

## Questions from the Infrastructure (including vacuum sewers) webinar

### **Why do we have vacuum sewer systems?**

The decision by the Stronger Christchurch Infrastructure Rebuild Team to install vacuum sewer systems to service parts of Shirley and Aranui was made after several options were considered through a multi-criteria assessment process - where the cost was only part of the decision.

The vacuum sewer systems were installed post-earthquake because of their affordability and ability to better cope with liquefaction and land settlement making them more resilient in future earthquakes.

### **Aren't gravity and pressure sewer systems much better?**

The re-installation of a gravity sewer system would have required pipes to be laid much deeper to align with standards and would have resulted in the need for many more pump stations to be built. This solution was also considered less resilient.

The installation of a pressure sewer system was considered as an option but had several legal, social and aesthetic complications - whilst also costing more.

### **Why wasn't future intensification considered by SCIRT?**

SCIRT was mandated to do 'Like for Like' replacement only – however, the Aranui and Shirley systems were designed to cope with intensification that was allowed by the Christchurch City Plan – which set the rules around development at the time. The vacuum pipes in Shirley and Aranui were sized to include extra flow where properties could be subdivided into 450 square metre lots and with enough space for an extra driveway. Since then, the City Plan has been replaced by the District Plan, which allows more intensification than what was allowed in the City Plan and the vacuum sewer system was designed for.

### **Why has capacity been reached?**

The Aranui and Shirley vacuum systems were designed for a housing density of between 10 and 29 houses per hectare depending on the location within the catchment. Actual development in these areas has however been at a much higher density and sometimes at different locations from where provision was made.

### **High inflow and infiltration from many properties**

Within these catchments has also been observed which puts additional strain on the systems. Inflow refers to stormwater entering the wastewater network and occurs mainly through low gully traps and incorrectly connected private stormwater drains into the wastewater network. Infiltration describes the entry of



groundwater, including sea-water, into the networks, mainly through faults such as cracked and broken private pipes. Again this contributes to overloading pipe capacities of the sewer network.

### **What is the Council doing to fix this problem?**

We are utilising a multi prong approach.

#### 1. Operational investigations and improvements:

- Tuning of the systems with help of a vacuum sewer specialist firm (FloVac). Calibration adjusts the air to liquid ratio in the vacuum pipes to optimal levels to achieve optimum performance.
- Install vacuum pressure sensors at the extremities of the networks so we can obtain better operational performance data and respond to issues in a proactive manner.
- I&I reduction programme: CCTV and repair programme, together with residents.
- Assess whether some key contributing flows can be diverted from a catchment (e.g. The Palms shopping mall).

#### 2. Capital investigations and long-term improvements:

We have already installed air admittance valves in the catchments which help improve air to liquid ratios. We are also in discussion with vacuum sewer specialists to identify options.

- Upgrade vacuum pumps and vacuum mains. Shirley is constrained at vacuum station (not enough room).
- Satellite station / wastewater collection and storage station: the satellite station doesn't generate vacuum but collects sewage from vacuum arm, then the satellite station will pump wastewater away into neighbouring catchment.
- New vacuum station near Horseshoe Lake Rd.

### **When will the upgrades and improvements take place?**

Operational improvements have commenced. Reducing I&I will be a multi-year programme as it requires residents to actively participate and undertake CCTV inspections and repairs of their private drains.

Capital improvements will need to be carried out in alignment with Council's long term plan processes. Since vacuum sewer upgrades are a significant financial investment this will require prioritisation in future infrastructure strategies and Long Term Plans.

### **How long will the development restrictions be in place?**

Restrictions will be in place until sufficient reduction in wet weather flow has been achieved or until the systems are prioritized for upgrade in future and funding has been secured.

However, even if substantial I&I reduction is achieved equally throughout the system, that there will still be an upper limit to the development that can be accommodated in these catchments.

### **What is the Council doing to help stop similar capacity issues in the future?**

As part of the draft Housing and Business Choice Plan Change, we propose adding a district-wide engineering provision to the District Plan which will require potential developers to check water and sewer network capacity prior to planning a new development.



### **If I'm not allowed to develop my lot beyond like-for-like, why are there new houses going up in my neighbourhood with more houses than they replaced?**

Without knowledge of your specific example we cannot comment on this.

Until recently Council operated on a 'first-in, first-served' basis, and recent builds and projects undergoing construction began their planning process, including checking for capacity in the Council's network, 8 months to 2 years ago. At the time of their enquiries the wastewater masterplans showed design capacity available.

But in general terms, in the past we evaluated development enquiries based on the knowledge of the system available at the time. Developers who requested and were granted a formal wastewater capacity certificate have capacity confirmed and 'locked in' for 6 months and were given the go ahead.

