

2.24 – Urban stormwater - section 32 evaluation for the Proposed Auckland Unitary Plan

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1 Overview and Purpose

1.1 Subject Matter of this Section

Stormwater systems, including both built networks (predominantly pipes) and natural elements (streams, overland flow paths, floodplains), are an essential part of urban environments to convey stormwater runoff from urban buildings and development to provide for the safe, healthy and efficient functioning of the community by reducing/avoiding harm to people and property during and after rainfall. However, stormwater runoff is a major contributor to adverse effects on freshwater and coastal water and sediment quality, and stream structure and health, in or adjacent to urban areas.

Given the nature and value of Auckland's freshwater and marine environments and urban development patterns, effective stormwater management that reduces adverse effects is essential in achieving sustainable community and environmental outcomes, the significant social and economic benefits associated with the regions streams and harbours and the Mana Whenua values and association with fresh and coastal waters as described in Section 2.5 of the Proposed Auckland Unitary Plan (the Unitary Plan). Current regional and district plan stormwater provisions have not been successful in reducing the on-going decline of the health, amenity and values of urban waterways, including streams and estuarine areas.

The Unitary Plan will replace the 12 existing district and regional plans (legacy plans), which contain significantly different provisions and requirements for managing stormwater. The Unitary Plan provides both the opportunity and the need to review current land use and discharge provisions in the legacy plans and develop one consistent approach to stormwater management that integrates regional and district requirements. It also enables further development and refinement of the current approaches to stormwater management throughout the region to reflect best practice, address existing gaps and take account of the increasing knowledge base regarding stormwater management and adverse effects.

The focus of this evaluation is on the stormwater management approaches that represent a significant change from that of the legacy plans.

The main changes for stormwater management relate to:

1. A greater emphasis on on-site management of stormwater quality and quantity for both new development and redevelopment.
2. New regime for managing stormwater quality including new performance requirements and their application to high contaminant generating activities
3. Management of stormwater volume and flow to protect higher value sensitive urban streams, including a low threshold at which controls apply.

The stormwater provisions also promote:

4. A greater emphasis on water-sensitive design and green growth for greenfield development and, where possible, redevelopment to achieve more sustainable stormwater management
5. Enhanced integration land and freshwater management with increased coordination for redevelopment.

These latter two are significant elements of achieving the relevant stormwater objectives in the Unitary Plan. However, they are not assessed in this report as they are not a major change but instead primarily strengthen the existing plan approaches to greenfields development and extend them into intensification and redevelopment to reflect the expected containment of growth within the Rural Urban Boundary.

A technical report has been prepared that collates relevant technical and scientific information and provides guidance on the basis for, and derivation of, the performance requirements in the Unitary Plan. This report is titled: “*Auckland Unitary Plan Stormwater Management Provisions: Technical Basis of Contaminant and Volume Management Requirements*” (Auckland Council, 2013) and included as 3.24.1.

1.2 Resource management issues to be addressed

Issue 1: Degraded freshwater and coastal water and sediment quality

Stormwater runoff from current and future land use and development has, and will continue to have, a major impact on freshwater and sediment quality and on the health of Auckland’s freshwater resources and coastal ecosystems (Auckland Council, 2013). Urban development introduces contaminants that may become entrained in stormwater runoff and transported to streams, the coastal environment or ground water aquifers. Past land development practices, including the modification of natural hydrological systems and the creation of large areas of impervious surface, have exacerbated these effects.

The adverse effects from stormwater contaminants vary significantly and depend on the type, nature and concentration of the contaminants and the type, sensitivity and value of the receiving environment. In general, contaminants in urban areas occur in stormwater at levels that adversely affect aquatic habitat and life and accumulate in stream and estuarine environments at levels that impact on healthy ecosystems and community and Mana Whenua values.

State of the environment monitoring and scientific studies (Auckland Council, 2013) on the quality of streams and estuaries in Auckland that receive urban runoff show that:

- Stream water quality indicates that common stormwater contaminants are elevated when compared to guideline levels.
- Stream sediment contaminants (particularly zinc and lead) are elevated when compared to guideline values.
- Streams are adversely affected by increased stormwater flows, including loss of land and damage to private property, increased erosion leading to discharges of sediment and loss of stream habitat and in-stream structure, and poor aquatic ecosystem diversity and health.
- Estuarine sediment contaminant levels are generally above threshold effect levels (levels at which adverse effects may start to occur) and in some instances are near or above probable effects levels (levels at which effects are likely to occur) resulting in degraded ecosystem diversity and health.
- Contaminant levels continue to increase in receiving environments, such as the Hauraki Gulf.

Contaminants typically found in urban stormwater include sediment, metals, organic compounds, nutrients, and pesticides and microorganisms. The contaminants of most concern in Auckland are sediment, zinc, copper, and pathogens (Auckland Council, 2013).

Sediment is primarily derived from the erosion of land and streams. Exposed soil and clay, typically associated with earthworks, produce the greatest yield of sediment. Where sediment loads are significant, sediment discharges can result in severe adverse effects on stream and estuarine environments (Auckland Council, 2013). As such, sediment has historically been identified as a key contaminant of concern and has been a major focus of regulatory efforts for earthworks and stormwater generally.

Metals are present in urban stormwater in both particulate and dissolved forms with the primary metals of concern being zinc (from roofing and tyres), copper (from brake pads, roofing and horticultural products) and lead (from old petrol and paint and roofing products). Metals currently occur in urban stormwater at levels that are above recognised water standards (Auckland Council, 2013). These metals are then deposited in streams and urban estuarine environments, where concentrations can increase over time to the point where adverse effects on aquatic life and ecological values will (and currently do) occur.

The coastal marine area is the ultimate receiving environment for most stormwater discharges and some areas of the coastal environment are particularly susceptible to the adverse effects of stormwater contaminants. For example, contaminants such as metals tend to accumulate in low energy estuarine environments. This is also often exacerbated by the presence of industrial and commercial areas in adjacent catchments, which contribute higher levels of stormwater-borne contaminants than residential areas. Estuaries are a highly productive element of marine ecosystems and elevated contaminant levels affect the health and species diversity of these systems, with flow on-effects to the wider marine ecosystem.

While the causes of freshwater and coastal environment quality degradation are well established, the most cost-effective and sustainable solution to reduce adverse effects is less clear. Significant research has been undertaken on the ability and cost of removing contaminants from stormwater. These studies show that:

- The traditional approach to stormwater quality treatment, involving the use of catchment or development scale ponds or wetlands, is expensive and relatively inefficient and in some instances can accelerate the rate at which contaminant levels increase in the environment. This supports an approach of primarily targeting high contaminant yielding areas rather than applying widespread treatment to remove contaminants (ACC/Metrowater, 2010¹).
- The opportunities for large-scale stormwater devices to be retrospectively located within existing urban areas are limited and often prohibitively expensive. This limits their ability to address existing adverse effects from stormwater contaminants.
- Large decreases in contaminant loads are required to bring about tangible change in receiving environment quality indicating that improvements in water quality will take time and involve significant costs (ACC/Metrowater, 2010).
- The cost of significantly reducing existing contaminant loads through sub-catchment scale measures is very large— estimates vary from \$1.8 to \$4 billion for catchment-based treatment in priority areas (those areas draining to estuarine environments) depending on the method and extent of contaminant removal (Hill Young Cooper et al, 2007²).
- Prevention/reduction at source is a more efficient way of consistently achieving significant load reductions across the region, such as has been achieved by removal of lead from petrol.

Overall, current evidence and research indicates that improvements in freshwater and coastal environment quality from improved stormwater management will take some time. Improvements are reliant on the ability to address contaminants from existing land use activities, with an emphasis on reductions at source and sub-catchment based approaches, where appropriate, to focus on sensitive or affected receiving environments. While some

¹ Auckland City Council and Metrowater: Auckland Waterways: Network Consents Management Plan, May 2010

² Hill Young Cooper, Cranleigh Merchant Bankers and Pattle Delamore Partners Limited: Funding Futures: Three Waters - Auckland Region, June 2007.

load reductions are occurring as a result of market changes in product use (e.g. the phasing out of galvanised iron roofing) others will require a regulatory response if reductions are to be achieved.

Total Suspended Solids (TSS) is the focus of stormwater quality management performance in operative regional plan provisions, with performance usually measured in terms of the annual percentage of TSS removed. However, TSS is rarely the primary management issue in urban stormwater and hence is not a good measure of the effectiveness of a device in terms of achieving improved environmental outcomes. Some devices are effective at removing TSS, but poor at removing dissolved metals and other anthropogenic contaminants of concern. In addition, measuring performance in terms of contaminant removal does not guarantee the water quality outcome. For example, removing 75 % of TSS from stormwater where there is high TSS may not give better effluent water quality than removing a lower percentage from flows with lower influent TSS.

To be effective, stormwater treatment devices need to be selected and designed to target the key contaminants in the stormwater flows having regard to the receiving environments they are trying to protect.

The National Policy Statement for Freshwater Management 2011 (NPS FM) directs Councils to improve the management of freshwater. It seeks to maintain or improve the overall quality of freshwater within a region, including improving water bodies that have been degraded, and to safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants.

Issue 2: Stormwater runoff effects on streams

Past urban development practice has usually included re-contouring and compacting land for new development to provide smoother, flatter land. This has directly resulted in loss of streams, overland flow paths and natural flood plains. The loss of these natural features, together with the introduction of extensive areas of impervious surface, has significant implications including increased runoff volumes and flow rates during rainfall events and reduced infiltration (Auckland Council, 2013).

Significant changes in runoff occur across the full range of storm events from relatively frequent small events through to larger storm events and it is the cumulative impact of small, frequent events that generally has the greatest impact (Auckland Council, 2013)).

Increased runoff can lead to the following effects:

- Accelerated erosion of stream channels and banks leading to failure, increased sediment discharges and loss of usable property.
- Increases in stream flow velocities and changes in stream channel and bed shape to a more homogenous form, having a negative impact on habitat for aquatic organisms.
- Significant structural modification of streams including culverts, constructed channels, bank reinforcement and other structures.
- Loss of in-stream habitat.

Loss of infiltration results in a reduction of recharge to stream systems and underlying groundwater systems. A significant consequence of this is a reduction in stream flows during summer months (stream base flow), which can significantly affect the ability of a stream to support healthy ecosystems.

These effects on stream morphology and ecosystem health cumulatively contribute to a reduction in amenity, community and Mana Whenua values of rivers and streams.

Research has shown that stream quality and health is generally correlated to the level of impervious surface within a stream's catchment. Stream health generally declines as impervious surfaces are introduced within catchments to the point where streams typically have poor natural values at a catchment impervious coverage of approximately 50-60 per cent.

Centre for Watershed Protection (in Auckland Council, 2013), defined the following in respect of stream health and its correlation to impervious area:

- Sensitive – generally able to retain their hydrological function and support good to excellent aquatic diversity (up to 10 per cent impervious).
- Impacted – show clear signs of declining stream health. Most stream health indicators fall in the fair range, although some reaches with extensive riparian cover may score higher (10-25 per cent).
- Non-supporting – no longer support their designated uses in terms of hydrology, channel stability, habitat, water quality, or biological diversity. Streams become so degraded that it may be difficult or impossible to fully recover predevelopment stream function and diversity (25 to 60 per cent)
- Urban drainage – often so extensively modified that they merely function as a conduit for flood waters. Consistently have poor water quality, highly unstable channels, and very poor habitat and biodiversity scores (>60 per cent).

This and other studies indicate that to retain good stream structure and health in urbanising and urban areas, catchment impervious surfaces need to be maintained at low levels – less than 10 per cent impervious for high-quality health and stream structure and less than 20-25 per cent for streams to sustain moderate in-stream ecosystem health.

Such low levels of impervious coverage are unrealistic in high density urban development, where impervious areas within some parts of the catchment could be as high as 100 per cent in commercial areas. This could also apply in medium density development where impervious surfaces typically comprise 40-50 per cent of the catchment area. However, the hydraulic effect of impervious surfaces on stream health can be reduced through the use of proven stormwater management techniques that manage stormwater hydrology to reduce runoff volumes and manage peak flows.

The important factor when considering receiving environment responses to stormwater runoff, therefore, is not necessarily the amount of impervious area in a catchment, but rather its hydrological and hydraulic performance. By applying controls on runoff, large areas of impervious surface can produce a hydrological response (runoff) equivalent to that from a much lower impervious area, particularly for more frequent storm events (up to two-year average recurrence interval [ARI] storms).

While many streams in developed urban areas are highly modified as a result of past development, streams with low to moderate levels of catchment imperviousness, or largely natural stream channels, have significant potential for protection and restoration. Managing stormwater runoff within the contributing catchment is one of the most critical factors in retaining (and enhancing) stable, healthy urban streams. This does not mean aspiring to maintain pristine streams in urban areas, but to achieve a state where streams retain multiple values including community, Mana Whenua, amenity and reasonable ecosystem health.

Connectivity is also a key consideration. Freshwater not only maintains life in catchments, but feeds marine life in river mouths and estuaries and streams provide access for fish spawning and a link between land and the coast. Freshwater systems, including headwater streams, floodplains, riparian margins and underlying groundwater systems should be managed holistically to achieve multiple benefits including improving environmental, social, and economic outcomes and reduce net carbon emissions.

Achieving these benefits cannot be achieved on a case-by-case basis because of the cumulative impacts of new and existing development and will therefore require a new more comprehensive approach through the Unitary Plan. While change will inevitably be slow, intensification of existing development can be used as an opportunity to achieve some improvements in stream quality and values through management of flows from existing (and future) development. Other beneficial outcomes from improved stormwater management include improved amenity, open space and stormwater conveyance and an improvement in stormwater quality, as most stormwater management devices deliver multiple benefits.

Issue 3: Integrating land use and stormwater management in new and redevelopment

Integrated land use and stormwater management is critical to achieving multiple community and environmental outcomes including a green, more sustainable Auckland as envisaged by the Auckland Plan. Improved integrated management of fresh water and land use and development in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment is also sought by the NPS FM.

Past land use development practices have led to significant loss and degradation of Auckland streams and coastal waters (Auckland Council, 2013). Many of Auckland streams, particularly in older urban areas, have been lost by piping or modified by engineering structures such as outfalls and concrete channels to protect against erosion and convey stormwater more efficiently. In addition, large scale earthworks, modification of riparian areas and flood plains has resulted in loss and degradation of natural hydrological systems and their contribution to ecological, community and Mana Whenua values.

The ability to manage stormwater effects becomes more limited once land has been developed in a way that does not incorporate effective stormwater management. Remedying the existing effects of development that did not adequately provide for stormwater management is significantly more expensive and less effective than preventing these effects through land use planning and design that is integrated as far as possible with retention and enhancement of freshwater systems.

It has been estimated that in the Auckland urban area up to \$6.1 billion dollars is required to significantly reduce existing adverse stormwater effects (Hill Young Cooper et al 2007), although this figure is a broad estimate based on assumptions of possible performance outcomes. It is now well recognised that taking a preventive approach to managing the adverse effects of stormwater from development requires stormwater management to be considered early in the development and planning process, rather than being an output of this process (Auckland Council 2013).

The importance of integrated management is recognised in the existing regional planning documents and approaches. However, implementation of this has been variable and often unsuccessful, reflecting the different priorities and approaches taken by the former councils and limited integration between the regional plans (which generally manage discharges) and district plans (which manage the land development and use activities that give rise to the discharges). This disconnect has historically led to an emphasis on “end of pipe” stormwater management, at a development or catchment scale, rather than integrated land use and water management.

While there have been improvements in how stormwater management is considered and planned for in new urban areas, there is a significant gap in the ability to address the effects of existing development. An integrated approach to address both the new effects from greenfield development and the existing effects of development at the time of redevelopment/ intensification is important given that a high portion of Auckland's growth is anticipated to occur via the intensification of existing urban areas.

Issue 4: Achieving green growth and sustainable urban development

As identified in section 1.4 below, the Auckland Plan places significant emphasis on green growth and sustainable urban development. The aim of this approach is to meet the challenges of providing for significant growth, while at the same time providing communities with safe, healthy and high quality environments to live in (i.e. a liveable city).

