Development Contribution Policy – Stormwater

Brownfield Stormwater Methodology

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Contents

Introduction

Stormwater infrastructure is a critical component of urban development, ensuring rainfall runoff is effectively managed to drain water away from buildings, reduce flooding on properties and roads, protect waterways, and maintain infrastructure performance. As urban areas grow and change, so too does the demand on stormwater systems. The costs of expanding and maintaining this infrastructure must be fairly allocated between available funding sources, including development contributions.

This document describes the process and methodologies used to develop a list of costed stormwater projects required to enable full build-out of an existing urban environment over a 30-year growth horizon and determine the fair allocation of those costs to growth.

To date, Auckland Council has not systematically upgraded the piped stormwater network in a brownfield catchment to enable growth. The Tāmaki AHP area is the first catchment where this has been proposed as part of the 2025 Development Contributions Policy consultation.

This document explains the methodology developed for the Auckland Housing Programme growth areas, which has been applied to Tāmaki before being extended to other Auckland Housing Programme areas and other brownfield growth areas.

Existing management of brownfield stormwater network

In the existing urban environment, stormwater development contributions are charged for catchment-scale projects, and all new developments within that catchment contribute. Catchment-scale projects typically include major upgrades such as large culverts, tunnels, wetlands, and stream restoration and stabilisation.

For the primary pipe network, a pipe capacity assessment is conducted by developers when applying for consent. If there is capacity, the developer can connect to the pipe; if not, the developer must implement on-site mitigation, usually an attenuation tank that releases runoff at pre-development flow rates. If the existing property discharges stormwater to a soakage field, the developer must demonstrate the ground has sufficient permeability to accept the increased runoff or construct new pipelines to the nearest stormwater network to avoid increasing flood risks.

The existing stormwater pipe capacity in older brownfield areas of Auckland is typically much lower than required for new developments in greenfield areas today due to lower historical design standards. As a result, stormwater pipes in older areas surcharge and overflow more frequently, and onsite developer mitigation aims to prevent this from worsening.

We are reaching a tipping point in intensifying parts of Auckland—the impact of increased impervious surface areas and more frequent high-intensity rain events due to climate change will overwhelm our pipe network more often, leading to more frequent hazardous flooding on roads and private property unless changes are made.

On-site stormwater management alone is not a solution

Currently, a pipe capacity assessment is conducted prior to development, and if there is insufficient capacity, the developer must implement on-site attenuation or network upgrades. This has led to the view within the development community that the impacts of intensification in existing suburbs can be entirely addressed through on-site developer mitigation.

On-site mitigation involves capturing stormwater on-site and either reusing it or releasing it slowly onto the road or into the pipe network. While this reduces peak flow, it still increases the total volume of stormwater travelling through the pipes and overland.

The cumulative effect across the catchment is a large total volume of water moving through pipes (or streams) into the receiving environment. On-site mitigation alone will not address the increased hazard on roads if the pipe network is not upgraded.

Developing the Brownfield Stormwater Methodology

The process of developing the stormwater methodology involved multiple steps, each with its own methodology, which have been developed by relevant specialists. A high-level summary of the process used for the Brownfield Stormwater Methodology is in Figure 1 below.

Define key assumptions	•Confirm alignment between hydrological and precinct boundary •Confirm key assumptions for stomwater network.
Catchment and network analysis	•Review catchment & network information and needs •Analysis of cathcment and pipe network. •Consider known growth projects
Project identification	•Identify and confirm catchment scale projects •Identify and confirm results of pipe network analysis
Costing of projects	•Develop costing methdology •Apply costing methodology to catchment and pipe network projects
Cost allocation methodology	•Develop cost allocation methodology to use for development contribution modelling.
Phasing of projects over time	•Develop an approach to use for phasing of projects over the 30 year timeframe.

Figure 1. Brownfield Stormwater Methodology process

Project identification was based on key information and assumptions to build a conceptual future scenario that the stormwater system would need to service.

Brownfield stormwater methodology key assumptions

Future Growth assumptions

The Tāmaki precinct is a Long-Term Plan (LTP) Investment Priority Area and, along with Māngere, Mt Roskill, Oranga, and Northcote, form part of the Auckland Housing Programme. The Auckland Housing Programme is supported by central government, and the Tāmaki Regeneration Company, supported by Kāinga Ora, has a significant development programme in the area.

These development plans have been included in the Auckland Housing Growth Scenario modelling by Auckland Council. The Auckland Growth Scenario 2023 v1.1, with a full build-out horizon added, was used as the basis to estimate full build-out.

Table 1. Auckland Housing Programme Area Growth to full build out

	Household		Population		Employment		Forecast Full Build Out Date
IPA Area	2024	Full-buildout	2024	Full-buildout	2024	Full-buildout	
Māngere	15,112	30,195	60,520	111,742	9,263	22,951	2060
Mount Roskill	21,633	41,821	67,153	130,547	16,229	29,542	2060
Tāmaki	8,447	21,626	25,717	65,853	9,193	14,064	2060
AHP Totals	**45,192**	**93,642**	**153,390**	**308,142**	**34,685**	**66,557**	

Impervious Surface Area

A key factor influencing stormwater demand is the extent of impervious surfaces—such as rooftops, driveways, and paved areas—which prevent natural infiltration and increase runoff. Many other factors also contribute to stormwater demand, including soil type, compaction, landscaping, buildings, and land use activities, however, developing an individual stormwater model for each site would be impractical due to the complexity and variability of urban development.

Impervious surface area is used as a reasonable and practical proxy for estimating stormwater demand. To ensure fairness and efficiency, stormwater demand calculations are based on average imperviousness across entire catchments rather than an assessment for each site. This approach balances simplicity with equity, enabling effective infrastructure planning while recognising the diverse nature of development patterns.

A 45% ISA is used for the historic catchment average, and this was usual at the time the neighbourhood was originally developed.

