwelling connection charge of the package treatment plant options considered. The preliminary cost estimate for the initial scheme to service 2020 flows is $5.91M + GST.

***Significance and Engagement***

61 This matter is of high significance, as determined by reference to the Council's Significance and Engagement Policy because this will be a new strategic asset

for the Glenorchy community. This is of high importance to the Queenstown Lakes District because of the impact on the environment, culture and people of the district (e.g. significant capital project). This project has high community interest which includes individuals, organisations and groups are affected by Council's decision.

***Risk***

62 This matter relates to the strategic risk SR1 "Current and future development needs of the community (including environmental protection)", as documented in the Council's risk register.

63 A number of potential risks to the project and implementation of a Glenorchy Sewerage Scheme have been identified. The key risks that relate specifically to the assessment of options and estimated residential dwelling/dwelling equivalent connection charges undertaken to date are: The use of wastewater flows based on NZS4404 flow allowances and the possibility that actual flows may be lesser or greater than these which would impact scheme cost; the possible implementation of flow based connection charges, particularly for commercial users, and the potential inability to recover additional connection charges from existing users due to the future increase in wastewater generation; the potential for cost escalation; consenting and approval risks surrounding the re-designation of the Peninsula Site and obtaining a discharge consent from the ORC.

64 It is intended that the key risks above will be managed and mitigated during the next stages of this project through further assessment that will include: verification of flow allowances based on the results of the water meter trial that is currently underway; further assessment of commercial operator funding options based on feedback and discussions at the recent commercial meeting; undertaking more detailed assessment and design work as recommended and continuing to engage with suppliers as appropriate; and continuing to work closely with and engage landowners adjacent to the Peninsula Site while undertaking the Assessment of Environmental Effects and preparation of the Discharge Consent application as recommended.

65 A number of other construction related risks have also been identified that relate to possible future stages of the project and these will continue to be monitored and updated as the further work recommended here is advanced.

66 In general terms the key risks to this project at this stage relate to insufficient funding and affordability for ratepayers.

**Financial Implications**

67 The project is identified in the LTP 2015-25 under project number 4028 Glenorchy New Wastewater Scheme.

- Budget under project No. 4028 Glenorchy New Wastewater Scheme
  - 2015/16 $ 261,750
  - 2016/17 $5,929,048

## Council Policies, Strategies and Bylaws

68 The following Council policies, strategies and bylaws were considered:

- Water and Sewerage Schemes – Small Communities (2004) - Sewerage and water need to be funded by the community that benefit.
- Growth Management Strategy (2007) - Infrastructure is provided in a way that supports high quality development located in the right places while adhering to the principles of sustainable development and ensuring that the environmental qualities of the district are protected.
- 3 Waters Strategy (2011) - We will manage risk and be able to adapt to a variety of future scenarios for climate change and population growth

69 The recommended option is consistent with the principles set out in the named policies/strategies.

70 This matter is included in the 10-Year Plan/Annual Plan

- Budget under project No. 4028 Glenorchy New Wastewater Scheme
  - 2015/16 $ 261,750
  - 2016/17 $5,929,048

## Local Government Act 2002 Purpose Provisions

71 The recommended option:

- Will help meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses by providing a community wastewater scheme build and operate by Council.
- Can be implemented through current funding under the 10-Year Plan and Annual Plan;
- Is consistent with the Council's plans and policies; and
- Would not alter significantly the intended level of service provision for any significant activity undertaken by or on behalf of the Council, or transfer the ownership or control of a strategic asset to or from the Council.

## Consultation: Community Views and Preferences

72 The persons who are most affected by or interested in this matter are the residents and ratepayers of the Glenorchy township and surrounds. Other potentially affected or interested parties also include the landowners adjacent to the proposed treatment plant and land disposal site, current users of this site including the Glenorchy Pony Club, and organisations including Otago Regional Council, Public Health South and local iwi.

73 The Council has undertaken preliminary consultation with the Glenorchy community and the Otago Regional Council. A public meeting was held in Glenorchy in October 2014 that outlined the preferred options and the anticipated residential connection charge. Two meetings have been held with commercial business owners, the first in October 2014 similar to the public meeting and the

second in April 2015 where more specific details of how individual businesses wastewater flows and hence connection charges were discussed.

74 In addition to the public meetings a number of questions have been received from or via the Glenorchy Community Association (GCA) and members of the public. Where possible answers have been supplied back to the GCA and made available on the Council website. Discussions to outline the proposal have also been held with the key landowner adjacent to the proposed treatment plant site. These processes remain ongoing and it is intended that it will continue and be expanded as the project is further developed.

75 Anecdotal feedback from the commercial business owners is supportive of a scheme with the majority favouring a commercial connection charge regime based on actual measured flows. The level of support amongst the residents appears to be mixed with the primary issue being the likely costs. It is intended to provide new updates to the community at 6-8 week intervals as work progresses.

76 In order to provide the community with as much robust information as possible, Council needs certainty on resource consent conditions from ORC and then design of the treatment plan. It is anticipated that after detail design is finished, the assessment of environment effects and resource consent conditions have been received, then the Community will be asked for their vote of support. The result will be reported back to Council to get approval to proceed with the tender process.

**Attachments**

A Long List Options Assessment
B GSS Boundaries and Treatment/Disposal Site Options