As the region intensifies, open space areas, urban streams and the coastal environment will come under more pressure from the effects of development while at the same time becoming even more scarce and valuable community resources. Healthy freshwater and coastal systems are a key aspect and opportunity of sustainable urban development, providing for a range of direct and indirect community, environmental and economic values. While it is difficult to estimate the true value of these resources, the value of Auckland's harbours were attributed an annual benefit in the order of \$ 400 million (ARC 1992³).

Current best practice stormwater management also demonstrates that retaining and using natural systems is a more effective, resilient and cost-effective approach to stormwater management than past approaches which have focused on the provision of built infrastructure (Auckland Council, 2013). Large areas of impervious surfaces combined with engineered stormwater networks rarely provide sustainable stormwater management solutions. These systems are designed to take stormwater runoff away from development as quickly as possible. However, in doing so they increase and concentrate stormwater runoff and eliminate natural processes that help manage the water cycle and aquatic ecosystems – essentially, *'the more you pipe, the more you need to pipe'*. Significant areas of impervious areas and engineered stormwater networks also reduce natural water infiltration into the soil, which in turn reduces stream base flows which provide essential life-supporting water flow during drier months.

The adverse effects of stormwater runoff can be mitigated to an extent but a "built infrastructure" approach generally leads to an on-going cycle of expensive engineering solution that can in turn lead to more modification and impacts on freshwater systems. As identified above, creating adverse effects during development, and then managing them retrospectively is significantly more expensive and less effective than preventing them through land use planning and design that is integrated as far as possible with retaining and enhancing freshwater systems.

An approach to development, focusing on green growth principles and water-sensitive design, is therefore required to avoid the costs associated with past development and stormwater management practices and to achieve quality urban environments with high amenity and natural values. For new growth in greenfield areas, current best practice is to align structure and catchment planning and implement water sensitive design. However, there is a large gap in respect of processes to integrate land use and water management for redevelopment.

While more sustainable development may occur via market preferences, successful and equitable implementation will require a regulatory response through the Unitary Plan. This

³ Auckland Regional Council (ARC) 1992: Auckland Regional Stormwater Project: An Economic View. Auckland Regional Council Technical Publication No 3, April 1992.

will also help achieve a consistent approach across the region and more effective implementation.

It is also important to note that water-sensitive design and the enabling of growth and affordable housing are not mutually exclusive. Many studies have shown that the costs to implement water-sensitive design approaches is similar or lower than traditional approaches; and the long-term financial implications of addressing issues that could have been avoided in the first place can also be reduced (Auckland Council, 2013).

1.3 Significance of this Subject

Managing the adverse effects of land use and stormwater on freshwater and coastal waters is a significant issue for the Auckland region as urban runoff is a major factor in the quality and health of these receiving environments. Managing adverse effects requires an approach to future growth that achieves the multiple environmental, social and economic outcomes sought for Auckland to maintain and, where possible, improve the overall quality of the freshwater and coastal environment consistent with national requirements and community expectations. Importantly, this requires an emphasis on both avoiding, as far as possible, the adverse effects of new development and taking opportunities to progressively reduce existing adverse effects in addition to more traditional mitigation measures.

A comprehensive water sensitive design approach to stormwater management is sought through the Unitary Plan that prevents or minimises the adverse effects of stormwater runoff on communities and the natural environment and restores environments and values where they have been degraded below community expectations or the level necessary to sustain ecosystem health. The elements of this approach include:

| Management Approach | | Implementation |
|------------------------|---|---|
| Water sensitive design | Avoid developing sensitive areas | Location of new growth areas |
| | Avoid/minimise generation of stormwater effects | Design/layout of development, incorporation of natural elements |
| | Targeted minimisation of adverse effects | At source/on-site flow and quality management devices |
| | Broad scale minimisation of adverse effects | Communal/sub catchment scale mitigation |
| Mitigation | Direct mitigation of adverse effects | Local mitigation of receiving environments |
| | In-direct/off set mitigation of adverse effects | Wider mitigation/enhancement of receiving environments |

Implementation of this management approach is hierarchical. That is, primary emphasis (particularly in greenfield development) is on reducing the generation of adverse effects, followed by minimising them on-site and then minimising at a sub-catchment scale prior to consideration of receiving environment mitigation. It is recognised that depending on individual circumstances, this may not always be possible and in this case a combination of techniques will be required.

This approach requires a policy shift for stormwater management through the Unitary Plan with a focus on:

- Aligning and integrating stormwater management planning and land and infrastructure development, both for new and redevelopment;
- Ensuring greenfield development delivers water-sensitive design and quality stormwater infrastructure and minimises the creation of new, or exacerbation of existing adverse effects on communities and the natural environment;
- Using intensification and managing redevelopment as an opportunity to incrementally reduce existing adverse effects through on-site control of stormwater contaminants and flows, land use planning, sustainable development, restoration of natural systems, and appropriate infrastructure capital works solutions;
- Focusing on existing stormwater management issues such as network capacity, aging infrastructure, flooding, stormwater quality and stream, ecological and natural values in areas identified as priorities for intensification.

1.4 Auckland Plan

The Auckland Plan's vision of "*The World's Most Liveable City*" includes the outcome of a "*Green Auckland*" and a range of priorities and directives relating to growth, development, social, economic, environmental and cultural outcomes for Auckland.

The significant challenge for Auckland in terms of stormwater and freshwater management is providing for significant, affordable growth, development and infrastructure while also managing adverse effects, including:

- Maintaining healthy natural environments that meet:
 - the needs of freshwater and marine ecosystems;
 - objectives established by legislation and national policy;
 - multiple community and environmental objectives;
- Enhancing environments where they have been degraded below expectations and objectives

The Auckland Plan recognises that the region must develop sustainably and that a transformational shift is required to "*strongly commit to environmental action and green growth*". In accordance with this transformational change, the Auckland Plan establishes a strategic direction of "*Acknowledging that nature and people are inseparable*".

It gives effect to this link between people and our environment by including priorities to:

- *Value our natural heritage;*
- *Sustainably manage our natural resources;*
- *Treasure our coastline and marine areas; and*
- *Build resilience to natural hazards.*

A series of directives and design principles provide further guidance as follows:

Directive 7.5: Protect ecological areas, ecosystems and areas of significant indigenous biodiversity from inappropriate use and development, and ensure ecosystems and indigenous biodiversity on public and private land are protected and restored.

Directive 7.8: Establish freshwater values and aspirations with communities and make freshwater an identifying feature of Auckland.

Directive 7.9: Set limits for minimum water quality and for maximum water take, to support iwi, community, and water users' aspirations.

Directive 7.10: Manage land to support values of waterbodies by protecting where they are high and reviving where they are degraded

Directive 7.12: Protect coastal areas, particularly those with high values – including special natural character, significant marine habitats and recreational importance – from the impacts of use and development, and enhance degraded areas.

Directive 8.2: Protect, enhance and increase Auckland's green infrastructure networks.

Directive 12.1: Identify, protect and provide existing and future network utility infrastructure to ensure efficient provision of secure and resilient water supply, wastewater, stormwater, energy and telecommunication services that will meet the needs of Auckland over time.

Directive 12.2: Integrate planning of network utility infrastructure to provide for population growth.

Directive 12.4: Ensure sustainable design and use of water resources

Environmental Design Principles: Rainwater harvesting, natural stormwater management systems

The Auckland Plan recognises that preserving marine and fresh water quality is fundamental to Auckland's future as these features have significant community, natural and cultural values. It also recognises how past development in the region has put pressure on water resources, which has resulted in major hydrological changes and progressively lowered water quality and ecological function within catchments and coastal receiving environments. However, there is now better understanding the effects of land use development and stormwater runoff and how to manage and reduce them. While discharges from land cannot be avoided, they may be minimised and managed to improve water quality and the values of urban streams and degraded coastal areas.

On Page 188, the Auckland Plan recognises that *“as Auckland continues to grow, managing our freshwater resources and maintaining the health of aquatic ecosystems will become even more critical. This challenge affects households, businesses, and the urban and rural environments, and has implications for our remaining natural areas.....Continued degradation of the marine habitat will lead to a decline in fish numbers. While we cannot avoid discharges from the land, we can improve water quality and the coastal values of degraded areas. It is important to consider the effects of our land-based activities on the coast.”*

The significant challenge of dealing with existing stormwater management issues such as flooding and the effects of contaminants carried in stormwater are also recognised. On Page 299, the Auckland Plan states that *“increasing contaminant levels in several coastal receiving environments need to be stopped by infrastructure investment and careful management of development”* and recognises that *“it is important to apply Water Sensitive Design approaches to new development areas, to avoid the creation of new flooding and environmental problems which are costly to fix retrospectively.”*

A range of actions is identified to help achieve this vision for Auckland. Key stormwater related actions include:

- Improve the management of discrete and diffuse sources of land and water pollution.

- Develop a statutory land-use framework, through the Unitary Plan, to constrain development in catchments with outstanding receiving environments.
- Apply low-impact and water-sensitive design principles to new development and redevelopment.
- Facilitate and invest in riparian planting to trap sediment and nutrients: enhance riparian areas and catchment headwaters.
- Provide for integrated management within whole catchments, to ensure freshwater and coastal outcomes are met by coordinating and sequencing of growth, land use, development and provision of infrastructure.
- Ensure that the Unitary Plan and other strategic documents contain criteria to assess the impact of significant growth proposals and plan changes on the operation of existing infrastructure networks and future infrastructure works.
- Recognition of the effects of growth on existing infrastructure networks and investment.
- Recognition of the limitations on infrastructure capacities, and making best use of these when determining growth locations.

1.5 National Guidance and Direction

Auckland Council is required to give effect to any National Policy Statement (NPS) through its RMA plans. Of particular relevance to stormwater management are:

- National Policy Statement for Freshwater Management, 2011 (NPSFM)
- New Zealand Coastal Policy Statement, 2010 (NZCPS)
- Hauraki Gulf Marine Park Act 2000 (HGMPA) - Sections 7 and 8 have the status of a NPS.

National Policy Statement for Freshwater Management

The NPSFM seeks to maintain or improve the overall quality of freshwater resources and maintain the life supporting capacity of freshwater resources. The primary mechanism of achieving this is by requiring regional councils to set objectives for freshwater bodies that reflect national and local aspirations and to set water quality and quantity limits to ensure those objectives are achieved.

Where freshwater bodies do not meet those limits, councils are required to adopt targets and methods to achieve the limits over time. Councils are also required under the NPSFM to manage efficiently within those limits, avoid over allocation and address existing over-allocation. Importantly, the NPSFM also requires the integrated management of land use, development and fresh water; and involvement of iwi and hapu in decision making.

The provisions in the NPSFM of particular relevance to stormwater management are:

Objective A1

To safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water, in sustainably managing the use and development of land, and of discharges of contaminants.

Objective A2

The overall quality of fresh water within a region is maintained or improved while:

- a) *protecting the quality of outstanding freshwater bodies;*
- b) *protecting the significant values of wetlands and*

- c) *improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*

Policy A1

By every regional council making or changing regional plans to the extent needed to ensure the plans:

- *establish freshwater objectives and set freshwater quality limits for all bodies of fresh water in their regions to give effect to the objectives in this national policy statement, having regard to at least the following:*
 - i) *the reasonably foreseeable impacts of climate change*
 - ii) *the connection between water bodies;*
- b) *establish methods (including rules) to avoid over-allocation.*

Objective C1

To improve integrated management of fresh water and the use and development of land in whole catchments, including the interactions between fresh water, land, associated ecosystems and the coastal environment.

Policy C1

By every regional council managing fresh water and land use and development in catchments in an integrated and sustainable way, so as to avoid, remedy or mitigate adverse effects, including cumulative effects.

Policy C2

By every regional council making or changing regional policy statements to the extent needed to provide for the integrated management of the effects of the use and development of land on fresh water, including encouraging the co-ordination and sequencing of regional and/or urban growth, land use and development and the provision of infrastructure.

New Zealand Coastal Policy Statement 2010

The New Zealand Coastal Policy Statement 2010 (NZCPS) also provides Auckland Council with direction for managing the effects of land use and discharges on the coastal environment. This includes a number of specific objectives and policies relevant to the management of freshwater resources, including:

Objective 1

To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by: ...maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.

To achieve this and other objectives, the NZCPS establishes a range of policies of which the most relevant are:

Policy 21 Enhancement of water quality

Where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems, natural habitats, or water based recreational activities, or is restricting existing uses, such as aquaculture, shellfish gathering, and cultural activities, give priority to improving that quality by:

- (a) *identifying such areas of coastal water and water bodies and including them in plans;*
- (b) *including provisions in plans to address improving water quality in the areas identified above;*

- (c) *where practicable, restoring water quality to at least a state that can support such activities and ecosystems and natural habitats; ...*
- (d) *....*

Policy 22 Sedimentation

- (1) *Assess and monitor sedimentation levels and impacts on the coastal environment.*
- (2) *Require that subdivision, use, or development will not result in a significant increase in sedimentation in the coastal marine area, or other coastal water.*
- (4) *Reduce sediment loadings in runoff and in stormwater systems through controls on land use activities.*

Policy 23 Discharge of contaminants

- (1) *In managing discharges to water in the coastal environment, have particular regard to:*
 - (a) *the sensitivity of the receiving environment;*
 - (b) *the nature of the contaminants to be discharged, the particular concentration of contaminants needed to achieve the required water quality in the receiving environment, and the risks if that concentration of contaminants is exceeded; and*
 - (c) *the capacity of the receiving environment to assimilate the contaminants; and:*
 - (d) *avoid significant adverse effects on ecosystems and habitats after reasonable mixing;*
 - (e) *use the smallest mixing zone necessary to achieve the required water quality in the receiving environment; and*
 - (f) *minimise adverse effects on the life-supporting capacity of water within a mixing zone.*
- (2) *.....*
- (3) *.....*
- (4) *In managing discharges of stormwater take steps to avoid adverse effects of stormwater discharge to water in the coastal environment, on a catchment by catchment basis, by:*
 - (a) *avoiding where practicable and otherwise remedying cross contamination of sewage and stormwater systems;*
 - (b) *reducing contaminant and sediment loadings in stormwater at source, through contaminant treatment and by controls on land use activities;*
 - (c) *promoting integrated management of catchments and stormwater networks; and*
 - (d) *promoting design options that reduce flows to stormwater reticulation systems at source.*
- (5) *.....*

In summary, the NZCPS seeks to maintain or improve coastal water quality where it is having significant adverse effects on ecosystems and habitats or on existing uses. The NZCPS specifically identifies a range of mechanisms to manage discharges into freshwater and sedimentation, including reducing contaminant loads and stormwater flows at source through design and controls on land use activities. It also requires particular regard to be had to the sensitivity of the receiving environment and nature of the contaminant when managing discharges. In addition, the NZCPS requires councils to provide for the integrated management of natural and physical resources and the management of land use activities.

Hauraki Gulf Marine Park Act 2000

A large number of Auckland's urban areas drain to the Hauraki Gulf Marine Park and hence are subject to the provisions of the Hauraki Gulf Marine Park Act 2000 (HGMPA). The purpose of the HGMPA is to establish objectives and integrate the management of the

resources of the Hauraki Gulf and its contributing catchments. Sections 7 and 8 of the HGMPA have the status of a national policy statement.