A 70% ISA is used in the models that identify flood hazard on roads in different storm events. 70% ISA is the usual ISA used to estimate Maximum Probable Development as this is the default level permitted under the highest residential zoning in the Auckland Unitary Plan. However, consents can be granted to exceed the permitted activity allowance and observed imperviousness in residential development undertaken under the Auckland Unitary Plan show that imperviousness typically reaches 90%.

A 90% Impervious Surface Area assumption was used to estimate the final pipe size needed for the pipe upgrade. The difference in the pipe sizes needed under a 70% ISA and 90 % ISA scenario is marginal – approximately 2-5% of the total project cost. The design life of new stormwater pipelines is also 100 years, so it is prudent to design for the higher ISA that is observed from new development.

A full build out Impervious Surface Area of 90% was chosen because:

- High-density zoning is increasing in growth areas.
- Consents in growth areas often exceed permitted activity defaults.
- Investigations confirm smaller lots approach 80% ISA, and business/industrial land further increases catchment-wide imperviousness.
- The cost difference between pipe sizes for 70% vs. 90% ISA scenarios is marginal (~2–5% of total project cost)

Hydraulic modelling

The 2020 Tāmaki North Flood Hazard Model was used to assess flood hazards and pipe capacity under 2yr, 10yr and 100yr rainfall Annual recurrence Intervals as well as the Existing Development ISA and the Maximum Probable Development ISA.

Climate change allowance

The current Code of Practice for stormwater management specifies that the primary stormwater network should be designed to handle a 1 in 10-year storm event, equivalent to a 10% annual exceedance probability, with an additional 2.1 climate change allowance to account for future climatic conditions. The secondary stormwater network, which includes overland flow paths and streams, is intended to manage stormwater when the primary system reaches capacity or becomes blocked. To enhance resilience, current guidelines recommend designing the secondary system to accommodate a more severe 3.8-degree climate change scenario. This approach ensures greater adaptability and robustness in the face of increasingly unpredictable and intense weather events.

Developer mitigation

Developer mitigation of stormwater effects is usually required in developments. In brownfield development, the current practice is to assess downstream stormwater pipe capacity prior to connection to determine if there is enough pipe capacity to take the additional stormwater from a new development/dwelling. If there is not enough capacity then the developer must attenuate some stormwater on-site.

This approach can work but there are some limitations to relying on developer mitigation entirely as a solution, including:

- The smaller lot sizes and more constrained development sites meaning it could be difficult to fit sufficient stormwater volume on site.
- The cumulative effect of attenuation across the catchment. Highly dispersed land ownership means any onsite mitigation would not be cumulatively applied across the catchment and therefore not be effective.

- A lack of regulatory regime to ensure ongoing maintenance and compliance of the onsite devices. There is a risk of unmaintained devices reducing in function over time and therefore creating more of an impact on the stormwater network than has been planned for.

Level of service

There is no existing legislated level of service for stormwater. Council is required to report quarterly to the Department of Internal Affairs on:

- The number of habitable floors that flood in a storm event
- The time it takes to respond to requests for service.

There is no performance aspect to the reporting in that there is no specified reduction in number of habitable floors flooded that needs to be achieved.

Other references to stormwater are in the Building Act and Health Act, both of which describe the need to drain stormwater away from houses to prevent damage to the building and for public health reasons.

A key part of this methodology has been to identify a level of service that a pipe network, or primary drainage network, is to be designed for.

Without a clear level of service, and mandate to deliver it, there cannot be a shared understanding of what stormwater investment is needed for the future.

New pipe network where ground soakage is used

Parts of Auckland, including Panmure in Tāmaki, rely on ground soakage to manage stormwater. The ability to use ground soakage depends on:

- the underlying geology of the area,
- the amount of impervious surface area and amount of stormwater that would be generated.
- the degree of soil compaction during development, and
- the subsequent soil infiltration rates.

Infiltration testing is usually done to test for the ground soakage potential prior to development.

Infiltration testing undertaken for the Tāmaki Stormwater Management Plan indicates that Ground soakage will not be a feasible method of stormwater disposal on the Tuff geology once Tāmaki is redeveloped due to the combination of additional stormwater created by infill development, the corresponding loss of previous area and the low infiltration capacity of the ground.

If the Council does not invest in new stormwater networks for soakage areas, developers will need to install their own pipelines to direct stormwater to the nearest discharge point (e.g., an existing stormwater network, stream, or coastal area). This could result in disproportionately high costs for some developers—particularly those far from a discharge point—and may also require onsite attenuation if connecting to an already constrained stormwater network.

To address this, the 2025 DC Policy identifies and incorporates new stormwater pipe networks, termed extensions, into this methodology. These extensions will create a more efficient system, benefiting the majority of developers.

Funding Boundary for Tāmaki growth area

Existing stormwater Development contribution policies use hydrological catchment boundaries as the funding boundary as far as practicable. There is good alignment between the Tāmaki North hydrological catchment with the Tāmaki Auckland Housing Programme area.

MSM zones are used in the Auckland Council Growth Model and growth in each MSM zone has been modelled to predict the pace and location of growth within the Tāmaki AHP area.

The Tāmaki North hydrological boundary was compared with the precinct boundary and MSM zones and it was agreed to use the same boundary as for Transport but with a modification to MSM zone 368 to bisect the boundary along West Tāmaki Drive as this is a natural ridgeline which forms a natural break in the hydrological catchment.

