Cranford Regeneration Plan: Stormwater Discharges and Cranford Basin

Over time Cranford Basin will be developed into a major stormwater management area. Three major projects with a stormwater component are jointly involved in development of Cranford Basin. These are the Styx Stormwater Management Plan, the Northern Arterial Extension and the LDRP[1] #503 Cranford Basin Active Management Project.

Cranford Basin is pivotal to the three infrastructure projects in the following ways:

1. The Dudley Creek drains Bishopdale and part of Papanui along a winding route through St Albans and Shirley, meeting the Avon River at Banks Avenue. Dudley Creek has long had insufficient capacity to carry urban runoff from its catchment and was duplicated in 1977 by the Dudley Creek Diversion (DCD). The Dudley Creek Diversion takes excess flood water from Dudley Creek at Paparoa Street and conveys it east via Dudley Creek Diversion into the Cranford Basin. Flood water from this and nearby sources is pumped out of Cranford Basin into the Dudley Creek Diversion Pipe at Philpotts Road, from where it takes the water directly to Horseshoe Lake. Flood flows that exceed the capacity of the pumping station (PS 219) in Cranford Basin are stored safely in the low lying part of Cranford Basin. The Styx Stormwater Management Plan formalised Cranford Basin as a ponding area and planned for the purchase of the (previously privately owned) ponding area, and long term development of stormwater treatment wetlands.

2. The Northern Arterial Extension (NAE) is the Council-owned part of the Northern Arterial Motorway, and links the Northern Arterial at QE 2 Drive to Cranford Street near Placemakers. The Northern Arterial Extension and Styx SMP projects jointly obtained resource consents, and permission to buy the land needed by their projects, in the High Court in 2013 via a Notice of Requirement. The consent granted to the NAE contained conditions requiring it to treat and store its own stormwater within Cranford Basin without elevating flood ponding within the basin. The NAE project elected to provide for its excess stormwater by the purchase of additional land for ponding and contributing to a third project which would increase the capacity of Cranford Basin.

   After the earthquakes the Council's Land Drainage Recovery Programme sought a way to relieve flooding in Flockton Basin and lower Dudley Creek. Its solution was to intercept most of the runoff from subsidiary catchments near Innes Road and pump the water into the Dudley Creek Diversion Pipe. The Cranford Basin Active Management Project will add capacity to Cranford Basin so that Dudley Creek flood water can be safely detained as long as necessary.

3. All three projects have joined to purchase additional land – encompassing all the floodable area within Cranford Basin – and to build a containment bund on the Basin perimeter which will fill low-lying places and increase the Basin's containment volume.

[1] Land Drainage (earthquake damage) Recovery Programme

Stormwater Requirements for the Regeneration Plan Area

Stormwater entering Cranford Basin is managed to conform to:

- The Styx Stormwater Management Plan (SMP) 2013
- The Styx SMP Stormwater Discharge Consent 2013
- The Designation for Cranford Basin 2014 granted pursuant to a Notice of Requirement
- The Waterways Wetlands and Drainage Guide
- Cultural Impact Assessment.
- The Cranford Basin Active Management Project consent.
- Northern Arterial Extension discharge consent.
- Draft Comprehensive (city-wide) Stormwater Network Discharge Consent 2016.
- The Infrastructure Development Standard (IDS).

The Styx SMP Consent requires new development above a size threshold of 10 residential lots to treat the first flush (25 mm) of stormwater runoff and mitigate post-development stormwater runoff increase.

The Designation authorises the Council to purchase specified land in Cranford Basin for stormwater purposes.

The Cranford Basin Active Management Consent limits the amount of water impounded within the proposed embankment around Cranford Basin to 680,000 cubic metres maximum.