7 Recognition of national significance of Hauraki Gulf

- (1) The interrelationship between the Hauraki Gulf, its islands, and catchments and the ability of that interrelationship to sustain the life-supporting capacity of the environment of the Hauraki Gulf and its islands are matters of national significance.*
- (2) The life-supporting capacity of the environment of the Gulf and its islands includes the capacity—*
 - (a) to provide for—*
 - (i) the historic, traditional, cultural, and spiritual relationship of the tangata whenua of the Gulf with the Gulf and its islands; and*
 - (ii) the social, economic, recreational, and cultural well-being of people and communities:*
 - (b) to use the resources of the Gulf by the people and communities of the Gulf and New Zealand for economic activities and recreation:*
 - (c) to maintain the soil, air, water, and ecosystems of the Gulf.*

8 Management of Hauraki Gulf

To recognise the national significance of the Hauraki Gulf, its islands, and catchments, the objectives of the management of the Hauraki Gulf, its islands, and catchments are—

- (a) the protection and, where appropriate, the enhancement of the life-supporting capacity of the environment of the Hauraki Gulf, its islands, and catchments:*
- (b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:*
- (c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:*
- (d) the protection of the cultural and historic associations of people and communities in and around the Hauraki Gulf with its natural, historic, and physical resources:*
- (e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:*
- (f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.*

In general, the state of the Hauraki Gulf is recognised as still deteriorating despite this legislative framework and the current generation of regional and district plans being in place for over 10 years.

1.6 Current Objectives, Policies, Rules and Methods

Stormwater management in Auckland is primarily directed by the Auckland Regional Policy Statement (ARPS), the proposed Auckland Regional Plan: Air, Land and Water (ALW Plan) and the Auckland Regional Plan: Coastal (Coastal Plan).

These regional planning instruments focus on managing the adverse effects of stormwater discharges through network discharge consents (held by the former councils) or private discharge consents, which require a Best Practicable Option (BPO) approach to prevent or minimise the adverse effects of stormwater diversions and discharges. In some cases, stormwater management is also achieved through land use provisions within legacy district plans although this is the exception rather than the norm.

This fragmented approach, which has limited integration between land use and the effects of stormwater runoff and a focus on “end of pipe” management, has failed to adequately address the adverse effects of stormwater runoff leading to ongoing degradation of freshwater systems and coastal waters.

Auckland Regional Policy Statement

The ARPS sets out the broad resource management issues, objectives and policies to achieve the integrated management of natural and physical resources within the region. It sets the overall strategic direction for the region, while the ALW Plan and Coastal Plan incorporate more specific policy provisions and methods for stormwater discharge consents.

Chapter 8 of the ARPS establishes an overall objective of maintaining water quality in water bodies (including rivers and streams) and coastal waters which have good water quality, and enhancing water quality where it is degraded. The policy framework establishes a preference for avoiding adverse effects on water quality from the discharge of contaminants in the first instance and, where avoidance is not practicable, remedying or mitigating adverse effects.

Specific policies are included in the ARPS in relation to stormwater discharges. These encourage territorial authorities to adopt a catchment-wide management approach and to use the BPO for stormwater quality control.

ALW and Coastal Regional Plans: Stormwater Discharge Consents

The primary provisions to manage the adverse effects of stormwater runoff are provided through the ALW and Coastal Plans. These plans generally seek to control both private and network (council) stormwater discharges through resource consents pursuant to s. 15 of the RMA. Both require the adoption of the BPO for managing stormwater contaminant discharges. Essentially the BPO, as defined by the RMA, is the best method(s) of preventing or minimising discharges of contaminants having regard to cost, practicality and the sensitivity of the receiving environments. The ALW Plan has extended the list of BPO considerations to include several other matters and the implementation of BPO is generally extended to include other (non-contaminant) aspects of stormwater discharges (e.g. flow effects).

Integrated catchment management plans (ICMPs) and stormwater network discharge consents (NDCs) are the primary tools for developing the BPO for stormwater catchments and networks. NDCs, once obtained, require legacy councils to undertake a range of actions to give effect to the BPO, including investment in stormwater infrastructure and managing new development. Often this requires the use of district plan provisions to enable stormwater controls to be implemented to manage stormwater discharges from private sites.

The NDCs issued to the legacy councils are subject to a range of conditions that vary in performance expectations and standards and management requirements across the region, and even across catchments of common receiving environments. Under the ALW Plan, network discharge consents have at times been applied as quasi-land use control rules as a means of regional council influence over land use management for water quality purposes. While this may have been considered necessary under the region's previous governance model, it is an inefficient means of managing stormwater and integrating land use and water management, often resulting in the inability to give effect to these conditions. This has also often resulted in sub-optimal solutions with high operation and maintenance costs.

Private stormwater discharge consents have typically been required when new impervious area (over 1000m²) is developed:

1. Where sites do not discharge to the public network, but instead discharge directly to the environment (subject to thresholds).
2. Where sites discharge to a public network, but the authorisation for the public network does not specifically include the new impervious area.

The latter has led to a situation where multiple resource consents are held for both the private and public discharges, which creates confusion, inconsistencies and additional costs to meet these requirements.

Additionally, consenting practice has been to apply a standard 75 per cent Total Suspended Sediment (TSS) removal requirement for all private discharges as the BPO, regardless of site or receiving environment characteristics and the type of land use (high contaminant load or low contaminant load).

More recently, flow management requirement (flow control and extended detention) have been applied to greenfield developments to protect stream environments but these provisions are rare and at best only apply to recently developed/consented areas. These requirements are also not applied to other development within the area serviced by a public stormwater network, leading to inconsistent application of requirements across developments depending on the presence, age and status of existing consents.

ALW Plan: Urban rivers and streams

The ALW Plan establishes a stream management framework for urban streams. Streams within urban areas fall into the Urban River and Stream Management Area category which is then broken down into six sub-categories or reach types based primarily on the proportion of impervious area within the catchment.

High value/low disturbance streams (Type 2) were identified as having less than 10 per cent impervious area in the contributing catchment. Moderately disturbed natural channels (Type 3) are identified as having between 10-25 per cent impervious area within the contributing catchment. Above 25 per cent, urban streams are described as highly disturbed (natural or artificial).

In describing these stream types, the ALW Plan indicates the following:

- Type 2 – High value low disturbance urban rivers and streams. These reaches are relatively unaffected by urban development, characterised by a low amount of impervious area (< 10 per cent) in the catchment. Water quality and habitat value would be expected to be high. However, habitat may be affected by past land management and use. This quality of habitat is rare in urban areas and is valued for ecological function and amenity value.
- Type 3 – Moderately disturbed urban rivers and streams. These reaches occur in catchments with moderate amounts of impervious area (10 – 25 per cent) and have been affected by their surroundings, but are typically not highly modified. Natural values are somewhat degraded. However, these reaches offer some of the best opportunities for restorative action. Moderately disturbed natural channels are likely to be important for fish passage and provide habitat for a diverse range of aquatic biota.

The framework for managing urban rivers and streams recognises the fundamental role these streams play in conveying urban stormwater and that many urban streams have undergone largely irreversible modification as a result of the level of imperviousness in the contributing catchment. The degree of modification then influences the management

objectives are relevant for that stream, with the policy framework providing a direction that priority be given to maintaining those streams with a large proportion of high-quality reaches.

Urban streams have many values and even though they may be modified they still have significant community and natural environment values. While the ALW Plan aims to better manage streams and adverse effects on them, the plan does not have provisions that effectively support holistic stream management, permitting the loss of intermittent streams, allowing significant stream piping and a lack of an approach to managing riparian margins. There is also a lack of linkage between the urban river and stream framework and the relevant plan policies such that it is unclear how the urban river and stream framework is given effect to and the outcomes it is intended to deliver.

Land use requirements

District plan rules, established pursuant to s. 31 of the RMA, are the usual mechanism to require development to meet the requirements established through the ICMP and NDC process and are commonly applied to development in greenfield development areas (as part of structure plan processes and subsequent plan changes). Section 31 rules are also the primary mechanism for avoiding or managing development within flood plains and flood prone areas.

Stormwater management controls vary from district to district and often within the district plans themselves as specific stormwater management controls were often applied to plan changes in new growth areas (e.g. Flatbush and Hobsonville/NORSGA). Some recent plan changes (for example NSCC changes 22 to 25) that have gone through the full RMA process (including Environment Court) provide a comprehensive approach to stormwater management through managing the effects of development on stormwater quality and quantity, stream health, riparian margins, and flood hazard areas. Other district plans simply focus on managing development in flood hazard areas and, to a lesser extent, stormwater quality management.

Council's ability to apply stormwater management requirements on private land use activities is generally limited by district plans. Requirements generally only apply to new development as the ability to apply district plan rules to existing development (or redevelopment of existing areas) is limited by existing use rights under s. 10 of the RMA. Section 10 allows land to be used in a manner that contravenes a rule in a district plan or proposed district plan if the use was lawfully established and the effects of the use are the same or similar in character, intensity, and scale. This allows existing land use practices which affect stormwater management to continue and prevents councils from requiring improvement in current (often inadequate) practices during redevelopment (unless there is a significant change in land use and existing use rights no longer apply).

Limitations of current approach

Stormwater management in the Auckland region has evolved significantly over the past 20-30 years. An important part of this evolution has been the recognition that managing stormwater at the development stage, rather than focusing on end-of-pipe and infrastructure-led solutions, is critical to achieving sustainable stormwater management outcomes. This is essential to meeting the aspirations of the Auckland Plan for green growth and sustainable urban development, and the ability to revive degraded receiving environments, which is a clear directive of national legislation and policy statements and the Auckland Plan.

Under the current network discharge consenting model, councils obtain network discharge consents subject to conditions often requiring both the implementation of infrastructure solutions and improvements and land use management controls to be implemented via district plans provisions. The development of district plan provisions for stormwater management is therefore often associated with plan changes for new growth areas rather

than applying across the entire district. This means there is currently significant variation in respect of district plan requirements both across the region and in most cases within individual district plans. There is also limited ability to transfer NDC conditions into district plan requirements

Over time, the approach to stormwater has evolved in response to new information and international best practice and pressures such as growth and the increasing awareness of the negative impacts of past development practices. This evolution has contributed to the variability in plan provisions, which are of different ages. For new growth in greenfield areas, current best practice is to align structure and catchment planning. However, there is a large gap in respect of processes to integrate land use and water management for redevelopment.

Current policies support integrated planning, but there is no mechanism to implement the outcomes in a co-ordinated way. The extent to which growth and redevelopment opportunities can be used to reduce the existing adverse effects of stormwater and associated environmental degradation is also limited by the current provisions of the legacy district plans and statutory limitations (existing use rights).

Overall, Auckland still faces significant stormwater management issues across the region both to reduce the adverse effects of existing development and to enable significant further growth and development in a way that sustains the natural environment and meets the expectations of communities and national guidance documents. In general, the limitations of the current approach are:

- Inconsistent provisions across the region.
- Inconsistent application of existing provisions due to the different ages and stages of plan changes and stormwater discharge consents.
- A focus on end-of-pipe management and the associated inefficiencies, ineffectiveness and costs of managing adverse effects after they have been created in preference to preventing them from occurring.
- A lack of consistent mechanisms to manage stormwater flows to maintain good and achieve higher stream health, quality and amenity.
- A lack of mechanisms to reduce existing adverse effects in the context of contaminant trends and national direction.
- A focus on TSS removal as a surrogate BPO for contaminants when metals and other anthropogenic contaminants are more likely to be of concern in an urban environment.
- On-going environmental degradation in the context of significant future growth while at the same time greater pressure on these resources for amenity and community needs.
- Lack of clarity regarding desired outcomes, resulting in lengthy and expensive consent processes and sub-optimal solutions.
- Leaving assessment of predictable environmental effects to be determined through the consent process on a case-by-case basis which results in uncertainty and cumulative effects (death by a thousand cuts).

1.7 Information and Analysis

The development of the stormwater management provisions in the Unitary Plan dating back to 2010, as detailed in the timeline of key milestones and decisions in section 5.

The key issues and challenges for stormwater management in the Auckland region have been apparent for some time and were outlined in the issues and options paper prepared to support the Unitary Plan provisions. There is also a significant body of monitoring and research information that details the state of Auckland's aquatic receiving environments and the adverse effects of land use and stormwater runoff. Much of this can be found as technical publications on Auckland Council's website. Those studies of most relevance to the proposed stormwater management rules have been summarised in Auckland Council (2013).

Reviews of international best practice and management approaches were undertaken at an early stage in the development of provisions, with an emphasis on states within the United States of America that are generally considered to be leading examples of stormwater management.

Numerous technical workshops were held internally and workshops were held with Auckland Transport and NZTA to refine the proposed provisions; and with Water New Zealand's Stormwater Interest Group (SIG) to help explain and discuss the provisions to assist in focusing industry feedback.

1.8 Consultation Undertaken

There have been two stages of consultation that have helped to inform the development of the proposed stormwater provisions in the Unitary Plan.

Stage 1: Pre-draft Consultation

Prior to the release of the draft, consultation was limited to Auckland Transport and New Zealand Transport Agency (NZTA), who have a high level of interest and involvement in stormwater management. Feedback was sought on the stormwater quality, quantity and discharge rules with refinement and agreement reached in a number of areas.

Stage 2: Feedback on draft Unitary Plan

A stormwater industry engagement workshop was held to inform the industry about the stormwater management and flooding rules. Further workshops were then held with Water New Zealand's SIG to provide clarification and information as they developed their feedback.

The draft Unitary Plan was released for public feedback from 15 March to 31 May 2013. Several hundred submission points were received relating to the stormwater provisions (objectives, policies, rules and definitions), many of which were technical in nature and detailed in scope. Each relevant technical submission was reviewed and the changes sought were considered.

This analysis of submissions resulted in some key changes and refinement of the stormwater provisions proposed through the Unitary Plan. In particular:

- Inclusion of a permitted activity for stormwater diversions and discharges from existing impervious areas;
- Clarification of flow management and stormwater quality requirements;
- A reduction in the consent status for some activities that cannot meet controls to restricted discretionary;
- A reduction in repetition and clarification where possible;
- Separation of stormwater management from wider integrated freshwater management objectives and policies;
- Exclusion of farm tracks from impervious area calculations in rural areas;

- Incorporation of a range of minor changes and amendments.

Overall, significant changes and enhancements were made to the draft Unitary Plan provisions for stormwater management in response to feedback.

1.9 Decision-Making

The development of the plan provisions for stormwater management and associated decision-making, is outlined in section 5. The process has involved multiple internal workshops with the Stormwater Unit; Council's Coast, Land, Air and Water Policy Unit and Council's Research, Monitoring and Investigation Unit.

Review and approval has been undertaken by appointed Unitary Plan workstream leads. Key topics have been referred to the Unitary Plan Over-sight Group and Political Working Party. The final text was reviewed and confirmed by the Unitary Plan Review Group.

1.10 Proposed Provisions

To address the issues identified in section 1.2, the limitations of the current approach identified in section 1.6 and to align with and achieve objectives and strategic direction in the Auckland Plan, there are a suite of provisions in the Unitary Plan that relate to stormwater management, both directly and indirectly. These provisions operate across a range of layers including RPS provisions, Auckland-wide provisions, zone provisions and overlay provisions that apply to specific spatial (mapped) areas.

The main changes for stormwater management relate to:

1. **On-site management of stormwater quality and quantity for both new development and redevelopment**. There is a greater emphasis on management of stormwater flows and contaminants at source using regional land use controls for both development and redevelopment. This is based on experience that preventing adverse effects from occurring (as far as possible) at the land use design and planning stage is more effective and less costly than subsequently mitigating or remedying effects after they have been generated. It is also more consistent with the general duties provided by RMA s. 17. However, the approach retains the ability to use sub-catchment scale management where this is the best option in the circumstances.
2. **Stormwater treatment performance**. There are new stormwater treatment performance requirements for a range of contaminants rather than the de facto 75 per cent TSS removal requirement associated with (but not specified in) the ALW Plan. There is also an increased focus on targeting treatment requirements for high contaminant generating areas/land-uses and the receiving environment.
3. **Stormwater flows/volumes management**. Application of hydrology performance requirements to manage stormwater runoff to protect higher value sensitive urban streams. Emphasis is also now placed on on-site stormwater management of stormwater volume (as opposed to the historical focus on peak flows) across the region, with a focus on those stream catchments with low levels of existing development and which are identified as being particularly sensitive to stormwater flow effects in the Stormwater Management Area Flow overlay; and also where development which exceeds zone based maximum impervious areas for the site in areas outside identified SMAF.