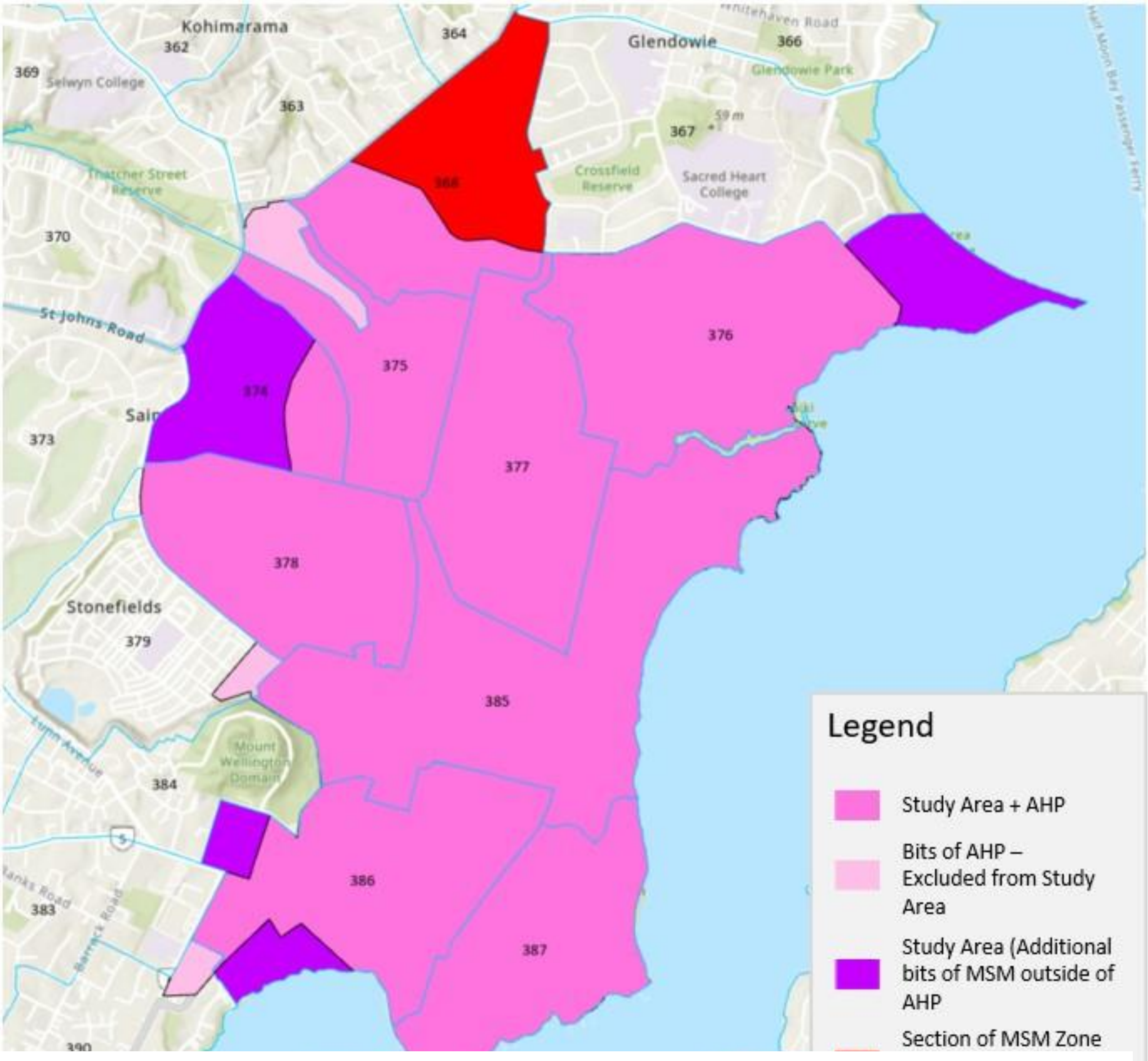

Figure 2. Tāmaki Funding Boundary

Some sections of the funding area are outside of the AHP Tāmaki boundary but are within the hydrological catchment so are included and these boundaries align to the MSM zones as noted in the table below.

Growth scenarios

The Auckland Growth Scenario 2023 v1.1 (AGS23v1.1) model predicts growth over the next 30 years starting in 2024 running through to 2054. The development of impervious surface area is the biggest driver of stormwater demand and is therefore used as a proxy for stormwater demand.

The AGS23v1.1 Model predicts the amount of growth, by household increase, per year for each MSM zone. Table 2 shows the percentage of growth modelled for each MSM zone that is being used for the modelling of the Stormwater Development Contributions.

Table 2. MSM zones and % growth used

MSM zone	AGS23v1.1 model %	Comments
368	41	Percentage adjustment reflects the exclusion of land in the MSM zone that is outside of the Tāmaki North hydrological catchment.
363	0	Excluded from funding area as part of AMETI designation.
374	100	Full MSM included as it aligns with catchment boundary.
375	100	Full MSM included as it aligns with catchment boundary.
376	100	Full MSM included as it aligns with catchment boundary.
377	100	Full MSM included as it aligns with catchment boundary.
378	100	Full MSM included as it aligns with catchment boundary.
379	0	Excluded as part of Stonefields which drains to a different catchment.
385	100	Full MSM included as it aligns with catchment boundary.
386	100	Full MSM included as it aligns with catchment boundary.
387	100	Full MSM included as it aligns with catchment boundary.
390	0	Excluded from funding area. While in Tāmaki North hydrological catchment this portion of the catchment is not expected to intensify and a large portion is fully impervious existing business land.

Identification of projects

The number and type of projects required depends on the characteristics of the hydrological catchments, existing constraints and, importantly, what level of service the pipe network is expected to provide.

The draft Development Contribution policy 2025 used for consultation identified a comprehensive pipe network upgrade. This would have reduced both nuisance flooding on private property and reduced hazard on roads. However, it would also be a significant expense – for council to borrow the money, for developers to pay in Development Contribution charges and for ratepayers. Feedback through public consultation on this option highlighted the cost of stormwater as a key concern.

Retaining the status quo, or existing way of managing stormwater, is considered equally unfeasible. A pipe network does not exist in some parts of the Tāmaki precinct and the lack of network would limit growth because there wouldn't be enough capacity in the ground to soak up more stormwater and it would be uneconomic for individual developers to install a pipe network. There would also be an increase in both the frequency and hazard of flooding on roads and private property.