However, due to significant operational issues encountered during wet weather events we no longer accept any enquiries and proposals in the Shirley and Aranui catchments, except 'like for like' developments.

### **There are lots in my neighbourhood that have been recently sold and don't have new construction, yet they are advertising that they will be building units—more than what's being replaced. How is this being allowed?**

As the vacuum sewer catchment's capacity was taken up over the last two years, some applicants negotiated alternatives to divert sewer discharge out of the vacuum sewer catchment and into an adjacent gravity sewer catchment to accommodate development that were near the edges of the vacuum catchments. Under the current District Plan density rules, the potential number of connections this would send to adjacent catchments was considered manageable, with the risk of overwhelming them being low.

However, now that the central government legislation calls for even denser intensification, to limit the impact on the adjacent catchments, Council is no longer offering development proposals the diversion option. Future modelling based on the result of the housing density plan change will inform whether or not the diversion option will become available again.

### **How can I find out if a lot falls within one of the vacuum sewer catchments?**

<https://ccc.govt.nz/services/water-and-drainage/three-waters-advanced-asset-network-map>

1. Open the "Layer List" and tick "Wastewater – Vacuum Sewer Catchment."
2. Then search the address you're interested in.

### **What is 'like-for-like development'? Specifically, would a minor dwelling of less than 80m<sup>2</sup> on the same section still be permitted (i.e. permitted currently, but that would be creating an additional wastewater connection).**

A 'like for like' development is any development that does not create additional demand on the system and is limited to the demand that is currently assigned to the property in the Shirley or Aranui masterplans.

An additional minor dwelling would add additional demand to the system and can therefore not be accommodated.



**The letter I received from CCC states that the Shirley scheme is experiencing 'severe operational issues when it rains because the peak wet weather flow is much higher than the vacuum pipes can accommodate'. Is there a report/report(s) available regarding the inefficiency of the Shirley vacuum sewer scheme from Inflow and Infiltration, and what the estimated cost would be to fix some of these inefficiencies?**

There are reports available that confirm the hydraulic challenges. Whilst processes are underway to identify inflow and infiltration, Council is not mandated to fix private laterals. In this case, we intend to use our latest bylaws to require property owners to investigate and repair their laterals.

**Has there been an investigation and cost estimation into the possibility to convert the Shirley scheme to a pressure sewer scheme or some other system with more capacity for development, or to permanently pump/divert some of the scheme areas to other wastewater schemes?**

Our high level investigations suggest that costs to upgrade or change the system will be considerable and could make private development in the area to be unfeasible. We will continue to investigate alternatives once the extent of future development can be better quantified, however, in the meantime, these systems are unable to service additional demand.

**Will the development constraint also apply to the commercial premises within the Shirley Scheme, for example will The Palms be constrained to 'like-for-like development' too?**

Yes, commercial premises like The Palms will also be subject to like-for-like development.

**Requirements for new housing within Vacuum sewers areas?**












For Shirley and Aranui, only 'like for like' development will be considered. In Prestons, development in accordance with the Prestons vacuum sewer masterplan.

In terms of additional requirements, existing wastewater laterals need to be CCTV'd and repaired, or fully replaced.

**The draft map with the proposed zones seems to indicate that the Residential Hills area will be covered by the Vacuum Sewer area. Is this correct?**

No, that is not correct. The map is not great in that all the different precincts are coloured lime green but have different coloured outlines. We only have three vacuum sewer catchments, Shirley, Aranui and Prestons.



- Town Centre Intensification Precinct 
- High Density Residential Precinct 
- Greenfields Precinct 
- Emerging Metropolitan Centre Precinct 
- Large Local Centres Intensification Precinct 
- Local Centre Intensification Precinct 
- Residential Hills Precinct 
- Waste Water Constraint Precinct 
- Rural Hamlet Precinct 
- Residential Mixed Density Precinct - 86 Bridle Path Road 
- Residential Mixed Density Precinct - Redmund Spur 

**Given the high proportion of Kainga Ora properties, why were they seemingly exempt from being required to get lateral pipework repaired to ensure optimal performance of the new system? (private owners were required by you to make post EQ repairs)**

We are not aware that Kainga Ora was exempt from repairing laterals.

Council is currently working with EQC to obtain a list of all properties that received an EQC pay out for broken drainage pipework. We will then use that list to ask property owners to provide evidence that their pipework has been inspected and repaired where required. This will also apply to Kainga Ora properties.

**Why not stick with gravity sewers?**

A gravity sewer system requires pipes to be laid much deeper to align with standards and would have resulted in the need for many more pump stations to be built. This solution was also considered less resilient.