As the SMAF controls seek to address the cumulative effects of stormwater runoff across a catchment, land use controls are applied where there is an increase in impervious area over 25 m², consistent with the provisions being applied at a household scale (as per existing provisions in the NSCC District Plan).

1.11 Reference to other Evaluations

Refer to the Section 32 Topic Matrix for reference to related section 32 evaluations. These include:

- 2.7 Design statements
- 2.8 Sustainable design
- 2.18 Maori & natural resources
- 2.22 Future Urban zone
- 2.25 Freshwater
- 2.26 Flooding
- 2.31 Earthworks
- 2.41 Strategic Transport Corridor zone

2 Objectives, Policies and Rules

The sections below outline and evaluate the provisions most relevant to stormwater management with a focus on stormwater quality and flow/volume management. It is noted that these build on the more general objectives and policies for freshwater.

2.1 RPS - Stormwater Objectives (2.6.3)

Regulatory framework

Part 2 of the RMA sets out the purpose and principles of the Act and includes a number of key directives for stormwater management. The purpose of the RMA is to achieve the sustainable management of natural and physical resources as defined in s. 5.

Sections 6, 7 and 8 of the RMA then set out the matters to be considered, if relevant, in achieving that purpose. The provisions in Part 2 of the Act of most relevance to stormwater management are provided below:

Section 6 – Matters of National Importance:

6(a) The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development;

6(c) The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;

6(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.

Section 7 – Other Matters:

7(b) The efficient use and development of natural and physical resources;

7(c) The maintenance and enhancement of amenity values;

7(d) Intrinsic values of ecosystems;

7(f) Maintenance and enhancement of the quality of the environment;

7(i) The effects of climate change:

Additional guidance is provided by national policy instruments including the NPSFM, NZCPS and HGMPA as described in section 1.5 above.

RPS Objective

The following objective is proposed:-

Chapter B, section 6.3 Objective 5: The adverse effects of stormwater runoff and wastewater discharges on communities, freshwater systems and coastal waters are minimised and existing adverse effects are progressively reduced.

This objective is appropriate as it contributes to the sustainable management purpose of the RMA by providing for the matters of national importance in s. 6 relating to natural character of the coastal environment, lakes and rivers, ecological values and the relationship of Mana Whenua with natural resources. It also responds to s. 7 matters relating to the intrinsic values of ecosystems and the quality of the environment. This objective will also help give effect to the NPSFM (objective A1 in particular), the NZCPS (objective A1 and policy 23 in particular), the purpose of the HGMPA and aligns with strategic direction and priorities in the Auckland Plan relating to stormwater.

In addition to directly addressing and responding to these Part 2 matters, this objective is considered appropriate for the following reasons:

- *Relevance* – this objective seeks to address the key issues identified in section 1.2 above in relation to the adverse effects from increased stormwater runoff and stormwater contaminants in urban and rural areas. This objective seeks to minimise effects (effects of stormwater cannot be entirely avoided) and reduce existing effects, reflecting the impact that existing development has already had and the opportunity to reduce these effects through change.
- *Usefulness* – this objective provides overarching direction on the outcomes sought in relation to stormwater quantity and quality. Supporting policies provide greater direction on the types of approaches and techniques considered to be appropriate to achieve this objective. This objective also complements other objectives and policies relating to Mana Whenua and natural resource management (Chapter B, section 5.2) and the coastal environment (Chapter B, Section 7) as it will enhance the mauri of natural resources by improving the quality of harbours and freshwater systems in the region.
- *Achievability* – this objective is achievable as the technology and other methods to achieve it have been successfully implemented within Auckland and fall within council's functions under RMA s. 30 and s. 31. Importantly, it recognises that reducing existing adverse effects will occur over a period of time.
- *Reasonableness* – this objective is reasonable as it is consistent with national direction in respect of discharges to freshwater and the management and reduction of stormwater at source, and with current best practice for stormwater management as implemented in Auckland.

2.1.1 Policies (Chapter B section 6.3)

The supporting RPS policies provide guidance on how Objective 5 is to be achieved. These policies take a broad approach to the issue of freshwater management, not just focusing on stormwater quality and quantity issues but also wider methods of ensuring improved and integrated freshwater and stream outcomes.

Policy 1 seeks to achieve the integrated management of land use and adverse effects on freshwater. As discussed above, this is directed by the NPSFM, NZCPS and Auckland Plan, and is essential to achieve improved stormwater outcomes in the future. The focus of this policy is on ensuring that significant development and redevelopment is accompanied by integrated water and land use planning as this development provides the opportunity to minimise adverse effects and reduce existing effects.

The emphasis of Policy 2 is to manage land use, development and subdivision to protect freshwater systems from the adverse effects of land development and enhance values where they are degraded. The concept of freshwater systems, including headwaters, is also important as these provide important components (natural assets) of the stormwater network. The aim of the provisions is to holistically manage the adverse effects of land development on freshwater systems, which contain much of the region's freshwater biodiversity in addition to contributing to numerous other community, amenity and environmental values, and for this to occur in an integrated way. This integrated approach is consistent with the NPSFM, NZCPS and the Auckland Plan. Of particular relevance to stormwater is the application of water sensitive design and green infrastructure (where practicable) and managing stormwater runoff to minimise effects on stream channels and other values of freshwater systems. The policy also seeks to use the opportunities provided by change to reduce existing adverse effects.

Policy 3 focuses on those matters likely to affect freshwater quality, with specific reference to the adoption of the BPO for managing stormwater network discharges and managing discharges and land use activities that generate contaminants. Policy 4 seeks to use the opportunities provided by land use development and redevelopment to reduce existing adverse effects.

Policy 10 provides specific direction to the aspects of stormwater management that are required to be addressed to achieve good water quality and freshwater outcomes. Given its place in the RPS, it guides the range of methods that will be adopted to manage and reduce adverse effects, which are developed further in subsequent Auckland-wide and overlay policies.

Overall, the policies provide comprehensive guidance as to how the objectives of maintaining/enhancing water quality and the more specific objective of minimising adverse effects and reducing existing adverse effects of stormwater runoff will be achieved. Collectively, these policies will ensure objective 5 is achieved through a cost-effective approach. In particular:

- The policies promote an integrated approach consistent with national requirements and the Auckland Plan. Such an approach is considered essential to achieve good stormwater outcomes as the Auckland region grows and intensifies, while maintaining and improving the quality of Auckland's freshwater and coastal systems.
- The policies promote an approach that will reduce, as far as possible, the generation of adverse effects through water sensitive design and other initiatives. This is considered to be more efficient and effective than past approaches that allow adverse effects to be created and seek to mitigate them at a later stage.
- The policies promote a more holistic approach to land use and freshwater management that complements other objectives and policies in the Unitary Plan relating to Mana Whenua and natural resources. Such an approach will assist in enhancing the Mauri of freshwater and the natural environment.
- The policies seek the adoption of the "best practicable option" for managing stormwater at a network scale. This approach enables economic and practical considerations to be considered alongside environmental considerations in determining stormwater management requirements. This is particularly relevant in managing existing adverse effects, which may not be cost effective or practical to fully mitigate or remedy.

2.1.2 Costs and Benefits of Proposed RPS Policies and Rules

The approach of the RPS objectives and policies is similar to that of the existing Auckland RPS but with a greater emphasis on water sensitive design, reducing the generation of adverse effects, integrated management of freshwater systems and importantly the management of land use to minimise adverse effects.

The costs and benefits of this approach are discussed in the following sections, but at a broad regional level:

- Adoption of water sensitive design and green infrastructure where possible will reduce the need for built infrastructure and associated stormwater management costs including operation and maintenance.
- A greater emphasis on the management of land use activities will increase costs to private developers and land owners. However, this will result in reduced adverse effects on communities and the environment, including existing adverse effects, consistent with regional and national guidance.
- The adoption of the BPO for managing stormwater discharges will enable costs, practicality and benefits to be considered on a stormwater network-wide basis.
- A holistic approach to managing freshwater systems and coastal waters provide significant opportunity to manage and restore these systems to meet multiple community and environmental outcomes.

2.1.3 Adequacy of Information and Risk of Not Acting

It is considered that there is sufficient information on which to base the proposed policies and methods. Refer to section 5 below and the companion technical reports for more information on the technical basis and evidence to support proposed policies and methods.

These technical studies support a more comprehensive approach to managing stormwater runoff, with an emphasis of managing stormwater at or near source where possible.

2.2 Auckland wide provisions: Stormwater Management

Water quality and integrated management: Objectives (Chapter C, section 5.15.1)

The Unitary Plan includes a number of objectives and policies that relate to freshwater and integrated management, within which stormwater management forms an integral component in urban areas. These wider objectives relating to freshwater quality are discussed elsewhere in this s32 report. The section below evaluates the policies related directly to stormwater runoff.

2.2.1 Policies (Chapter C, section 5.15.1)

The Auckland-wide policies relating to stormwater diversions and discharges and stormwater quality for land use and ground soakage provide guidance on achieving the water quality and other freshwater objectives. The evaluation below should therefore also be read in context of the water quality and land use objectives focused on protecting areas of high freshwater quality from degradation; avoiding further degradation of areas of degraded water quality and enhancing these areas where practicable; protecting the life-supporting capacity of freshwater and coastal waters; ensuring that future development minimises adverse effects, and provides for Mana Whenua relationships and values.

Stormwater Management: Policy 9 establishes management approaches to avoid significant adverse effects of stormwater runoff in greenfield areas and mitigate other effects. This is achieved by approaches such as water sensitive design; management of stormwater flows/runoff, contaminants and gross pollutants (litter); and the provision of appropriate

infrastructure, including green infrastructure where possible. This is consistent with the approach of the Auckland Plan (environmental design principles) and the NZCPS (Policy 23) and current best practice. As discussed in section 1.2, research has identified that it is essential to manage adverse effects at source as far as practicable to achieve improved community and environmental outcomes. Section 1.3 discusses the desirability of adopting a hierarchical approach to managing adverse effects where possible, with an emphasis on avoiding effects through design and elimination of sources (especially for contaminants), before managing/minimising on-site, followed by broader measures to minimise adverse effects. Avoiding the generation of adverse effects and their minimisation as close to the source as possible are generally more effective and efficient at reducing adverse effects than wider management and mitigation measures.

Policy 10 establishes the expectation and process for reducing adverse effects over time. It articulates the proposed approach of focusing stormwater quality management on high contaminant generating areas, requiring the management of flows in (mapped) areas that have been identified as having high values and/or susceptibility to erosion, and a greater emphasis on the use of green infrastructure where possible, consistent with the Auckland Plan's transformational shift to green growth.

The attention on areas of high load/ high sensitivity is an issue focused and cost-effective approach, consistent with the direction provided by the NPSFM (Objective A2) and Policy 23 of the NZCPS. The policy also provides guidance to network discharges and adopts the use of BPO, consistent with the ALW and Coastal Plans. A BPO approach for the wider drainage is consistent with the use of BPO under the RMA as it provides for the ongoing operation of essential infrastructure, including discharges of water and contaminants, while minimising the adverse effects of the discharges. In this regard, it gives effect to the objectives in Chapter C, section 5.15.1 and other Unitary Plan objectives relating to significant infrastructure.

Policy 11 provides additional guidance to the matters to consider when making decision on the extent to which adverse effects should be prevented or minimised. This policy specifically refers to the Hauraki Gulf Marine Park, in accordance with the status of s 7 and s 8 of the HGMPA as a national policy statement.

Policies 12-15 provide specific guidance on managing high contaminant generating areas, with a clear directive that management is to be on-site unless downstream communal devices provide the same or better performance. This enables decisions to be made as to how best to achieve the objective of reducing contaminant loads and associated adverse effects, with a preference for on-site reduction and management as the most effective way of reducing contaminant loads. This is consistent with NZCPS Policy 23 and Directive 7.10 of the Auckland Plan.

Policy 16 specifically identifies the need to manage flow in order to manage stormwater and runoff in zones where maximum impervious areas apply and SMAF areas. Effectively managing hydrology is an important component of minimising flood risk and effects on urban streams. The SMAF approach has been adopted to focus management where it is considered to achieve the greatest benefit – those urban streams with relatively low levels of development, high susceptibility to stormwater flows and moderate to high existing natural values.

Policy 17 and 18 provide specific requirements for discharges to ground soakage in areas underlain by groundwater aquifers and peat soils respectively, in order to address the specific stormwater management concerns with these two methods of stormwater disposal.

Collectively, these policies provide a comprehensive approach and are considered to be appropriate to achieve the objectives for the following reasons:

- They provide clear direction as to how the objectives are to be achieved, including a range of methods for preventing/managing adverse effects.
- They allow for Auckland's significant growth and intensification while maintaining, and progressively reviving, degraded urban environments to help meet the multiple aspirations of the Auckland Plan including growth, infrastructure, natural environment and Mana Whenua.
- They minimise costs by focusing on:
 - protecting water quality and freshwater systems of higher value/lower degradation;
 - reducing problems at-source;
 - reducing adverse effects on and enhancing areas that have been subject to degradation;
 - minimising on-going changes/adverse effects in other urban areas.
- They seek to manage adverse effects on site as far as possible, which is consistent with the general duties provided for under RMA s. 17 and Policy 23 of the NZCPS and the issues. However, the policies provide the alternative of managing effects on a sub-catchment/communal basis in the situation where this is the best option.
- They build on existing ALW and Coastal Plan, and in some cases district plan, provisions, to give more consistent and effective best practice regional stormwater management.
- They are consistent with the direction provided by national policy statements under the RMA being the NPSFM, NZCPS and HGMPA.
- They provide for an integrated land use and freshwater management approach that manages stormwater and associated adverse effects at multiple levels including:
 - avoiding effects (where possible) through water sensitive design;
 - on-site management;
 - sub-catchment scale management;
 - stormwater network discharges.
- They seek to give effect to integrated land and freshwater outcomes, linking to a holistic framework for the management of urban streams and water quality.
- They seek to ensure the on-going operation and development of the stormwater network, consistent with the Unitary Plan provisions for significant infrastructure.

2.2.2 Rules: Chapter H, section 4.14

The proposed stormwater rules in Chapter H, section 4.14 of the Unitary Plan manage stormwater from the development or redevelopment of impervious areas and include a range of rules relating to stormwater diversions and discharges and land use (quality and flow). Note that SMAF provisions are addressed separately below.

Both diversion/discharge and land use controls are utilised for several reasons:

- The Unitary Plan covers both regional and district planning functions;

- To provide a consistent management framework for stormwater runoff, irrespective of whether a site's runoff is directed to a public network or via a private discharge (direct to a receiving environment).

Discharge Rules

The stormwater diversion and discharge rules largely follow those of the previous ALW Plan, but apply a less restrictive consent activity status in some areas. The rules:

- Permit existing diversions and discharges (as per the ALW Plan), subject to conditions regarding existing adverse effects and change;
- Permit increases in impervious area subject to similar controls as the ALW Plan (1,000 m² in urban areas, up to 5,000 m² in rural areas);
- Apply C/RD consent activity status to stormwater network consents. While this is similar to that of the ALW/Coastal Plan, network discharge consents are more likely to be considered as a controlled activity than currently occurs. This is consistent with the objective to facilitate the operation of the public stormwater network as it is significant infrastructure.
- Apply RD consent activity status to new large roading projects (currently RD or D under network provisions in the ALW Plan).
- Impose maximum permitted impervious areas for discharges to ground soakage set at the maximum permitted impervious area for the zone or a maximum of 1,000 m² (previously just 1,000 m²). This has been implemented to better align discharge and land use controls than previously occurred, recognising that discharge to ground soakage can cause stormwater problems such as flooding if not appropriately designed and managed.
- Included a controlled activity for the diversion and discharge of stormwater where a new development has been through an integrated land use and water planning process, as part of structure/framework planning, to streamline consenting and better integrate land use and discharge provisions.
- Permit a greater area of new impervious area for a road (up to 5,000m² – previously captured by general rules with a maximum 1,000 m² permitted in urban areas).

In summary the diversion and discharge rules are similar to those of the ALW Plan, but with some less stringent consent activity status and area thresholds (subject to controls) and improved integration and consistency with development controls.