Sources of information to identify the projects needed in Tāmaki were:

- Healthy Waters stormwater catchment models
- Healthy Waters pipe criticality surveys
- Stormwater Management Plans (SMP)
  - Healthy Water's Panmure North SMP (2019); Prepared by WSP Opus
  - Healthy Water's Omaru Creek SMP (2016); prepared by Harrison Grierson
  - Kainga Ora Neighbourhood SMPs
    - Point England and Panmure North SMP (Neighbourhood 4&5) (2024)
    - Glen Innes Northwest SMP (Neighbourhood 1) (2024)
- Healthy Waters stormwater projects identified in previous AMPs / LTPs
- Developer's servicing plans and development schedules
  - Kainga Ora Neighbourhoods 1, 4 and 5

Catchment Scale Projects

Catchment scale projects are analogous to precinct projects in brownfield areas. Catchment projects were identified by reviewing the Council's Stormwater Management Plans and projects identified by Kainga Ora, and then cross-referenced with the Long-Term Plan. These include stream stabilisation projects to improve conveyance, improve water quality and manage flooding. The timing of these projects has been informed by the catchment managers and when projects are required to support known development planned by Tāmaki Regeneration Company and Kāinga Ora.

Alternative option for Pipe Network/Primary drainage projects

Analysis of the primary pipe network used a flood hazard model to identify areas of moderate risk on roads in a 10% Annual Exceedance Probability event. Pipe upgrades are then planned downstream of where a hazard on main roads is predicted. This will improve drainage on high-use roads so that hazard is reduced, this benefits everyone in the catchment. As roads are where excess stormwater from a site is directed improving drainage of roads will provide a secondary benefit.

Network extensions refer to new sections of pipe network installed in neighbourhoods which historically relied on ground soakage to manage stormwater. There is a limit to how much stormwater can soak into the ground and the increased amount of impervious area will both increase the amount of stormwater to soak into the ground and reduce the amount of ground for stormwater to soak into.

The pipe network project includes both the network extensions and upsizing of existing pipes.

Kainga Ora Auckland Housing Programme overlap

At the time of this methodology development Kāinga Ora had Treasury approved business cases for Stages 1 – 6 of development planned for Tāmaki. These business cases included funding for a number of pipes to enable superlot development for the Tāmaki precinct. These pipes are largely in existing areas of soakage where there is no existing network or pipe upgrades where there is insufficient pipe capacity. To ensure there was no duplication of pipe network Auckland Council Healthy Waters obtained from Kāinga Ora the upstream catchment that their proposed pipe network was intended to service and then compared it to information held by Auckland Council on the council proposed pipe network and made a decision as to whether the pipes were a straight duplication or provided an alternative but equivalent stormwater function or the pipes were only to service Kāinga Ora lots and did not contribute to the wider public network.

Project costing

Guidance on council’s approach to cost estimation for healthy waters projects can be found in “Healthy Waters’ Project Cost Estimation Manual September 2024”.

Alta was commissioned to provide cost estimates for projects identified in the Tāmaki growth area. These projects are in different stages of planning and design, with some at a feasibility stage and some more advanced at a concept design phase.

Alta provided cost estimates for the following:

- Pipe network upgrades – upsizing of underground stormwater pipes
- Catchment scale projects – wetlands, stream widening and treatment devices

Alta used a mixture of historic rates from similar projects, and cost build-ups using first principles to arrive at the direct cost estimate. In line with the Auckland Council cost manual for stormwater projects, Alta has applied an allowance for internal costs and contingency to calculate the final expected estimate. Escalation has not been allowed for in the estimates as this will be calculated and applied by the Development Contributions team.

Pipe Network Estimates

Details on pipe assets that require upsizing based on expected development and climate change were provided to Alta. The information provided on the spreadsheet document is as follows:

- Upgrade/Extension – some assets are upgrades of existing pipes and some extensions
- WSP ID – WSP provided an assessment of the catchment and grouped assets
- SAP ID – the asset ID off Auckland Council GIS
- Length of upgrade or extension
- Number of manholes

- Manhole depth
- Minimum cover
- Pipe invert depth
- Existing diameter
- Pipe diameter (45% IMP + 2.1mm)
- Pipe diameter (90% + 2.1mm)

Assumptions made for the pipe network upgrades to achieve a consistent costing approach across all listed assets are listed below:

- All pipes installed by open cut/trenching method
- All reinstatement in the road carriageway
- Number of manholes assumed based on length of asset (information provided by Council)
- Cover on the pipe set at 1 metre (information provided by Council)
- Manhole depth generally considered to be 2 metres (information provided by Council)

A model was used that provides a high-level estimate for stormwater works in the early stages of a project. The model uses known costs from suppliers and subcontractors in the Auckland area, as well as industry production rates and overheads costs to provide the direct works cost for the pipe upgrade. Figure 1 below shows the flowchart for developing the costs in the model.

