

## Jeffreys Road Water Supply – Replacement Tank Location Options

This paper outlines the issues for the two location options for the replacement tank. The work undertaken to date is at a concept stage. More work will be required to undertake geotechnical investigations, confirm the tank design, and expected construction costs.

Purpose of the project:

CCC requires the earthquake damaged 200 cubic metre submerged suction tank to be replaced by a new suction tank incorporating resilient design and having a buffer capacity. The suction tank is to be connected to the 4 new deep wells and put into service by February 2019.

General Constraints when considering the location and design of the suction tank at Jeffreys Pump Station are as follows:

- Water table at approximately 1 m below ground on average
- Proximity to the Wairarapa Stream and resulting lateral spread risk
- Requirement of the 10 m boundary set back to the south. A resource consent will be required if the tank is built at the current location (Option 1). The 10 m set back line passes almost halfway through the existing utility site
- The building recession plane limits the height of structures close to a boundary.
- The need for the new structure to be close to the new wells while allowing for clearance to construct, operate and maintain the tank
- The suction tank size is required to be increased to 500 cubic metres to allow for 1 hour buffer capacity, to facilitate sand removal and to provide for emergency chlorination.

Two site location options for the replacement tank were considered:

- Option 1 - Build tank at current location, new suction tank will be larger than the existing damaged tank and extend slightly into the Park
- Option 2 - Build the tank west of the existing utility site, still on Council land, on what is currently a grassed area of the Park

Comparison of Options:

| Issues           | Option 1 – 500 cu m tank at present location (below ground)  | Option 2 – 500 cu m tank at Park (above ground)   |
|------------------|--|---|
| Technical issues | <ul style="list-style-type: none"> <li>• Potential water ingress issue with tank buried below water table</li> <li>• Greater lateral forces (static and earthquake) that would need additional engineering to mitigate</li> <li>• Construction risks due to:               <ul style="list-style-type: none"> <li>• Proximity of the existing pump station building to the east. Horizontal clearance is needed for construction and operation and to ensure no damage results from any site excavation.</li> <li>• Proximity of wells 7 and 8 to the west. Horizontal clearance needed for construction of</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Proposed tank is above ground and will not experience this risk.</li> <li>• Location is further away from the Wairarapa Stream and may have lower earthquake risks which may result in lower-cost ground improvement requirements (to be determined through detailed design)</li> <li>• Site unimpeded by services</li> <li>• The ability to build above ground and above the water table makes construction significantly easier</li> </ul> |

| Issues          | Option 1 – 500 cu m tank at present location (below ground)   | Option 2 – 500 cu m tank at Park (above ground)   |
|-----------------|---|---|
|                 | <ul style="list-style-type: none"> <li>wellhead and pipework, and future well maintenance.</li> <li>• Proximity of the reserve and playing field to the north limits how far the tank can extend to the north</li> </ul>  |   |
| Cost            | <ul style="list-style-type: none"> <li>• Additional works required for below-ground structure (may range from \$750k to \$1.5m):               <ul style="list-style-type: none"> <li>• Sheet piling and dewatering</li> <li>• Additional piling cost</li> <li>• Additional construction cost</li> </ul> </li> <li>• Potential additional consent costs</li> </ul>  | <ul style="list-style-type: none"> <li>• Generally lower construction cost</li> <li>• Additional length of pipe works \$80k</li> </ul>  |
| Consents        | <ul style="list-style-type: none"> <li>• Requires resource consent as within the 10 m setback from the boundary</li> <li>• Affected residents strongly opposed owing to proposed height</li> <li>• If written approvals not received from affected residents, consent process will take a minimum of 20 weeks with costs of \$100k minimum or more</li> <li>• The consent process could be extended beyond 12 months if further challenged</li> </ul>   | <ul style="list-style-type: none"> <li>• Will comply to set back and recession plane requirements</li> <li>• Approval may take 4 to 8 weeks</li> </ul>  |
| Location issues | <ul style="list-style-type: none"> <li>• Existing pump station site boundary will need extending slightly to the north and will affect the footpath.</li> <li>• May need screening and colouring to mitigate residents' concerns and community requirements.</li> <li>• Limited space available around existing site infrastructure (pump shed and water wells) leading to:               <ul style="list-style-type: none"> <li>• limits on future works on site</li> <li>• more difficult operating conditions on site</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Adjacent footpath will have to be moved slightly to accommodate tank, without affecting the amenity of the park (see layout drawing)</li> <li>• Loss of amenity value of the south-western corner of the park taken up by the tank</li> <li>• Tank height will meet the District Plan requirements for recession planes</li> <li>• May need additional screening and colouring to mitigate residents' concerns and community requirements</li> </ul> |
| Aesthetic       | <ul style="list-style-type: none"> <li>• Will be designed to suit location and may require some screening/aesthetic detail</li> </ul>   | <ul style="list-style-type: none"> <li>• Will be designed to suit location</li> <li>• May require more attention to aesthetic details/screening</li> </ul>  |
| Pros/Cons       | <p>Pros</p> <ul style="list-style-type: none"> <li>• Smaller overall footprint as for existing water supply utility</li> <li>• Minimal impact on the park</li> <li>• Less visual impact as within existing compound</li> </ul> <p>Cons</p> <ul style="list-style-type: none"> <li>• Greater risk of water ingress into tank</li> <li>• Increased impact from earthquake given closer proximity to stream</li> </ul>   | <p>Pros</p> <ul style="list-style-type: none"> <li>• Above ground construction reduces stresses on tank meaning simpler structure, simpler and faster construction, lower capital cost</li> <li>• Resource consent not required if the tank is able to meet all built form standards of the Planning Zone</li> <li>• Very low risk of water contamination</li> </ul>  |

| Issues | Option 1 – 500 cu m tank at present location (below ground)  | Option 2 – 500 cu m tank at Park (above ground)  |
|--------|--|--|
|        | <ul style="list-style-type: none"> <li>• The edge of the tank will be several metres inside the playing field. This is a health &amp; safety risk and is likely to be unacceptable to sports users.</li> <li>• Additional time taken to obtain resource consent could be significant with subsequent delays to installation of the replacement tank</li> </ul> | <p>Cons</p> <ul style="list-style-type: none"> <li>• Loss of amenity value of part of the park</li> <li>• Greater visual impact</li> </ul> |

At this point of time, the preferred location is the location at the south-western corner of the Park (Option 2).