Land Use Rules: Contaminants and flow (excluding SMAF)

Land use rules apply in several circumstances:

1. To high contaminant generating activities (HCGAs - stormwater quality).
2. To impervious areas in excess of zone maximums, in areas that discharge to the combined sewer and where there is no connection to the stormwater network.
3. In identified areas within sensitive stream catchments (SMAFs – covered below).

In respect of the quality rules there is a focus on:

- Managing stormwater quality from HCGAs. Activities identified as HCGAs including roofs and cladding (zinc based roofing products, galvanised iron, copper), parking area exposed to rainfall and high use roads. These areas are identified as having high contaminant yields compared to other sources.

- Applying stormwater management controls to new development and existing areas at the time of redevelopment. Controls are applied to the area of development / redevelopment or the entire site once a 50 per cent threshold of change is reached.
- Targeting stormwater quality requirements based on the contaminant of concern and receiving environment sensitivity. This will involve treatment device performance standards for a range of key contaminants of concern (metals, sediment, and temperature) as appropriate to the nature and sensitivity of the receiving environment to those contaminants.
- Establishing device effluent concentrations that are achievable by most current stormwater treatment devices, assuming they have been appropriately designed and sized. It is noted that the effluent concentrations are a design standard, similar to that currently applied for TSS under the ALW Plan.

Under the current planning regime, stormwater treatment is a common requirement of most new major development. The major changes are:

- A focus on high contaminant generating areas as being concentrated sources of contaminants;
- The application of stormwater treatment to existing HCGAs at the time of redevelopment, including the whole site where a trigger of 50% change is reached, consistent with the approach to reduce existing adverse effects;
- A move away from the standard practice of 75%TSS removal to a device effluent performance standard for contaminants of concern/specific receiving environments.
- Some currently stormwater treatment devices that are currently used may no longer be able to be used in some circumstances – the most notable being the use of large stormwater ponds where the subsequent discharge is to a river or stream.

In respect of flow rules (excluding SMAFs), these apply in areas where stormwater runoff may contribute to significant adverse effects. In particular:

- Where a site's impervious area exceeds that of the relevant zone maximum (where they apply) which, unless mitigated, may result in stormwater flows exceeding the capacity of the stormwater network, or adverse effects such as flooding or accelerated stream erosion.
- Where a site's runoff is directed to the combined sewer network, such that any increase in impervious area/runoff will result in a corresponding increase in combined sewer overflow;
- Where the site is not connected to the public stormwater network, to ensure that there is an appropriate method of disposing of stormwater without giving rise to significant adverse effects on other properties and the environment.

These rules are considered to be achievable for the following reasons:

- They do not apply to existing land use activities, until such time as there is further development or redevelopment.
- The rules seek to better manage stormwater quality and quantity at-source through on-site stormwater controls which are more targeted and effective at reducing adverse effects. This approach is therefore likely to be more effective and efficient in achieving improved environmental, community and Mana Whenua outcomes.
- The performance standards can be achieved by reducing flows/contaminants at source or through proven technologies.

- On-site stormwater management focused on controlling stormwater volumes, flows and contaminants has proven to be a more cost-effective approach than traditional end-of pipe solutions, particularly when these are integrated into development plans. In particular, it is practically difficult to reduce stormwater volumes at a large scale and apply large-scale measures in existing developed areas.
- The stormwater quality rules will be more effective at reducing new and existing adverse effects by targeting stormwater treatment requirements on the contaminant of concern and the sensitivity of the receiving environment.
- The stormwater treatment requirements focus on those areas where contaminants are at their highest level, which is the most cost-effective approach to reduce contaminants load and associated adverse effects compared to site-wide requirements.
- Applying controls at the time of development/redevelopment will not impose a cost on existing development and will help reduce costs and improve the efficiency of implementation.
- Resource consent can generally be sought as a restricted discretionary activity where the identified requirements cannot be met. This enables a wider range of considerations and alternatives to be assessed, if necessary.

2.2.3 Costs and Benefits of Proposed Stormwater Policies and Rules

Council is currently preparing a report of the costs of the implementation of the onsite stormwater management provisions. This will include specific information on the range of costs associated with on-site management requirements.

The main benefits expected from the proposed policies and rules are:

- A reduction in the adverse effects associated with growth, development and intensification including:
 - reduced contaminant loads and associated benefits, using a targeted approach;
 - reduced flow impacts on stormwater network capacity, streams and freshwater/coastal environments;
 - reduced requirement for rehabilitation costs;
 - reduced network management costs to address adverse effects.
- A reduction in the extent and nature of existing adverse effects, which are difficult and costly to otherwise reduce in existing urban areas using large scale, communal methods. This is consistent with national and regional objectives and requirements to maintain or improve freshwater and coastal water quality in the context of significant new growth and intensification.
- Numerous unquantifiable but significant environmental, social, Mana Whenua and economic benefits associated with healthy downstream waterways, improved freshwater and coastal water quality.
- Placing emphasis on managing stormwater at or near source, which targets problem areas without requiring treatment of large areas of land, is generally more cost-effective and efficient and consistent with the NZCPS. However, this approach does not exclude communal options where they are more effective and efficient.
- Application of controls to new and significant redevelopment will reduce adverse effects in areas of intensification and redevelopment. The 50 per cent threshold to apply stormwater controls to the entire site will further reduce adverse effects over time.

- Stormwater treatment requirements that are better aligned to the nature of contaminants and sensitivity of receiving environment which provides a more targeted and effective approach to improve environmental outcomes.
- An approach for stormwater quality treatment that enables more regionally-consistent, certain and transparent requirements.
- Stormwater disposal options are assessed for sites that do not have a connection to the public stormwater network, to ensure that satisfactory long term disposal options are available. Poor disposal options often generate significant problems and costs for ratepayers.
- Combined sewer overflows are not increased as a result of intensification and development, and reduced where possible.

The main costs expected from the proposed policies and rules are:

- Greater emphasis on on-site stormwater requirements will have consequential costs to site owners and developers and lead to a shift in cost from the public to private sector. However, communal management is not precluded, where this is a suitable option.
- On-site controls will require on-going maintenance and compliance which will result in on-going costs for site owners and the requirement for compliance management regimes. However, it is expected that there will be reduced operational and maintenance requirements for the public network as a result.
- Developers undertaking redevelopment/intensification will face greater costs to implement controls to address existing adverse effects, which will be more significant for those developments that exceed the 50 per cent threshold. However, introducing these requirements at the time of redevelopment will help to minimise these costs.
- Development in excess of impervious area maximums will incur costs associated with reducing flows to the equivalent of that of the allowed impervious area.
- Capital costs to implement contaminant reduction/stormwater treatment in HCGAs and to maintain these devices. However, applying these requirements at the time of development/redevelopment will reduce marginal costs and help ensure they are integrated into site design/development plans.
- The inclusion of certain roofing materials as HCGAs may result in a change in roofing type from uncoated to coated roofing materials which may increase construction capital costs or alternatively require treatment of roofing in commercial and industrial areas.
- Stormwater management costs associated with major projects, such as major redevelopment/roading, are not considered to change significantly. Major projects are likely to go through a restricted discretionary activity consent process, and be subject to the adoption of site-specific management requirements, as is currently the case.
- Sites that do not have a connection to a stormwater network will be required to go through a resource consent process, with resulting cost, to ensure that there is a suitable long-term stormwater disposal option.

Overall there will be costs associated with implementing the stormwater quality and flow rules for developers/site owners/road controlling authorities to implement the stormwater controls for flow and quality. Benefits are likely to be reflected in environmental, social and Mana Whenua outcome for the region through the gradual improvement in the quality of Auckland's harbours and stream systems, consistent with national and regional objectives.

A focus on on-site management should also result in long term cost savings for the region in respect of the provision, upgrading and maintenance of public networks.

2.2.4 Adequacy of Information and Risk of Not Acting

It is considered that there is sufficient information on which to base the proposed policies and methods. Refer to Auckland Council (2013) for more information.

The risk of not acting is that development will continue to degrade freshwater and marine receiving environments and the on-going decline in water quality and ecosystem health. This is contrary to the strategic direction of the Auckland Plan and the NPSFM, NZCPS and HGMPA.

2.3 Stormwater Management Area: Flow (SMAF)

SMAF: Objectives (Chapter E, section 7.5)

The following objective is proposed:-

Objective 1: High-value rivers, streams and aquatic biodiversity in identified catchments are protected from the adverse effects of stormwater runoff associated with urban development and where possible enhanced.

This objective contributes to the sustainable management purpose of the RMA by providing for the matters of national importance in s. 6 relating to natural character of the coastal environment, lakes and rivers, and ecological values. It also responds to the s.7 matters relating to the intrinsic values of ecosystems and quality of the environment. Unless appropriately managed, river and stream systems are at risk of significant degradation from urban development. However, urban stream systems still contain significant biodiversity and important community and Mana Whenua values. As Auckland intensifies, these wider values and the interface between the land, streams and the coast will become even more important.

The objective gives effect to the NPSFM (Objectives A1, A2 and C1) and aligns with Directive 7.5 of the Auckland Plan. It also addresses a number of key stormwater issues for the Auckland region identified in section 1.2, including degraded freshwater quality, loss and modification of freshwater systems and the adverse effects of increased stormwater flows. As such, this objective is considered appropriate to achieve the purpose of the Act and the directives in relevant national guidance and the Auckland Plan.

In addition, this objective is considered to be appropriate to achieve the outcomes sought for stormwater management for the following reasons:

- *Relevance* – this objective is relevant as it seeks to give effect to the RMA s 6 and 7 matters, NPSFM objectives seeking to maintain or improve freshwater water quality and achieve integrated land use and freshwater management and RPS objectives seeking to minimise adverse effects and reduce them over time. In particular, the SMAF objective places emphasis on those systems with higher values and those that are most vulnerable to increased stormwater runoff.
- *Usefulness* – this objective provides clear direction to developers and decision-makers on the approach to manage sensitive stream systems in areas of urban development. These stream systems have been identified and mapped throughout the region and identified as overlays (SMAFs). This will help to avoid complex and lengthy environmental effects assessment and consenting processes associated with a case-by-case assessment approach.

- *Achievability* – this objective will be achieved through the identification and mapping of sensitive areas as overlays in the Unitary Plan together with rules to apply hydrological performance controls to ensure stormwater flows are appropriately managed in these catchments. A range of stormwater measures are available to meet the requirements. This approach is similar to that recently implemented in the region in the legacy NSCC district Plan and falls within Council’s RMA s30 and s31 functions.
- *Reasonableness* – this objective is reasonable as it enables development to occur in higher value/sensitive urban stream catchments while also protecting and enhancing in-stream biodiversity and other values in these areas, enabling the multiple objectives of the Auckland Plan to be achieved. It has also already been accepted and successfully applied in parts of the Auckland region and this objective will ensure this approach is applied consistently across the region.

2.3.1 SMAF Policies (Chapter E, section 7.5)

The supporting policies provide the performance targets that are required to be met for the two identified areas. Policy 1 relates to managing flows within SMAF areas to ensure the adequate functioning of the stormwater network, minimise adverse effects and enhance values where possible. The requirements for meeting this are in Table 2: SMAF Hydrology Mitigation Requirements in Chapter H, section 4.14.2 (Rules). Policy 2 details the areas to which the hydrology mitigation requirements, including during redevelopment, giving effect to RPS and region-wide objectives seeking the progressive reduction of existing adverse effects.

The hydrology mitigation requirements have been derived on the basis of information provided in Auckland Council (2013). This technical report outlines the adverse effects of increasing impervious area in catchments and methods for mitigating these effects. The SMAF areas have been derived based on a set of core factors that were then subject to a range of modifying factors. The core factors are: stream slope; current level of impervious area within the contributing catchment; and ecological value (measured MCI). Modifying factors include growth pressures, extent of existing flow mitigation within the catchment, identified erosion, and the presence of enhancement and other restoration projects.

These policies are considered to be appropriate to achieve objective 1 because:

- Stormwater flows and hydrological changes are a major factor in determining the health and condition of streams in urban areas. These policies will reduce the significant on-going stream loss and modification that Auckland currently faces.
- The policies provide clear guidance on expectations for managing stormwater flows in the overlay areas which have been derived to protect and enhance those streams that have the highest current or potential values and/or are susceptible to erosion from increased stormwater flow.
- They provide different flow management requirements for SMAF 1 and 2 based on a stream’s existing state/level of development and sensitivity to increased flows.
- They use scientifically established threshold values to enable the objectives and performance targets to be achieved which will ensure they are effective in achieving the multiple outcomes sought for stormwater through the Unitary Plan.
- They apply proven best practice stormwater management consistently and comprehensively across the region, which is a more transparent and equitable approach than currently exists.
- The approach provides clarity and certainty as it minimises lengthy and costly processes associated with case-by-case assessments and the risk of cumulative

adverse effects. This is likely to achieve greater efficiencies in the implementation of these requirements and improved environmental outcomes throughout the region.

2.3.2 Rules

The proposed stormwater flow rules in Chapter H, section 4.14.2 of the Unitary Plan will apply land use controls to manage stormwater flow with an increased focus on:

- Application of flow controls in SMAF areas which are (sub) catchments identified as sensitive to increases in stormwater flows and with values that can be protected or enhanced through managing stormwater flows. The key requirements in SMAF areas is to manage stormwater runoff to ensure the adequate functioning and performance of the stormwater network and to contribute to retaining stream naturalness, biodiversity and other values. The basis for the controls is provided in Auckland Council (2013).
- Applying stormwater flow controls within SMAF areas to new impervious surface, areas of redeveloped impervious surface, and entire sites where the area of development/redevelopment is more than 50 per cent of the site.
- Addressing the cumulative effects of stormwater discharges across a catchment by applying land use controls (controlled activity) at a low threshold of impervious area increase – 25 m². This is consistent with the provisions being applied at a household scale.
- Targeting hydrology mitigation requirements depending on the level of existing development/sensitivity (SMAF 1 and SMAF 2).
- Providing a focus on reducing stormwater volume rather than just managing peak flows, to minimise erosion of stream channels.
- Providing the same mitigation requirements for roading, but subject to different permitted activity thresholds.
- Providing for consideration as a restricted discretionary activity where mitigation requirements cannot be met, to enable a wider series of considerations to be assessed.

These rules and the outcomes sought by them are considered to be achievable for the following reasons:

- They are based on an existing approach within the region which has been achieved in practice. Managing flows within the contributing catchment is one of the most critical factors in retaining/enhancing stable, healthy streams and their associated natural and amenity values.
- They are not applied region-wide, but focused on identified, sensitive, stream systems.
- There is a range of measures that can be adopted to achieve the mitigation requirements.
- These rules provide for development while minimising the further degradation of sensitive and high value streams which is a significant issue for the Auckland region.
- These rules will encourage the reduction of stormwater volumes at source which is the most cost-effective approach as it is not generally practical to reduce volumes at a catchment scale.
- They seek to address cumulative adverse effects that negate the benefits of applying hydrology controls elsewhere in the catchment.

- Volume reduction is an effective, achievable approach to reduce stormwater effects on freshwater systems and enhance stream base flow and naturalness contributing to numerous other values.
- Resource consent can be sought as a restricted discretionary activity where the controlled activity requirements cannot be met. This enables a wider range of considerations and alternatives to be assessed if necessary.

2.3.3 Costs and Benefits of Proposed Policies and Rules

As identified section 1.2, the loss and degradation of urban streams is a significant issue in Auckland and must be addressed if the multiple values of growth and environmental protection enhancement are to be realised in urban stream catchments. These policies and rules address the deficiencies of the urban stream management framework of the ALW Plan, which recognises the different stream types and associate management objectives but does not provide a specific mechanism to achieve improved outcomes.

The approach is consistent with recent NSCC district plan changes that provide a comprehensive approach to manage stormwater flows, stream health and riparian margins, and have gone through a full RMA process.

Council is currently preparing a report of the costs of the implementation of the onsite stormwater management provisions. This will include specific information on the range of costs associated with on-site management requirements.