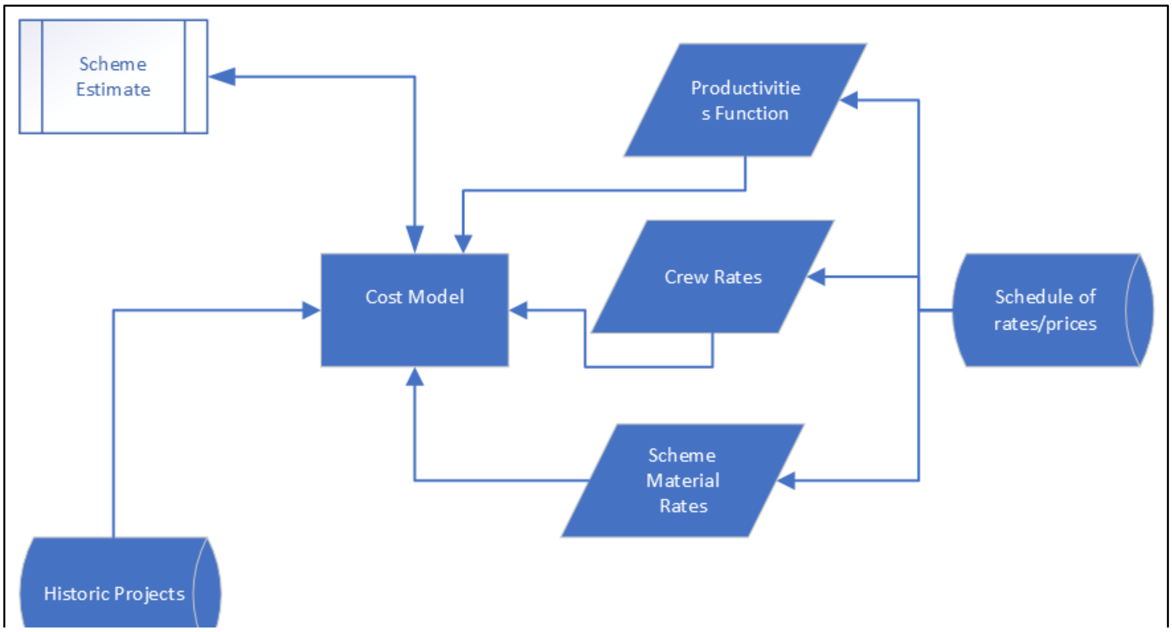

Figure 3. Flowchart of cost model

While the model provides a reasonable and fair assessment of the direct works cost for pipe upgrades, there are some assumptions/considerations within the model that are listed below:

- Production rates are calculated by metre cubed (m^3) of trench excavated per hour, as the pipe diameter increases the linear metre production decreases, and therefore the cost per linear metre increase.

- Production rates are impacted by the expected utilities in the line of the trench, the number of utilities is assumed based on trench location and no specific utility assessment is part of the estimate.

- Production rates are impacted by the location of the trench, and therefore the reinstatement required. This is assumed as road reinstatement for all pipes.
- Drainage crew rates are split into small, medium or large with a greater cost as crew size increases. A large drainage crew has been assumed for all pipe network upgrades.
- Traffic management crew rates are split into small, medium and large with a greater cost as crew size increases. A large traffic management crew has been assumed for all pipe network upgrades due to all works being in the road.
- Material costs for all drainage products are known from suppliers in Auckland, and the factored cost includes delivery to site.
- Backfill material costs for all aggregates are known from suppliers in Auckland, and the factored cost includes delivery to site.
- Reinstatement costs are based on trench width and the location of trench. All pipe estimates have assumed asphalt reinstatement is required.
- An on-site overhead allowance of 20% is applied to all estimates.
- An off-site overhead allowance of 15% is applied to all estimates.

The above list provides the assumptions and factors that are applied to the calculation of the direct works cost for pipe upgrades. There are also exclusions in the model, which are listed below:

- Land purchase
- Escalation
- Service relocations
- Excavation in rock
- Excavation in contaminated material
- Archaeological discoveries

With the above considerations, the information that is provided to Alta by Auckland Council can be entered into the spreadsheet and the direct works cost is calculated.

The Auckland Council Healthy Waters cost estimation manual provides guidance around the internal fee costs that should be applied to estimates. This includes, but isn't limited to, costs for designer fees, consenting, PM costs; and should be applied as a percentage of the direct works costs. The recommended range is between 22 – 46%. For these estimates a 34% allowance for internal fee costs has been applied.

The estimation manual provides guidance on the project contingency allowance to be applied at each phase of a project. Contingency is to cover unexpected events and changes during a project lifestyle, this could be to cover potential project risks and any changes during design development. The pipe network estimates are being completed at the Strategic Assessment phase, and Alta have applied a 40% contingency to all project costs.

The P50 expected estimate is the sum of the direct works cost, internal fees and contingency.

The P50 expected estimate is the value that is provided to Auckland Council for the Long-Term Plan.

Specialist Estimates – for catchment scale projects

Alta was provided with relevant design information for the project that is to be priced. This could be in the form of design drawings, design reports, sketches and design memos.

The estimates are calculated using known historic rates from similar projects, or by building up the costs using first principles. The cost build-up calculates the direct works cost as above in the pipe network estimates, but the following variables are specifically addressed based on the location, size and scope of the project.

- Preliminary and General
- Traffic management
- Temporary Works
- Service protection and relocation
- Contractors risk
- Time related On-site overheads
- Off-site overheads & Profit

The above items are calculated by estimating the individual components within each category, or by applying them as a percentage of the physical works cost.

The physical works component of the estimate is calculated as accurately as possible from the provided information and categorised into a relevant sub-category of the estimate. These sub- categories could include, but not be limited to, Stormwater works, Earthworks, Landscaping and Structures.

The internal fee costs and contingencies applied adhere to the cost estimation manual and fall within the recommended ranges. Where necessary additional costs will be added to the internal fee projected cost for items such as land purchase.

The P50 expected estimate is the sum of the direct works cost, internal fees and contingency.

The P50 expected estimate is the value that is provided to Auckland Council for the Long-Term Plan.

Where projects were already costed for inclusion in the Long Term Plan these costs were used for the Development Contribution model.

Cost Validation Process and Review

When estimates are completed, they go through a review process and are compared against pricing in recent tenders for similar work.

This allowed Alta to provide a fair market value to the estimates and ensure the costs are within an expected range from across the industry.

Phasing of projects

How the projects are phased or timed across the 30 years is important in calculating the cost escalations and other factors in modelling the final development contribution cost.

A significant amount of money is committed in the 2024 LTP for non-pipe projects that enable intensification of the Tāmaki project or will mitigate the effects of growth. In phasing projects, it is acknowledged that there is the potential for variance in when and how growth occurs. Stormwater projects have been identified that will be required for growth, however the actual location of growth is uncertain.

To phase the pipe network projects it was agreed that the projects be aggregated and then spread by cost based on the % growth per year over the 30 years. This gives a degree of flexibility in delivering the pipe network projects. The larger scale projects including the Pilkington Rd upgrade, stream daylighting and stream works are generally scoped at a high level and an approximate timing estimated as shown on the Tāmaki Projects list.

