

## Memorandum

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Subject	SDF Stormwater Model Schema Statement

## Modelling Strategy

For all the solution options being investigated (Future 3, 4 and 5), the strategy proposed is to divide the catchment into parts and provide individual outfalls for each. This aims to decrease the size of key pieces of infrastructure such as trunk mains, outfalls, and major pump stations, along with reducing the impact of bottlenecks such as the existing Anderson Bay Road trunk main. The proposed outfalls are as follows:

- The existing Portobello Road pump station, with any required capacity upgrades, to drain the area between Anderson Bay Road and King Edward Street via the existing network (with upgrades informed by the modelling).
- Isolate the Hillside Road trunk main near Bradshaw Street and pumping this flow to the existing Wilkie Road conduit which currently drains the Orari Street catchment.
- A new outfall to drain the remainder of the catchment, approximately composed of the area between Forbury Road and Bradshaw and Kirkcaldy streets, and the area south of Bay View Road, including the existing Tainui sub catchment. This will comprise of a new outfall running parallel to the existing Portobello Road outfall, or, alternatively, could be discharged to the open ocean on St Clair beach.

For all three options new and upgraded pump stations along with pipes, will be required in certain locations to provide the required conveyance capacity. This will be accompanied by storage facilities and increased greenspace which will attenuate flow peaks and decrease the required scale of infrastructure such as pump stations. Upstream network upgrades (including inlet capacity) and designated overland flow paths (i.e. along roadways) will be required to provide sufficient drainage for individual areas and deliver stormwater to storage and waterways in the larger events. These upstream network upgrades will be targeted at areas where surface flooding still exceeds 100mm (in events greater than the 10 year) even with the primary upgrades (waterways, trunk mains, pumps, and storage).

The construction of each future option will be staged over the short, medium, and long term. The **short-term works are common between the three options being investigated** and will involve the initial splitting of the catchment, primarily through the installation of new trunk mains and pump stations. Waterways/trunk mains and storage facilities would then be developed and enlarged, along with pump station expansion as required, through the medium and long term.

### Future 3 - Network (Pipes and Pumps)

The principle for Future Option 3 is to provide an upgraded network of pipes and pumps in South Dunedin to effectively remove water from the catchment during rainfall events. New and upgraded trunk mains will be installed to convey water to storage and new outfalls:

- A new trunk main to intercept flows from the eastern portion of the catchment will run along Kirkcaldy and Moreau streets from Bathgate Park to Bellona Street.
- Upgrade the existing trunk main on Bellona Street and divert to a dedicated outfall to reduce load on the Portobello Road PS.
- Upgrade the trunk main on Royal Crescent (conveys flows from the Tainui PS) and divert to the new outfall.

### Options 4 & 5 - Network (Waterways)

For Future Options 4 and 5, the principle is to provide dedicated space in South Dunedin to accommodate and then remove water in the catchment during rainfall events. A network of waterways will provide large arteries to convey runoff to storage and then to outfalls:

- A primary waterway to convey flows from the southern part of the catchment is proposed to run from near Forbury Park to the intersection of Portobello Road and Anderson Bay Road, along or parallel to Bellona Street, New Street, and Queens Drive. Installed in the medium term
- Additional significant branches, developed in the long term, would be positioned along or parallel to Ajax Street and King Edward Street.
- Waterways will initially be assumed to be two stage channels with a small central channel for low/groundwater flows. Initial overall dimensions will be a total base width of 8m, 1.5m depth, and 1:4 embankment. Channels are assumed to be grassed swales and a Manning's roughness value of 0.03 will be modelled. These waterways will be graded to ensure water will flow along them, this may mean the depth increases as it travels downstream.

### Storage

Storage to provide flow attenuation is proposed through the construction of basins and wetlands at existing parks in the east of the catchment (Forbury, Tonga, Bathgate) and adjacent to the existing Tainui stormwater pump station:

- Pump stations will be required at these storage facilities to drain them down following rain events, along with groundwater management.
- Storage will be expanded through the short, medium and long terms.
- Basins and wetlands will be initially assumed to be 1.2m deep, with the ultimate extents being the boundaries of the parks proposed to be utilised.
- It is assumed that storage will be able to be expanded from these extents if required, with storage extent balanced against infrastructure size using engineering judgement considering factors such as reasonable pump station depth.

### Land Raising and Managed Relocation

Some managed relocation will be required for all options:

- For options 3 and 5, land raising will be undertaken in the long-term extending from Forbury Drive west to approximately the western boundary of Forbury, Bathgate, and Tonga parks.
- Managed relocation will be required for all options to provide space for the proposed storage facilities, greenspaces, and waterways. Some of this relocation will be to proposed developments within the catchment on Chisholm Links and Hancock Park.
- New development on relocation areas and newly raised land will be assumed to be medium density residential.
- It is assumed that new developments will use onsite stormwater storage to reduce peak flows

## Seawall

A new seawall is proposed for all options to protect from sea level rise:

- For Options 3 and 4, this will be constructed along Portsmouth Drive.
- For Option 5 the seawall will be constructed along Otaki Street, with the existing area between Otaki Street and Portsmouth Drive to have floodable first floors.
- This will be modelled as an impervious barrier.

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