The benefits anticipated from this approach are:

- Primary benefits include:
 - Minimising the adverse effects of stormwater runoff on sensitive streams;
 - Reducing existing stormwater adverse effects on streams that are still only moderately affected by urban development;
 - Better enabling multiple environmental, community and Mana Whenua values to be achieved while providing for further growth and intensification.
- Stormwater flow management is aligned to the sensitivity and values of the receiving environment based on the identification and spatial mapping of catchments which have been identified as high value or particularly sensitive to increased stormwater flows.
- At-source management is more effective in reducing stormwater volume and therefore reducing erosion and maintaining/enhancing stream health.
- A low impervious area increase (25 m²) for flow controls provides equity and enables cumulative effects to be better managed, which is critical in managing the effects of stormwater discharges.
- A focus on managing volume rather than peak flow is a more effective approach to reduce adverse effects on streams with numerous benefits for stream naturalness, amenity and other values.
- Adoption of controls will also result in improved stormwater quality as volume/flow mitigation also provides water quality treatment.
- The approach builds on existing best practice in the region.

The main costs anticipated from this approach are:

- The adoption of flow controls in SMAF areas will lead to an increased capital cost to site owners/developers/road controlling authorities from the increased stormwater management requirements, on-going operation and maintenance costs and associated regulatory /compliance costs.
- Controls and hence costs will apply to most development due to the low development thresholds considered necessary to effectively manage cumulative effects (25 m² new impervious area for most development).
- Costs to manage volumes will be similar to managing peak flows although there will be some limitations on the range of devices that can be used.

Overall there will be costs associated with implementing the stormwater quality and flow rules for developers/site owners/road controlling authorities to implement the stormwater controls within SMAF areas. This is likely to be offset by economic, social and Mana Whenua benefits for the region through sustaining the values of urban stream systems and the gradual improvement in the quality of Auckland's streams, consistent with national and regional objectives.

A focus on on-site management should also result in long term cost savings for the region through less costly rehabilitation and maintenance works to retrospectively address adverse effects.

This will help ensure that Auckland grows in a sustainable manner consistent with the green growth vision outlined in the Auckland Plan.

2.3.4 Adequacy of Information and Risk of Not Acting

It is considered that there is sufficient information on which to base the proposed policies and methods. The adverse effects of impervious area, and associated stormwater flows, are well understood as documented in Auckland Council (2013).

Not acting would result in continued degradation of streams that have been identified as being susceptible to increases in stormwater flows and/or with high current or potential natural values. Providing a higher level of stormwater management within these streams is essential to retain the multiple ecological, community and Mana Whenua values of these important resources.

3 Alternatives

Alternative approaches have been considered through the development of the proposed provisions. As discussed in section 5, the development of the provisions has included an initial options assessment paper, a range of workshops, and on-going refinement of provisions in response to industry and stakeholder feedback.

These sections below identify and assess the key options and alternatives that have been considered in response to the issues that have been identified, for the three key areas of change highlighted in Section 1.10:

- On-site stormwater management of quality and quantity;
- Stormwater treatment performance/requirements;
- Stormwater volume/flow management.

3.1 On-site stormwater management Introduction

Existing stormwater runoff is affecting the quality of the region's fresh and coastal water, and will continue to do so if current practices continue. There are strong directives in national and regional guidance to maintain water quality and enhance degraded freshwater and marine systems. Current stormwater management is generally not meeting best practice and causes avoidable adverse effects. However, existing effects cannot easily be mitigated by intervention and are therefore proposed to be reduced over time to achieve growth aspirations and a sustainable green Auckland with healthy streams and harbours.

As outlined in Section 1.6, the current approach to manage stormwater in the region is through discharge consents and the adoption of BPO, both at the network scale for council and site scale for private development that does not discharge into the public network. A continued focus on network or sub-catchment scale management will not address existing adverse effects, particularly as the region intensifies, as a large component of these effects are determined by land use which cannot be directly controlled through discharge consents. Hence, a change in approach is required to enable growth while achieving more effective community and environmental outcomes and in particular to take the opportunities offered by intensification and re-development to reduce existing adverse effects.

To achieve more effective outcomes, a focus on on-site reduction and management of stormwater is necessary. This is currently a requirement of most new (greenfield) development, but generally not redevelopment as district plan land use controls for stormwater are variable and are subject to existing use rights, which essentially allow existing management practices to continue.

Options and alternatives

The options that are assessed below cover two main alternatives:

1. An emphasis on on-site management vs. communal stormwater management;
2. The application of controls to new development only vs. other alternatives;

Options 1a, 1b and 1c evaluate the alternatives for the use of controls for stormwater management. The alternatives are:

- 1a. Status quo
- 1b. Sub-catchment scale stormwater management
- 1c. On-site management with sub-catchment scale management when this is the best option (proposed).

Option 1a – is the continued use of regional and district plan provisions to manage stormwater discharges. The regional planning framework would continue to manage stormwater network discharges through integrated management at the catchment level and adoption of BPO to manage (prevent or minimise) the adverse effects of discharges. Private stormwater discharge consents would continue to manage the effects of non-network consents usually at a site, or sometimes development, scale. Stormwater will also be managed through district land use controls in a variable manner depending on the approach taken by the legacy councils and their response to growth pressures and developments in stormwater management practice.

Option 1b – would involve a continued focus on end of pipe treatment for stormwater through the wider use of sub-catchment scale stormwater management devices.

Option 1c – would provide a greater emphasis on managing stormwater flows and contaminants at source, using regional land use controls for both development and

redevelopment. It would also allow for a downstream sub-catchment scale devices where this is a better option.

Options 2a, 2b and 2c evaluate the alternatives for the application of on-site stormwater management. The alternatives are application of on-site management to:

- 2a. New development only
- 2b. New and existing areas at the time of redevelopment (proposed)
- 2c. Requiring existing sites to implement controls in advance of new development.

Option 2a – application to new development only would be similar to the status quo with stormwater controls required for new development only.

Option 2b – application to new development at existing areas at the time of redevelopment would require stormwater management controls at the time of development (where specified) in addition to new development. Controls would be applied to the area of development/redevelopment or entire site once a 50 per cent threshold is reached.

Option 2c – requiring existing sites to implement controls in advance of new development. Priority land use activities would be given a sunset clause (e.g. five years) by which compliance with s. 30 land use controls would be required.

The tables below discuss each alternative compared to the proposed alternative.

| | 1a. Status Quo | 1b. Sub-catchment scale stormwater management | 1c. On-site management with sub-catchment scale management when best option (preferred) |
|-----------------|---|---|---|
| Appropriateness | This option is not considered appropriate to achieve the outcomes sought in relation to improved quality and reduced quantity. It is also inconsistent with the objective to achieve more consistent stormwater requirements across the region, and the legislative and strategic direction which contains a strong directive to reduce existing adverse effects to improve the quality of degraded freshwater and coastal areas. | This option is not considered appropriate to achieve the objectives in relation to stormwater as they seek to better manage flow and quality at source and encourage integrated planning of land use and stormwater management that adopts water sensitive design to achieve multiple environmental, social and economic benefits. This option provides little incentive to developers and land-owners and places a continued reliance on public stormwater management which requires significant capital investment and has on-going costs. | This option is considered to be the most appropriate to achieve the objectives to reduce stormwater quantity and improve stormwater quality by the requirement for on-site controls unless a sub-catchment scale device is proven to be more effective. This provides flexibility while also encouraging land owners to manage and control stormwater on-site which allows for controls to be targeted at the specific problem. The approach is consistent with s. 17 of the RMA and gives effect to the strong directives in the NZCPS and the Auckland Plan. |
| Effectiveness | It is highly ineffective to replace existing plans with the same provisions and retain inconsistency. This would continue to result in a regionally variable approach to stormwater with less certainty for development and outcomes that do not reflect best practice. Sustainable outcomes and integrated land and stormwater management would also largely be focused on areas of new growth rather than existing urban areas. This would not lead to improvement in fresh and coastal water quality failing to give effect to strong directives in national and regional guidance. Due to the variability in approaches across the legacy plans and their different emphasis and requirements, the risks of this option will be greater than its achievements. At the very least, a consistent set of district plan provisions for stormwater management is considered necessary. However, this is a highly ineffective approach given the likely outcomes and will not address the significant gap in the current framework relating to the limited ability to manage and reduce existing adverse effects. As a consequence, degradation of urban streams and estuarine systems would likely continue on their current path, which is inconsistent with the strong directive in legislative and strategic guidance to maintain or improve water quality where degraded. | This option is not considered to be an effective approach to achieve the outcomes sought for stormwater. It encourages traditional land use practices where stormwater is managed after the event rather than integrated into site design which can both reduce overall development costs and improve environmental outcomes. It provides limited incentives to reduce stormwater at source and adopt water-sensitive design which is a more cost-effective and sustainable approach long-term with the cost-benefit ratio improving as the size of development and density increases. Sub-catchment scale devices can be effective in new greenfield development. However, they are less effective in existing areas due to difficulties in finding places for them to be sited where they are most required, and their limited performance efficiency. Sub-catchment devices on their own will, therefore, have limited effectiveness overall given that a large amount of the region's growth is expected to occur through intensification. | This option better integrates land use and water outcomes using provisions available under the Unitary Plan, with a focus preventing and managing stormwater quality and quantity at source, enabling more sustainable management of natural and physical resources. This is more likely to achieve improved environmental outcomes and wider social, amenity and economic benefits associated with improved stormwater management that uses natural systems and processes. This option will therefore be effective in achieving the outcomes sought for stormwater and give effect to the requirements and direction of the NPSFM, NZCPS, HGMPA and Auckland Plan. |
| Efficiency | This option would be inefficient as, while the approach may be well established, it provides an inconsistent approach to stormwater management across the region and an uncertain context for development about stormwater requirement which is inappropriate under a single Auckland Council. This will continue to lead to confusion and inconsistent application of stormwater management. As a consequence, it is not considered to be the most efficient and cost-effective approach to manage stormwater across the region. | This option is more efficient from a regulatory perspective, as it reduces the number of management devices and hence consent and compliance costs. However, it will be inefficient and ineffective in reducing contaminant loads and stormwater volumes and is unlikely to achieve the objectives of maintaining receiving environment quality and improving it where degraded. | The option is less efficient from a regulatory perspective as it will result in significantly more stormwater management devices and resource consents. On-site stormwater controls are more targeted and effective at reducing adverse effects and hence are more efficient way of achieving the desired community and environmental outcomes. On-site stormwater management focused on controlling stormwater flows and contaminants at source is more sustainable, particularly when integrated into site development/redevelopment plans |
| Costs | <ul style="list-style-type: none"> This is not regionally consistent and would result in variability in stormwater controls and policy approaches across the region with associated transactional costs. It will continue to result in degradation and cumulative adverse effects as the current generation of plans have proven to be unsuccessful at preventing and reducing adverse effects. It does not address key stormwater issues associated with the limited ability to address existing adverse effects. This will | <ul style="list-style-type: none"> This is a relatively inefficient method of managing stormwater and, in most cases, water-sensitive design approaches are less expensive to install and maintain than a large scale traditional drainage systems. Public stormwater management has significant capital investment and on-going costs, and competes with other public land use requirements particularly in existing urban areas. It is difficult to apply in existing areas and, as a consequence, | <ul style="list-style-type: none"> A more regulatory intensive approach has consequential costs to site owners and developers. On-site controls and designs require checking and on-going compliance and maintenance and hence additional on-going costs. It would shift the cost to individual sites with a perceived shift in costs from public to private sector. However, this approach does not preclude sub-catchment scale stormwater |

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| | <p>inevitably result in continued degradation of the natural environment with associated environment, social and economic costs to the region.</p> <ul style="list-style-type: none"> • It is inconsistent with the strategic direction which recognises the importance of addressing existing adverse effects to maintain and improve (where degraded) fresh and coastal water quality. • ICMPs and NDCs often do not provide clear guidance on stormwater requirements for development, creating uncertainty and often resulting in the requirements being negotiated at the resource consent stage increasing transactional cost. • There will be inconsistent application of requirements across developments depending on the presence and status of existing consents. • It is an inefficient process and not a sustainable stormwater management solution. A decision has been made to replace existing plans. | <p>limited ability to implement devices to address existing effects.</p> <ul style="list-style-type: none"> • There may be a lower cost overall, but this necessitates the concentration and management of large stormwater volumes often not physically possible because of space requirements. • Stormwater volumes cannot easily be reduced (detention not reduction) meaning there is limited ability to protect stream health. This can also significantly affect natural flow regimes leading to adverse effects in the upper catchment • There is no incentive for landowners or developers to reduce stormwater generation which is inconsistent with s. 17 of the RMA and NZCPS. | <p>management where this is the best option.</p> |
| Benefits | <ul style="list-style-type: none"> • The current approach to manage stormwater has been subject to extensive negotiations recently settled and the approach is now reasonably well-known and accepted. • The current approach has led to some integrated planning and improved outcomes in new developed areas. | <ul style="list-style-type: none"> • It is the best option in some circumstances where there are cost savings and efficiencies to be gained from a communal approach, particularly in new greenfield development. • There is less consent processing and compliance monitoring for council. • Council operation and maintenance is more likely to be undertaken than private management. | <ul style="list-style-type: none"> • It provides flexibility to achieve the best, most suitable outcome. A focus is given to managing stormwater at source and target specific problem areas without requiring treatment of the entire site. • It enables communal management where the best option is providing flexibility for development, particularly in greenfield areas. • It encourages reduction at source (i.e. treatment not required where certain products not used) which is more cost-effective and sustainable. • Major quantifiable benefits from better on-site management include reduced contaminant loads, avoidance of downstream rehabilitation and maintenance costs, and increased property values along with numerous unquantifiable benefits associated with healthy downstream waterways. • It is consistent with RMA s.17 general duties. • It is likely to achieve significant reductions in stormwater contaminants and flows leading to improved environmental water and sediment quality over time. • It provides greater certainty of stormwater requirements and outcomes. • It is consistent with the strategic direction on reducing adverse effects, maintaining freshwater quality, enhancing degraded waterways, and encouraging greater uptake of water-sensitive design for both new and re-development sites, delivering multiple environmental, social and economic benefits for the region. • It does not require large tracts of land for sub-catchment scale stormwater management and can be integrated with other requirements, such as landscaping, and design principles, such as water-sensitive design. |
| Risks | <p>The key risk associated with this option is that the quality of Auckland's freshwater and marine systems will continue to be degraded, leading to a significant reduction in the multiple</p> | <p>The key risk associated with this option is that traditional approaches to land use development continue to occur with limited uptake of new, more cost-effective approaches to</p> | <p>The main risk associated with this option is the failure of on-site devices due to inadequate maintenance and compliance. Regulatory processes will need to be in place to ensure</p> |