A key assumption in allocating projects is that the funding to deliver any of the 30-year projects will not be available until 2027 which is the date of the next LTP. It is also assumed that network extension and pipe upgrade projects are unable to be funded in the first decade.

A significant number of the network extension projects are needed to enable the Kainga Ora neighbourhoods. Central government financing through the Housing Acceleration fund may enable the Council to deliver some of the enabling works for Kainga Ora neighbourhoods in the first decade. Should this happen our DC policy will be amended to reflect the new project timing and cost at the next Development Contribution policy update.

The process for phasing of projects is set out below:

Step #	Step
1	Identify the projects covered by the HW LTP budget and the date for these projects - these will be timed based on the timing year in the LTP
2	Total up the costs for all other projects (so all projects less the HW LTP Projects)
3	Estimate the amount of growth per year from Start Year (2027 earliest year that projects can start) to End Year
4	Multiply total costs of projects x %age growth per year = $'s per year
5	Estimate the timing of the $'s based on the growth from Start Year (2027 earliest year that projects could be delivered) to end year, proportioned
	Timing will be the completion Year of the project
6	Costs spread over the completion year and the prior 2 years (total of 3 years of spend in total)
7	Escalate costs
8	Overlay what budget is available. If budget is not available, then move projects out to 2035 onwards
	Finance to coordinate with HW/DPO to ensure right projects are moved out

Cost allocation

This document is a framework on how costs may be allocated for stormwater projects in brownfield areas.

The Auckland Housing Programme in Roskill, Tāmaki and Māngere have been identified by Auckland Council as a priority for intensification (growth) for a number of years (and LTP cycles). In addition to the development anticipated through the Tāmaki Regeneration Company, Kainga Ora and other large scale public housing providers it is anticipated there will be a significant amount of growth from intensification of privately owned lots.

Key principles:

- The cost of the infrastructure should be fairly apportioned between level of service and growth, based on the extent to which growth creates the need for and benefits from the infrastructure relative to existing residents.
- The expected life span of the existing infrastructure influences the proportion of renewals.
- The growth component of any upsizing of the network is the difference between the size of the network required to service the existing drainage catchment (in relation to current design standards) and the size required to convey the maximum build out scenario to meet the same design standard.
- The cost allocation methodology needs to be fair, equitable and transparent.

Renewals

Renewals refers to the replacement of an existing asset due to either age or (more commonly) failure. The proportion of cost assigned to renewals is related to the remaining useful life of a pipe which is based on the age, material and condition of a pipe. The design guidance in the Stormwater Code of Practice (v3, January 2022) states that the network should have a design life of 100 years. In practice stormwater and manholes can be assumed to have a much longer life provided there are no external factors (such as saltwater intrusion, high velocities or drops).

Auckland Council's Asset Management Plan uses a pipe deterioration model to estimate the percentage of pipe network that will need renewing over different time forecasts. This model uses the age and material of the pipe information as well as any condition assessment of the pipe which may have been done through operational works. The model is updated annually and is audited by Audit New Zealand.

Critical assets (criticality 4 and 5) of poor condition (condition rating 4 and 5) are replaced proactively within five to 10 years of inspection. Assets with medium or low criticality (criticality less than 3) are replaced when they fail (run to failure mode) unless their performance endangers public health and safety (e.g., habitable floor flooding, road obstruction, etc).

The pipe deterioration model, updated with the most recent information for Tāmaki North catchment, has been used to estimate the renewal % over the 30-year time period. The approach to identifying the renewal component has been to take the estimated % of pipes in different condition classes and multiply it by 70%. The 70% was derived from taking the difference between the original pipe size and future required pipe size and dividing it by the future pipe size. Testing this formula against a sample of the critical pipes this resulted in a 30% increase in pipe size therefore the pipe renewal percentage is 70%.

For critical pipes with a current condition rating of 4 or 5 these are 100% renewals minus 30% for the increase in pipe size so this comes to a 70% total allocation for renewal. For critical pipes currently in condition 3 it can be expected that 30% of these pipes will deteriorate over the 30-year period and become condition 4 and 5 pipes which will need replacing. Pipes in condition 1 & 2 are in good condition so are not expected to need replacing at all unless in response to growth therefore no renewals will be charged for critical pipes in condition 1 or 2.

Critical pipes that have not been surveyed have had the average % of pipes in conditions 3, 4 & 5 applied to get an estimate.

Non-critical pipes (critical 1, 2 & 3) are run to failure and so only a much smaller % is expected to be replaced as reactive renewals.

The full list of renewal percentages is set out below.

Table 3. Renewal percentage applied to pipe type in cost modelling

Project Type	Pipe Criticality	Pipe Condition	Expected rate of renewal over period	Replacement cost as % of total upgrade cost	Renewal share to be applied	Comment
Upgrade	4 or 5	4 or 5	100.0%	70.0%	**70.0%**	100% of condition 4 and 5 critical pipes to be replaced within next 5-10 years
Upgrade	4 or 5	3	30.0%	70.0%	**21.0%**	30% of condition 3 critical pipes expected to degrade to condition 4 or 5 and require replacement within 30 years
Upgrade	4 or 5	1 or 2	0.0%	70.0%	**0.0%**	Newer pipes, no renewal expected over 30 years.
Upgrade	4 or 5	Not Surveyed	16.7%	70.0%	**11.7%**	Condition unknown, applied average rate of renewal across all critical pipes, see table below
Upgrade	1,2 or 3	All	3.8%	70.0%	**2.7%**	Reactive replacement only, where pipe has failed. Expect to replace 3.8% of non-critical pipes over 30 years
Extension	N/A	N/A	0.0%	0.0%	**0.0%**	New asset, no renewal
Renewal only	All	All	100.0%	0.0%	**100.0%**	Renewal only projects e.g. same size pipe, like for like replacement.