Development Rules for New Development in the Regeneration Plan Area

The Outline Development Plan is intended to contain development rules whose purpose is that development will meet Council (SMP, IDS and District Plan) requirements and the requirements of external consents and constraints. Development rules (which are draft at the time of writing) are intended to ensure that:

- Stormwater attenuation and treatment is to occur within the boundary of the development area;

- The first 25 mm of rainfall in a storm event is to be treated to a target water quality meeting Schedule 5 Tables S5A and S5B and Schedule 8 of the Land and Water Regional Plan 2015;

- Overland flood water is not unduly impeded from draining eastward into Cranford Basin from Papanui;

- Groundwater levels are not to be lowered nor raised as a consequence of land drainage or land stabilisation or filling;

- The effects and potential effects of development are to be investigated and reported in a Geo-hydrological Management Plan to be carried out by suitably qualified independent experts, in regard to the effect and potential effects on infrastructure and other assets of any settlement or subsidence that may occur over time under possible scenarios (e.g. seismic events). This Plan will be approved by the Council;

- Design and implementation plans are to be prepared and reviewed by suitably qualified experts and submitted for Council review to illustrate that the development will proceed in a way that achieves the objectives and recommendations of the Geo-hydrological Management Plan.

Stormwater is permitted to be discharged from the development into the Council's stormwater designation at no. 45 McFaddens Road (west of Cranford Street), being the land identified on the ODP as "Designated Stormwater Management Area". Any discharge to this land would subsequently be conveyed to open drain or piped network.

Stormwater Quantity Effects

The Outline Development Plan requires detention within the development boundary of runoff in excess of natural (i.e. pre-development) runoff. The Cranford Basin stormwater management facility, downstream, is designed to mitigate the 50 year average recurrence interval event with the pre-existing level of catchment development. The application of the Styx Stormwater Management Plan, Surface Water Objectives 3, 4 & 5 accordingly require detention of rainfall excess up to the 50 year average recurrence interval event. This level of mitigation will avoid placing additional demands on Cranford Basin and thereby achieve compliance with the surface water objectives.

The ODP indicates locations where detention might be carried out (shown as grey ellipses in the plan included in the ODP) but actual locations will be proposed by the developer(s).

An event larger than the 50 year average recurrence interval event will not be fully contained and will partly spill. Stormwater spilling from the development area for any reason will enter the Council's Cranford Basin stormwater management facility. Flood water in the Basin is contained by an embankment that is designed to contain flood water from the Upper Dudley Creek and the Northern Arterial Extension and an allowance for flood water pumped from Flockton Basin, up to the 50 year average recurrence interval event, with an additional safety allowance (a freeboard). The freeboard of 0.4 metre will provide some surplus capacity for over-design events. Any excess will spill via a designated spillway adjacent to Philpotts Road.

Building consents in the development area are expected to conform to standard practice that all floor levels will be above the 200 year ARI flood level within the Flood Hazard Management Area and above the 50 year ARI flood level elsewhere.

Stormwater Quality Effects

The Styx Stormwater Management Plan requires the first flush of stormwater be treated in sedimentation basins. The first flush is the first 25 mm of rainfall. "Treatment" is to be carried out to a target water quality meeting Schedule 5 Tables S5A and S5B and Schedule 8 of the Land and Water Regional Plan 2015. Target water quality standards in the LWRP are set at levels that will protect 95% of aquatic species from harm. In practice the water quality standards will be very difficult to achieve in the long term as paint systems deteriorate and road traffic increases. The Council faces a similar problem city-wide because of the low contaminant limits permitted by Regional Rules. New roofing and an expectation of relatively light traffic volumes are indicators that treated water quality from the proposed development is likely to be better than the average water quality from the remainder of the catchment.

References

Styx Stormwater Management Plan 2013, CCC, TRIM reference 15/790302 (Part A), and 12/664735 (Part B "Blueprint")

Styx SMP Stormwater Discharge Consent CRC131249, TRIM reference 13/1266793

Cranford Basin Active Management (LDRP 503) Resource Consent Decision

a. To dam: CRC172577, TRIM reference 16/1436882
b. To discharge: CRC172578, TRIM reference 16/1436873

Waterways Wetlands and Drainage Guide 2003, TRIM reference 10/403431 (Part A), 10/403405 (Part B). Current versions available online.

Cultural Impact Assessment for Cranford Basin – Proposed Rezoning for Urban Activities, Tipa & Associates 2016, TRIM reference 16/1136434

Northern Arterial extension discharge consent [***reference***]