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| | <p>environmental, social and economic values these assets deliver. Given the variable provisions across the region, this option also has a high level of risk that inconsistent approaches to stormwater management will continue, resulting in uncertainty for development in many areas.</p> | <p>development that integrate stormwater management into site design to better control stormwater flow and quality at source and reduce overall development costs.</p> <p>The limitations of past development practices and stormwater management approaches are well-established. In Auckland.</p> <p>Additionally, there is a risk that intensification of existing urban areas will exacerbate existing effects rather than provide an opportunity to reduce them as large scale communal devices are problematic, and often highly expensive, to implement in developed areas.</p> | <p>appropriate compliance is achieved.</p> |
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| | 2a. New development only | 2b. New and existing areas at the time of redevelopment | 2c. Requiring existing sites to implement controls in advance of new development |
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| Appropriateness | <p>While this option may lead to improved outcomes in some areas, it will not achieve the objectives in relation to freshwater quality and stormwater quantity and quality as existing adverse effects will not be addressed. It will not deliver the outcomes sought by the NPSFM, NZCPS, HGMPA and Auckland Plan.</p> | <p>This option is considered to be the most appropriate to achieve the objectives relating to improved stormwater quality and reduced quantity, and to maintain/enhance freshwater quality while also not imposing undue costs on developers and landowners. This is consistent with the requirements of the NPSFM, NZCPS, HGMPA and the Auckland Plan.</p> | <p>While this option will be effective in achieving the objectives relating to improved stormwater quality/reduced quantity and maintaining/enhancing freshwater quality, it is not considered the most appropriate approach given the potentially significant costs imposed on existing land owners/uses.</p> |
| Effectiveness | <p>It will achieve positive environmental outcomes for new development and help to maintain environmental quality in those areas.</p> <p>However, this option would be highly ineffective at addressing the adverse effects from existing land use activities and will therefore not address the gradual decline in the quality of Auckland's fresh and coastal systems caused by the adverse effects of existing development.</p> | <ul style="list-style-type: none"> It will minimise the adverse effects of new development using a proven approach and use redevelopment opportunities to reduce existing effects. It will also improve existing stormwater water quality over time, with resulting receiving environment benefits, although the rate at which existing effects will be reduced is uncertain. | <ul style="list-style-type: none"> This option offers a key advantage in that existing adverse effects can be addressed at a faster rate, providing greater certainty about reductions and subsequent improvements in environmental quality. This is the most effective way of achieving the desired outcomes. However, it may not be practical or financially feasible for land owners to retrospectively implement more stringent stormwater controls in the absence of redevelopment. Overall, the costs of this aggressive approach are likely to significantly outweigh the benefits |
| Efficiency | <p>Major new development already goes through extensive planning processes and stormwater management is currently a part of this process, so it is efficient to implement.</p> | <ul style="list-style-type: none"> This option is considered to be the most transparent, equitable and appropriate to protect water environments while enhancing those areas where quality and values have been degraded by existing land use activities. Applying controls at the time of development or redevelopment will reduce costs and integrate stormwater controls into site design and development plans, improving efficiency of implementation. | <ul style="list-style-type: none"> While this option may be the most effective to address existing effects and improve freshwater quality within a shorter timeframe, it requires significant regulatory intervention. In the absence of redevelopment, this approach will often be impractical, very expensive or inefficient for site owners and there will also be significant compliance monitoring costs to ensure appropriate controls are implemented within prescribed timeframes |
| Costs | <ul style="list-style-type: none"> It will impose less cost overall as controls will not apply to redevelopment. It does not address existing adverse effects in the context of contaminant trends and national direction resulting in the continued degradation of urban stream and estuarine systems. This will have significant cost on community and ecosystem values and lead to significant loss in the direct and indirect economic benefits associated with the regions streams and harbours. | <ul style="list-style-type: none"> Developers undertaking redevelopment/intensification will face greater costs to implement controls to address existing effects. However, these would be applied at the time of redevelopment which provides an intermediate solution where a new stormwater management concept/plan can be brought into the new development plan. This helps reduce marginal costs as far as possible and can potentially lead to cost savings such as less clearing, earthworks and pavement costs from clustering working with landscape contours. Managing the entire site runoff will result in further cost to implement stormwater devices. | <ul style="list-style-type: none"> Retrospectively introducing new stormwater requirements in the absence of redevelopment has a lower benefit-cost ratio. This will potentially result in significant additional costs for existing land uses across the region. Accelerating controls is unlikely to have additional significant long-term benefit in receiving environment quality than under a more passive regime. |

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| | | <ul style="list-style-type: none"> • There will be more consent and regulatory processes. | |
| Benefits | <ul style="list-style-type: none"> • It is generally lower cost as it can be integrated into site design and implemented at the time of development. • There are no costs to existing land owners as they would not be required to retrospectively implement stormwater controls. • It minimises the adverse effects of new development. | <ul style="list-style-type: none"> • Application of controls to new and significant redevelopment will reduce adverse effects in areas of growth and intensification, helping improve freshwater and harbour quality and deliver significant economic value to the Auckland region. • This will address existing adverse effects over time which will be accelerated by applying to the entire site once the 50 per cent threshold is reached. This will ensure a more comprehensive approach to manage stormwater as Auckland grows both through new development and intensification. • It reduces cost implications by enabling stormwater controls to be integrated into new site design/intensification plans. • It is consistent with legislative and strategic direction which recognises the importance of addressing existing adverse effects to maintain and improve freshwater and coastal water quality. | <ul style="list-style-type: none"> • Potentially there could be a significant reduction in existing effects. • It provides more certainty about the rate of reduction as timeframes for compliance can be specified. • It enables priority land uses to be targeted for compliance to address contaminants of concern. • It is consistent with the strategic direction which recognises the importance of addressing existing adverse effects to maintain/improve freshwater and coastal water quality. |
| Risks | <p>The key risk associated with this option is that the limited ability to address existing adverse effects means freshwater and marine systems quality will continue to decline. This is inconsistent with national direction and will lead to loss of direct and indirect environmental and economic values for the region.</p> | <p>Risks associated with this option include:</p> <ul style="list-style-type: none"> • Concern at increasing the cost of redevelopment and intensification (although these costs are an accepted feature of greenfield development and application to redevelopment could be considered more equitable) • The rate of improvement is uncertain as existing adverse effects would only be addressed at the time of redevelopment which may not coincide with receiving environment priorities • Receiving environments may reach the point of no return before reductions are apparent. | <p>There are significant risks associated with an aggressive approach, particularly the use of a high level of regulatory intervention in existing land use activities and costs</p> |

3.2 Stormwater treatment performance

Introduction

Stormwater runoff is the most significant issue for urban water quality in Auckland, making stormwater contaminant management a major component of the overall freshwater management approach for the past 20-30 years. There has been a gradual evolution from an initial focus on end-of-pipe treatment via ponds to a more holistic approach incorporating reduction at source, on-site management/treatment, and use of ponds, wetlands and other natural devices and systems to minimise contaminant levels in stormwater runoff.

While knowledge of stormwater contaminants of concern and their effect on the region's receiving environments has also significantly improved over the past 20 years, degradation of fresh and marine waters from stormwater discharges is still continuing. Improved stormwater quality management is required if the Auckland Plan's aspirations for growth and healthy natural environments are to be realised.

Options and Alternatives

The options below provide an assessment of the alternatives that have been considered to improve stormwater treatment performance. They address two key issues:

3. Stormwater treatment performance requirements;
4. The application of those requirements to HCGAs or other alternatives.

Options 3a, 3b and 3c evaluate the alternatives for the performance requirements for stormwater treatment. The alternatives are:

- 3a. Status quo (75 per cent TSS removal)
- 3b. Stormwater quality design standards based on contaminants of concern and receiving environment (proposed)
- 3c. Case-by-case assessment and design.

Option 3a would involve the continued management of stormwater discharges based on the use of TSS as a surrogate for contaminant removal. Treatment requirements generally require 75 per cent TSS removal from discharges from new impervious areas.

Option 3b would target stormwater quality requirements based on the contaminant of concern and receiving environment sensitivity. It would require treatment device performance standards for a range of contaminants of concern (metals, sediment, and temperature) as appropriate.

Option 3c would manage stormwater contaminants and treatment requirements on a case-by-case basis depending on the nature of the land use, the type of contaminants being generated on-site, and the sensitivity of the receiving environment.

Options 4a, 4b and 4c evaluate the alternatives for the application of treatment requirements. The alternatives are application of treatment requirements to:

- 4a. Applying requirements to all areas;
- 4b. Applying requirements based on receiving environment sensitivity;
- 4c. Applying requirements to high contaminant generating activities (proposed).

Option 4a would apply stormwater quality requirements to the entire site at the time of development or redevelopment with associated performance standards.

Option 4b would apply stormwater quality requirements on the basis of receiving environment sensitivity. Higher stormwater quality requirements would be applied to activities in those areas draining to sensitive receiving environments.

Option 4c involves an increased focus on managing stormwater quality from HCGAs. Activities identified as HCGAs include roofs and cladding (galvanised iron/zinc based/copper), car parks exposed to rainfall and high use roads⁴.

The table below discusses each alternative compared to the proposed alternative. It is important to note that in addition to on-site management, the BPO approach is applied to public stormwater networks to further enhance stormwater quality outcomes in priority areas in accordance with the BPO assessment.

⁴ Industrial sites are also identified as high contaminant generating areas although these are controlled by the Industrial and Trade Activity provisions of the Unitary Plan.

| | 3a. Status Quo (75% TSS) | 3b. Based on contaminant of concern and receiving environment (proposed) | 3c. Case by case assessment and design |
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| Appropriateness | This past approach to stormwater treatment, while simple and well accepted, is not considered appropriate to achieve objectives as it focuses on sediment and not contaminants of concern. | It provides a targeted, cost-effective approach to stormwater contaminant reduction and is considered to be the most appropriate approach to achieve the objectives in relation to improved stormwater and downstream freshwater quality. | While this option will be effective in achieving the objectives relating to improved stormwater/freshwater quality, it is not the most appropriate method given the potentially significant administration/enforcement costs and the uncertain context for development. |
| Effectiveness | <ul style="list-style-type: none"> This approach has proven to be limited in its effectiveness to treat contaminants of concern, often resulting in the selection of inappropriate devices, poor rates of contaminant removal and an inability to achieve improved environmental outcomes that give effect to the strategic direction. A generic performance standard based on removal makes no allowance for influent concentrations and hence no incentive for reduction at source. | <p>It will be more effective in:</p> <ul style="list-style-type: none"> Reducing new and existing adverse effects by targeting contaminants of concern having regard to receiving environment needs Achieving desired freshwater and coastal environment objectives. | While this option offers the most effective and targeted approach to manage stormwater quality, it provides an uncertain context for development, and it would be costly and resource demanding to administer. |
| Efficiency | It is well-established and understood. However, it can also result in the poor selection of inappropriate devices and rates, making it inefficient at achieving the desired outcomes. | <ul style="list-style-type: none"> It is a similar approach to current practice and while it will take some time to become common practice, it will be supported by technical guidance It is a more efficient way of achieving outcomes as it is targeted at specific contaminants and receiving environment needs. | <ul style="list-style-type: none"> There are potentially significant transaction costs to determine the most appropriate stormwater treatment device/method on a case-by-case basis. This would create costs and uncertainty for developers. It would also be costly and inefficient for council to administer and enforce, with ongoing compliance costs. While this option may achieve the most beneficial environmental outcomes, these benefits are unlikely to be commensurate with the costs incurred by all parties involved from this highly regulatory approach. |
| Costs | <ul style="list-style-type: none"> TSS is not a good surrogate for most contaminants and can lead to selection of inappropriate devices. A device can be designed and implemented to remove 75 per cent of TSS but this is not always effective in removing other contaminants. It may result in an increase in contaminant (i.e. metal) concentration in receiving environments and associated costs. | <ul style="list-style-type: none"> It is more limiting on device selection as not all devices suitable. It is more complex and difficult to develop and administer than generic treatment requirements. Guidelines will be required | <ul style="list-style-type: none"> This is a very regulatory/intensive approach for council/land owners/developers with associated costs. Inevitably, it would require a high degree of assessment and customisation. It does not provide certainty to development about performance standards with requirements negotiated on a case-by-case basis. It is likely to lead to significant uncertainty and transaction costs for developers and council. |
| Benefits | <ul style="list-style-type: none"> It is relatively simple to understand and well accepted by industry. The treatment devices to achieve the desired standard are reasonably well-established with supporting technical guidance. It increases the range of devices able to be used | <ul style="list-style-type: none"> It enables contaminant management to better align to both the nature of the contaminants and receiving environment sensitivity, providing a more targeted and effective approach. A performance-based approach enables consistency, certainty and transparency of requirements for a range of land uses activities and allows for flexibility as to how outcomes are to be met. It provides an equitable approach and can take into account other measures such as reduction at source. It will lead to improved environmental outcomes based on proven efficiency, so it is achievable and consistent with legislative and strategic direction. It is new to industry, but not significantly different with main | <ul style="list-style-type: none"> It is the best option to manage stormwater contaminants in a targeted manner based on the nature of the land use, the type of contaminants being generated on site, and the sensitivity of the receiving environment. It would provide a strong framework to improve environmental outcomes by reducing new and mitigating existing adverse effects consistent with strategic direction. |

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| | | <p>changes in relation to device selection which will be supported by technical guidance.</p> <ul style="list-style-type: none"> It is the most likely future proof option with implementation of NPSFM. | |
| Risks | Risks include inappropriate selection of treatment devices and poor rates of contaminant removal leading to undue costs to developers and councils, and continued environmental degradation. | The risks associated with this policy are low as reducing stormwater contaminants is an accepted and appropriate requirement for developers to protect and enhance freshwater quality. | The primary risks relate to the costs, uncertainty and variability associated with this case-by-case approach both for developers and council. |

| | 4a. All areas | 4b. Based on receiving environment | 4c. High contaminant generating areas (proposed) |
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| Appropriateness | While this option may provide a more comprehensive approach it will not necessarily lead to the best outcomes and is therefore not the most appropriate option to achieve the stormwater objectives | Currently, there appears to be limited benefit in moving to a receiving environment-based approach as such an approach is likely to cover most of the region in the absence of more specific identification of specific receiving environment values. However, this may be a more appropriate approach following the implementation of the NPSFM and marine spatial planning to identify priority areas and associated requirements. | Focusing stormwater treatment requirements on the contaminants and loads of greatest concern is considered an appropriate method of achieving the desired community and water quality objectives while minimising the costs to developers and land owners. |
| Effectiveness | While this option may provide a more comprehensive approach, it is unlikely to be the most effective overall as it is not focused on treating the contaminant of concern. The risk is that costly stormwater treatment requirements are imposed without a corresponding improvement in stormwater quality management which is not cost-effective and sustainable solution long-term. | <ul style="list-style-type: none"> It is likely to be more effective in target areas, but only if a higher level of performance is specified. It is less effective outside target areas. Sensitive areas have not currently been identified and are the subject to future processes (NPS implementation, marine spatial planning). | Focusing management of stormwater contaminants where they occur at the highest level is the most cost-effective approach to reducing contaminant loads. This will help achieve objectives to maintain/improve water quality and prevent further degradation of Auckland's freshwater and marine systems. |
| Efficiency | <ul style="list-style-type: none"> There are likely to be significant and often undue costs associated with treating all stormwater runoff generated on-site rather than focus on effective treatment of areas of most concern. The end result is likely to be stormwater treatment costs that often outweigh the environmental benefits achieved which is not an efficient approach for developers or the community. | <ul style="list-style-type: none"> It is likely to be efficient by targeting priority areas. However, these areas are likely to be extensive in the absences of receiving environment values. It may impose requirements on activities that contribute less load and hence a less efficient and less cost-effective approach to reducing contaminant loads. | This option is efficient at reducing contaminant loads by targeting high load areas, with resulting environmental benefit. However, as it is a new approach, there will be a significant learning curve with resulting inefficiencies of application initially. |
| Costs | <ul style="list-style-type: none"> Larger devices would be required to treat stormwater runoff. This may be difficult to fit into the site and involve significantly greater cost. It could potentially result in undue cost on development by requiring treatment of all site runoff rather than focusing on areas of concern. | <ul style="list-style-type: none"> Costs would depend on the extent of sensitive environments with initial assessments suggesting more than 80 per cent of region would be deemed "sensitive". Costs would reduce outside sensitive areas but likely increase for activities inside them, as treatment requirements would likely be more significant. This does not address the issue that contaminants can move in the environment and hence effects may be more far-reaching, resulting in degradation outside the target area with resulting environmental costs. | <ul style="list-style-type: none"> There will be costs to implement contaminant reduction/stormwater treatment devices for HCGAs and to maintain these devices. Applying requirements at the time of development or redevelopment will reduce marginal costs. Costs will also be reduced by applying requirements to specific areas and the entire site where thresholds are reached. There will be a regulatory cost associated with on-site management/application of devices and on-going compliance. |
| Benefits | <ul style="list-style-type: none"> It provides more comprehensive treatment of stormwater runoff from sites, but not necessarily better outcomes. | <ul style="list-style-type: none"> It is more effects-based. It enables requirements to be targeted in priority areas to improve outcomes in key areas. | <ul style="list-style-type: none"> This approach focuses on contaminants and loads of greatest concern providing the most cost-effective contaminant reductions. The traditional approach to stormwater quality treatment - catchment or development scale ponds or wetlands - is expensive and relatively inefficient. This supports an |

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| | | | <p>approach of targeting high contaminant yielding areas rather than applying widespread treatment to remove contaminants.</p> <ul style="list-style-type: none"> • Device size is reduced, resulting in lower cost for developers/site owners. • It will reduce existing adverse effects and improve environmental outcomes irrespective of location. • A performance-based approach enables consistency, certainty and transparency of requirements for HCGAs. It also allows for flexibility on how outcomes are to be met which may vary depending on the nature of the contaminants and sensitivity of the receiving environment. |
| Risks | The risks relate to excessive costs to implement stormwater large treatment devices without necessarily resulting in a better outcome. | Priority areas are difficult to identify and will likely change following subsequent processes. | <ul style="list-style-type: none"> • HCGAs are not well defined or are not representative of the full range of activities that generate high contaminant yields. • Managing HCGAs alone may not be sufficient to achieve necessary contaminant reductions. |

3.3 Stormwater volume/flow management

Introduction

The loss of freshwater systems and the degradation of their values, particularly streams, as a result of stormwater runoff is a significant issue for the region. The introduction of impervious surfaces into a catchment, unless mitigated, significantly increases stormwater volumes and flows and can have profound effects on the physical structure, ecosystem health and functioning of freshwater systems (Auckland Council 2013). Past development has resulted in both the physical loss and significant modification of streams throughout Auckland's urban area with associated adverse effects on natural values and amenity.