Level of service

In stormwater Level of Service improvements refers to:

- Risk reduction to habitable floor flooding, or
- A reduction in floodplain extent, or
- An improvement in public safety from impacts of stormwater; or
- Amenity additions to a project.
- Hydrology improvements and contaminant reduction that results from existing community. Impacts on hydrology and water quality resulting from growth are included in the growth component.

These level of service improvements often benefit both the existing community and new growth.

Growth

Growth created by the existing community is called inherent growth and results from modifications to existing homes and lots and not through subdivision or the creation of new dwellings. For stormwater this would be an increase in impervious surface area in the form of paved surfaces, sheds etc added to existing lots by homeowners. The impact of this form of growth is captured in the allocation of cost to Level of Service improvements and the existing community has both contributed to the need for and derive a benefit from the projects. Development Contributions are not charged for this form of growth.

The creation of new buildings and impervious surface area through the intensification and redevelopment of existing brownfield land is new growth and this is the form of growth that is captured and charged through a Development Contribution policy.

As dwellings can build up without changing the impervious surface area the anticipated total impervious surface area has been the focus in the development of stormwater methodology as this has the greatest impact on peak flow and size of the stormwater network.

Cost allocation methodology for pipe network projects

The methodology in Table 4 below sets out the approach that has been applied in the development contribution modelling and incorporates the methodology above.

Legislation provides guidance on how the growth component of a Development Contribution is calculated including the need to clearly identify causation and benefits. For causation the change in impervious surface area is used as a proxy for stormwater demand on the network. The historic ISA is 45% and the future ISA is 90%.

For benefit the change in population and dwellings was used. This is because there will be a significant increase in the households in the precinct and it was more appropriate to consider the number of households that would benefit rather than rely on impervious surface area. The modelled future households are 21,626 compared to the existing households of 8,447.

Table 4. Steps in calculating cost allocation

<table>
<tr><th colspan="2">Stormwater Cost Allocation for Pipe Network projects</th></tr>
<tr><td>Step 1: Determine the funding boundary.</td><td>Align to the relevant hydrological boundary. The Tāmaki North hydrological catchment aligns well to the precinct and this forms the basis of the funding boundary.</td></tr>
<tr><td>Step 2: Estimate growth in the Funding Area.</td><td>Estimate change in total impervious surface area in the hydrological catchment(s) from existing to full build out.

In Tāmaki existing impervious surface area s 45% and anticipated full build out is 90%.</td></tr>
<tr><td>Step 3: Determine the Renewal component.</td><td>Will the project be replacing an existing asset?

• If no, (e.g. new pipe network/extensions), then there will be no renewal component.

• If yes, then determine the renewal component from the table below:

<table>
<tr><th>Pipe criticality</th><th>Pipe condition</th><th>Renewal component</th></tr>
<tr><td>4 or 5</td><td>4 or 5</td><td>70.0 %</td></tr>
<tr><td>4 or 5</td><td>3</td><td>21.0 %</td></tr>
<tr><td>4 or 5</td><td>1 or 2</td><td>0.0 %</td></tr>
<tr><td>4 or 5</td><td>Not surveyed</td><td>11.7%</td></tr>
<tr><td>1, 2 or 3</td><td>All</td><td>2.7 %</td></tr>
</table></td></tr>
<tr><td>Step 4: Determine the residual amount to be allocated between the existing community and the growth community.</td><td>Residual amount = (Project cost – renewal)</td></tr>
<tr><td>Step 5: Determine the extent to which growth causes the need for the investment.</td><td>Would some or all of the project be delivered in the absence of growth?

• If yes, then growth share = $\frac{\text{Future ISA – Existing ISA}}{\text{Future ISA}}$ * Residual amount
$= \frac{90\% - 45\%}{90\%}$

• If no, then 100% to growth</td></tr>
<tr><td>Step 6:
Determine the proportion of the residual amount that provides benefits to the growth community</td><td>Does project provide an increased LOS for existing residents at end of growth period?

• If yes, then growth share = $\frac{\text{Future households – existing households}}{\text{Future households}}$
$= \frac{21{,}626 – 8{,}447}{21626}$

• If no, then 100% growth</td></tr>
<tr><td>Step 7: Calculate final growth community share.</td><td>Average the results of Step 5 and 6 and multiply by Step 4 to get the proportion of costs attributable to the growth community.</td></tr>
</table>

The formula in Table 4 above was applied to network extension projects and to pipe upgrade projects.

For extensions the projects would not be delivered in the absence of growth so it is 100% caused by growth. There would be some benefit to existing households as a result of the extensions and so the formula in Step 6 is applied which results in 61%. The average of the causation and benefit percentages is 80.5% which is the growth component charged.

For pipe upgrades, which are for the road hazard reduction, it is different. There are already some areas of known flood hazard on roads and so future growth cannot solely be the cause of the need for pipe upgrades. In this case the formula in Step 5 is used resulting in 50% causation and for Step 6 61%. The combined average of these steps is 55.5% growth component charged.

Table 5 below shows the final percentage that will be charged to growth for pipe network upgrades and extensions based on application of the methodology of Table 4.

Table 5. Cost allocation to growth

	Causation Allocation	Benefit Allocation	Allocation to Growth (Average of Causation & Benefit)
Upgrades	50% (Based on increase in new ISA)	61% (Based on increase in Households)	55.5%
Extensions	100% (Based on growth triggering need for network)	61% (Based on increase in Households)	80.5%

Cost allocation for catchment scale projects

The process for allocating costs for the non-pipe catchment scale projects is different. Generally, there is already an existing asset in place that is serving a function but may no longer be fit for purpose or unsuitable for an intensified environment. There may also be changed expectations on what that asset provides given its catchment scale and the intensified environment it will be serving in the future.

Another factor that alters the approach is that as these projects are catchment scale, they are often cornerstone projects and so it is often appropriate to do these projects ahead of significant development occurring in a catchment.

For these reasons the non-pipe catchment scale projects in Tāmaki have been recognised as needed for a number of years and therefore most of them are also in the 2024 Long-Term Plan. Projects in the Long-Term Plan have usually undergone a more in-depth scooping and design process so there is more detail available on the drivers of the project and design and therefore a more refined process of allocating costs between the renewals, level of service and growth is applied.

Allocations to each driver are based on the driver for the project, the existing asset and expert judgement from the relevant specialists. Allocations made for projects in the 2024 Long Term Plan have not been changed and have been reflected in the Development Contribution policy.

The splits for the non-pipe catchment projects are in Table 6 below:

Table 6. Cost allocation splits for catchment projects in the 2024 LTP

Project Name	Growth	Level of Service	Renewal	DC growth
Maybury Reserve	95%	5%	0%	95%
Johnson Reserve daylighting	60%	40%	0%	60%
Point England Reserve Wetland renewal	30%	10%	60%	30%
Pilkington Rd stormwater upgrade	60%	30%	10%	60%
Howard Hunter Tributary Erosion	50%	40%	10%	50%

Cost allocation for serviced and unserviced areas

Council considered three options for investment in Tāmaki pipe networks during the development of its 30-year infrastructure works programme as shown in the table below:

Table 7. Options considered for the piped network

Option	Infrastructure Delivered	Service Level Outcome	Total Cost
Option 1: Developers mitigate onsite (Status Quo)	No pipe upgrades/extension Developers use tanks or build pipelines themselves. Overland flow aims to be 'no worse' than existing, but cumulative impact can increase depths. Existing pipes have less than 10yr capacity	Service level worse than at present or in other brownfield areas. Dangerous depths on some roads, depth and extent will get worse over time. as climate changes High reliance on compliance More nuisance flooding.	$37m
Option 2: Upgrades prioritised for road safety	New or bigger pipes only where depth on roads is dangerous, servicing around 50% of the catchment. Developers upstream of new pipes use tanks, overland flow kept 'no worse' than existing	Service level superior to current level and major issues mitigated. Medium reliance on compliance	$477m
Option 3: All Primary Network Upgraded	Bigger pipes across the catchment	Service level equivalent to greenfield areas. Low reliance on compliance Higher funding commitment from Council 2034-2054 than under Option 1 and 2	$667m

Council has chosen option 2 for inclusion in our 30-year infrastructure works programme, as we consider this option achieves an appropriate balance between cost and safety improvements, benefiting the entire community through safer roads and better access during wet weather.

Under this option Council will upgrade and extend pipes in the areas at risk of dangerous flooding. Under this option, around half of the Tāmaki catchment will be serviced by an upgraded and extended stormwater network. Developments within 30m of a pipe will be required to connect to this network. Developments in the areas without access to the stormwater network will still be required to undertake on-site mitigation to attenuate their peak flows.

As part of the development of our Contributions Policy 2025, we have considered the equity of contribution charges between the areas that will be directly serviced by the upgraded pipe network, and the unserviced areas that will be required to provide onsite mitigation works, as set out in this section.

Effects of on-site mitigation works

Currently a pipe capacity assessment is done prior to development and if there is not enough capacity in the existing stormwater network then a developer must do on-site attenuation or build new piped networks themselves. Because of this there is a view that the stormwater impacts of intensification of an existing suburb can be entirely addressed through on-site developer mitigation, with no additional council infrastructure.

The Council does not agree with that view. On-site mitigation involves capturing stormwater at its source and either reusing it or releasing it slowly—either onto the road or directly into the pipe network. While this approach reduces peak stormwater flow, it still leads to an overall increase in the total volume of stormwater passing through the drainage system. This occurs because development replaces permeable surfaces (which previously allowed water to infiltrate the ground or be absorbed by plants through evapotranspiration) with impervious surfaces, directing all rainfall into the stormwater system.

The cumulative effect across the catchment of intensification, even with mitigation of peak flows, is that there is a larger total volume of water to shift through pipes (or streams) into the receiving environment. Intensification still has an impact on the pipe network and will contribute to road hazard if the pipe network is not upgraded and extended to receive this additional volume. (For this reason, option 1 was rejected, as it leads to worsening and more dangerous flooding over time.)

Benefit and causation between serviced and unserviced areas

The extent to which developers in the unserviced areas receive differing benefit from and cause the need for the council's upgraded pipe network compared to developments in the serviced area needs to be considered. The table below identifies the differences in benefit and causation between serviced and unserviced areas.

Table 8. Benefit and Causation between serviced and serviced areas

Differences in benefit and causation between serviced and unserviced area	
Benefit	Only developments in serviced areas receive the benefit of being able to discharge stormwater from their property into a council stormwater network. However, developments in both serviced and unserviced areas will receive the same level of benefit from safer access to roads due to the reduction of street flooding.
Causation	Development in both the serviced and unserviced areas create increased stormwater volumes that cause the need for the upgraded pipe network. Unserviced properties using on-site mitigation will contribute a smaller share of this volume than those connected to the pipe network
Costs	On average, onsite mitigation works will cost more than direct connections to the pipe network and will require on-going maintenance by the property owner.

Differential for Tāmaki local stormwater charge

The Tāmaki local stormwater charge funds investment in the Tāmaki pipe network as well as catchment wide projects such as stream daylighting to improve conveyance, improve water quality and manage flooding.

Developments in the serviced and unserviced area receive the same level of benefit from the catchment wide projects. Developments in the unserviced area of the catchment benefit from the investment in the pipe network and also contribute to the need for the upgrades, albeit to a less extent than properties in the serviced area. On this basis, council considers it reasonable that developments in the unserviced area contribute to the cost this network infrastructure through a DC charge. To reflect the lower level of benefit received by developments in unserviced as opposed to serviced areas, council considers it appropriate to apply the local change on a differential basis as follows: Developments in the unserviced area will pay a differential equivalent to 50 per cent of the share of the local stormwater charge attributable to the Tāmaki pipe network .

Developments in the serviced and unserviced area will both pay the same charge for the sub-regional urban stormwater charges they receive the same benefit from this investment.