While some legacy plans contain provisions to manage stormwater flow, these are rare and generally only apply to new development areas. The regional stormwater discharge framework for managing flow also has limitations. The Unitary Plan therefore provides an opportunity to both rationalise and improve the provisions across the region for managing stormwater runoff.

The proposed management of stormwater volume/flow in the Unitary Plan is through the following approaches:

- water-sensitive design applied to greenfield and redevelopment;
- hydrology controls in areas catchments identified high sensitivity/value to increased stormwater flows as SMAF or SMAF overlays;
- the control of impervious surfaces and runoff volumes in areas outside the SMAFs.

Within SMAF areas, it is proposed to apply the hydrology controls to small areas of increased impervious surface at a site level, with the threshold for controls set at 25 m² of new or redeveloped impervious surface. This is considered necessary to address the challenge of impervious surface creep and the difficulties in managing cumulative effects on streams unless low thresholds are used.

In respect of hydrology controls, the Unitary Plan proposes a change in approach from the traditional management of peak flows to one focussed on volume reduction. The reasons for this are discussed in detail in Auckland Council (2013). However, the primary reason is that traditional flow control approach of the existing plans does not reduce the volume of water but rather reduces the peaks and spreads the flows out over a longer period of time. While this reduces peak flow effects such as flooding, it increases the time over which the smaller erosive flows occur and can lead to increased stream erosion. Minimising both peak and erosive flows requires that the volume of stormwater runoff be reduced.

Options and Alternatives

A number of options and alternatives have been considered in respect of stormwater volume/flow management:

5. Spatial application across the region;
6. Threshold at which the controls apply;
7. Stormwater volume control vs. management of peak flow.

In terms of the spatial application of controls, the following alternatives have been considered:

- 5a. No flow controls;

- 5b. The application of stormwater flow controls in SMAF areas;
- 5c. The application of stormwater flow controls in SMAF areas and zone impervious area thresholds outside SMAF areas (proposed).

Option 5a would mean no stormwater flow controls, with areas of new impervious area only regulated by zone limits.

Option 5b would involve the application of flow controls solely in SMAF areas. SMAF areas are (sub) catchments identified as sensitive to increases in stormwater flows with values that can be protected or enhanced through managing stormwater flows.

Option 5c is similar to Option 5b, but with the additional application of stormwater flow controls outside SMAF areas aligned to the impervious threshold limits for the relevant zone.

In respect of the threshold for flow controls, the following alternatives have been considered:

- 6a. A threshold of 25m² impervious area for the adoption of flow controls in SMAFs (proposed)
- 6b. A larger impervious area at which hydrology controls are required.

Option 6a would involve SMAF controls being triggered at a low level of impervious surface development or redevelopment. Under option 6b, SMAF controls would be triggered at a higher level of impervious surface development or redevelopment.

The following alternatives have been considered in respect of the management of stormwater flows:

- 7a. Managing peak flows (status quo)
- 7b. Primarily managing stormwater volumes (proposed).

Option 7a represents the status quo in most areas, where stormwater flow are managed based on peak flow rates in specified storm events. Option 7b would seek to reduce stormwater volumes from a site.

The tables below discuss each alternative compared to the proposed alternative.

| | 5a. No flow controls | 5b. The application of flow controls solely in SMAF areas | 5c. The application of stormwater flow controls in SMAF areas and zone maximum impervious area outside SMAF areas (proposed). |
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| Appropriateness | This option is not considered to be appropriate to achieve the objectives in relation to stormwater, particularly in relation to reducing stormwater flow, preventing further degradation of freshwater systems and enhancing these systems. | <ul style="list-style-type: none"> This option have been proven to be an achievable and appropriate approach to achieve outcomes sought in relation to protection and enhancement of stream health as is modelled on recent plan changes in Auckland. It is consistent with the strategic direction which seeks to protect high value freshwater area and enhance degraded ones | As for Option 5b with the additional benefit of enabling growth in areas outside SMAFs while maintaining stream health and the capacity of the stormwater network. |
| Effectiveness | <ul style="list-style-type: none"> This option would not address the issues associated with increased stormwater flow, including the loss of stream systems and adverse effects on ecosystem health. There are also significant risks in not effectively managing stormwater flow as Auckland grows and intensifies, as evident by past development practices. This option would not be effective in achieving the desired community and environmental outcomes | <ul style="list-style-type: none"> Managing flows within the contributing catchment is one of the most critical factors in retaining/enhancing stable, healthy streams and their associated natural and amenity values. This option would be effective in enabling development while minimising the further degradation of sensitive and high value urban streams which is a significant issue for the Auckland region. It has also proven to be an achievable approach and is modelled on a similar approach successfully adopted and implemented by a legacy council in the region | <ul style="list-style-type: none"> As with Option 5b for SMAF areas. This option enables development while ensuring runoff from development does not exceed the capacity of the stormwater network. |
| Efficiency | While this option would be efficient to administer and implement, there would be significant environmental and community costs associated with the continued loss, modification and degradation of freshwater systems throughout the region. Therefore, it would not be an efficient method of achieving the desired outcomes. | <ul style="list-style-type: none"> This option requires significant regulatory intervention and industry up-skilling. It is an efficient method of achieving improved outcomes in sensitive stream catchments as communal solutions do not reduce stormwater volumes. | As with Option 5b. |
| Costs | <ul style="list-style-type: none"> With no controls other than impervious surface limits, there would be continued loss of freshwater systems and degradation of their values from stormwater runoff. A lack of controls may also reduce the effectiveness of the stormwater network by allowing impervious areas to be developed in excess of network design capacity, leading to increased flooding and other issues, and associated remedial costs. | <ul style="list-style-type: none"> There will be greater costs for development in SMAF areas as a required of stormwater flow requirements. Compliance monitoring would be required. Industry would need to get up to speed with requirements and techniques. | <ul style="list-style-type: none"> As per Option 5b for SMAF areas. Potential for additional costs to developers outside SMAF areas to meet impervious area limits or implement flow mitigation to achieve the same level of runoff. However, this is offset by benefit of additional development. |
| Benefits | <ul style="list-style-type: none"> It is a simple regime to administer. There are lower costs for developers/property owners. | <ul style="list-style-type: none"> It enables stormwater flow management to be better aligned to sensitivity and values of the receiving environment. SMAF devices (bio-retention, porous paving and rain water tanks) are consistent with the water-sensitive design approach and effective in managing smaller more frequent stormwater flows (1-2 ARI) to reduce erosion and maintain/enhance stream health. Stream health would be maintained or enhanced in identified areas. It provides for development while protecting receiving environment values. | <ul style="list-style-type: none"> As per Option 5b for SMAF areas. It helps manage the capacity of the stormwater network to cater for intensification. It is the most comprehensive approach to protecting /enhancing stream and harbour quality which provides significant recreational, amenity and economic value to Auckland. |
| Risks | This option presents significant risks to the physical structure, ecosystem health and functioning of freshwater systems. It would lead to continued development practices that exacerbate stormwater flows and result in the continued physical loss and | <ul style="list-style-type: none"> Performance standards may be difficult to achieve in some sub-catchments. On-site conditions (contaminated land, instability) may | <ul style="list-style-type: none"> As for Option 5b. <p>This may result in increased flood risk if impervious areas are consistently allowed to significantly exceed zone thresholds as</p> |

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| | significant modification of streams throughout Auckland's urban area. | preclude some mitigation options. | controls have less effect in larger storms. |
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| | 6a. A threshold of 25m² impervious area for the adoption of flow controls in SMAFs (proposed) | 6b. A larger impervious area at which hydrology controls are required |
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| Appropriateness | <ul style="list-style-type: none"> Despite the increase in regulatory processes and requirements for residential and industrial sites, this is the most effective (and possibly the only) method of reducing cumulative increases in stormwater flows. | <ul style="list-style-type: none"> Despite the increase in regulatory processes and requirements for residential and industrial sites, site management of stormwater is an effective (and possibly the only) method of reducing stormwater flows to streams that will achieve multiple stream and community outcomes. However, the establishment of an appropriate threshold for hydrology controls to be implemented is critical to ensuring the desired stream health outcomes are achieved. A higher threshold increases the risk of cumulative effects. |
| Effectiveness | <ul style="list-style-type: none"> This option provides an effective way of managing the cumulative adverse effects of stormwater runoff on sensitive/high values urban streams. It helps to manage the challenge of managing the 'death by a thousand cuts', which is a significant resource management issue. Reducing flows at source is the most effective way of reducing stormwater flows. It is not practical to reduce flows at a catchment scale as these devices can detain flows but not reduce them easily or effectively. | The higher the threshold, the less effective in managing the 'death by a thousand cuts'. |
| Efficiency | <ul style="list-style-type: none"> This option will require increased regulatory processes, including resource consents and compliance and associated compliance. Given the low threshold, the hydrology requirements will apply to a large number of sites. However, efficiency has been considered and consents have been identified as controlled activities, with focussed matters of control, to streamline consent processes and minimise requirements. | Depending on the threshold, less development will be affected with reduced regulatory processes. However, efficiency has been considered and consents have been identified as controlled activities, with focussed matters of control, to streamline consent processes and minimise requirements. |
| Costs | <ul style="list-style-type: none"> Additional costs: <ul style="list-style-type: none"> to house owners/developers/road controlling authorities in SMAF areas due to an increased stormwater management requirements. associated with resource consents and regulatory processes (minimised due to controlled activity status) On-going: <ul style="list-style-type: none"> operation and maintenance costs compliance costs. | <ul style="list-style-type: none"> The costs will be much the same as for Option 6a. However, overall, the costs will be less due to the higher threshold at which controls are required. Reduced environmental outcomes will result, with associated environmental costs. |
| Benefits | <ul style="list-style-type: none"> Significant mitigation of new impervious areas in sensitive stream catchments. Reduction of existing stormwater stress on streams as redevelopment of existing areas would be used as an opportunity to address existing effects. Improved stream health and quality. The ability to more effectively provide for multiple urban stream values, consistent with Auckland Plan aspirations. This threshold is already in place in some parts of Auckland and is more consistent with site scale requirements than the current 1000m², which would not capture the residential sites that comprise much of the SMAF areas. The threshold allows minor increases to be undertaken as a permitted activity. | As for costs, the benefits for this option are the same as for Option 6a, but will be less due to the more limited application of controls. |

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| Risks | <p>Key risks include:</p> <ul style="list-style-type: none"> • The industry does not have the capacity to support widespread application of SMAF controls/devices • Significant resistance to installing stormwater management devices on private property • On-going compliance monitoring/management of a large number of sites may be difficult to achieve • Change and redevelop does not occur fast enough to address existing effects. | Key risks are the same as for Option 6a, but are generally less given the more limited application of controls. |
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| | 7a. Status quo (managing peak flow) | 7b. Primarily managing stormwater volumes (proposed) |
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| Appropriateness | Solely managing peak flows will not achieve the objectives for stormwater through the Unitary Plan, particularly in relation to streams. | It is the most appropriate and effective method of achieving the objectives, particularly for streams, but also provides flexibility to be used in combination with peak flow management where volume control is not applicable. |
| Effectiveness | It is not highly effective as it does not address the primary management issue, which is the erosion of stream channels. However, it does reduce adverse effects to some extent so is partially effective. | Volume reduction is an effective method of reducing stormwater effects on freshwater systems and enhancing stream base flow, aquifer recharge and other values. |
| Efficiency | It is as efficient to implement as current practice and can be achieved by a variety of stormwater management devices | It is less efficient to implement as it limits the devices that can be used, particularly communal devices that are limited in their ability to reduce stormwater volumes. Additionally, volume control cannot be used in all circumstances and hence alternative options are required. |
| Costs | <ul style="list-style-type: none"> • Costs are generally well accepted as part of (greenfield) development. • It does not address effects and, in some cases, may worsen them by reducing peak flows by extending the duration of moderate flows that cause erosion and sedimentation. • It doesn't encourage water-sensitive design as it does not reduce stormwater volumes, making it inconsistent with other policy approaches in the Unitary Plan and the strategic direction in the Auckland Plan. • It does not provide for base-flow/aquifer recharge. | <ul style="list-style-type: none"> • There is a similar cost to devices for managing peak flows, but some limitation on the types of devices that can be used as some do not reduce stormwater volumes. • It is not applicable everywhere as it can lead to instability/other adverse effects such as mobilising contaminants in soil, stability. Peak flow management still required in some circumstances. |
| Benefits | <ul style="list-style-type: none"> • It is an accepted methodology that is well understood by development community. • Detention can be provided both on-site or in a communal device. | <ul style="list-style-type: none"> • It reduces overall flow which is a more effective approach to reduce adverse effects on streams and leads to corresponding ecosystem and water quality benefits. • It is consistent with water-sensitive design principles, making it complementary to other Unitary Plan policy approaches. • It provides for aquifer and stream recharge/base flows by increasing infiltration. |
| Risks | The key risk is that improved outcomes, as envisioned by the Auckland Plan and the NPSFM, will not be achieved. | <ul style="list-style-type: none"> • There are risks to land stability in some areas. • Industry may oppose limitation on use of some common devices due to their inability to reduce volumes. |

4 Conclusion

The proposed management options identified above and included in the proposed Unitary Plan are considered the most appropriate approach to achieve the outcomes sought for stormwater through the Unitary Plan. In particular, they:

- Address the key issues for stormwater management in the Auckland region, including minimising the adverse effects of new development and the progressive reduction of existing adverse effects (see section 1.2).
- Enable deficiencies in the current stormwater management approach to be addressed (see section 1.6) and provide a more consistent, clear and equitable approach across the region.
- Give effect to the national requirements of the RMA, NPSFM, NZCPS and HGMPA, and in particular expectations regarding improving and maintaining the quality of freshwater systems and downstream marine environments.
- Enable the multiple aspirations of the Auckland Plan, including community and Mana Whenua, to be met to enable Auckland to grow and intensify in a sustainable manner consistent with the green growth vision.
- Provide for intensification in a way that seeks to reduce adverse effects instead of incrementally increasing effects.
- Minimise cost by requiring improvements in stormwater management to be implemented as part of redevelopment.
- Focus on problem issues (HCGAs) or sensitive areas (SMAFs).
- Provide greater clarity and certainty to site owners and developers to enable efficient design, development and consenting processes.

It is recognised that the proposed provisions will likely increase development costs, particularly in SMAF areas and in respect of addressing HCGAs. However, improved stormwater management is required to achieve multiple community and environmental management outcomes and costs have been minimised by providing for upgraded stormwater management to occur at the time of development/redevelopment.

5 Record of Development of Provisions

5.1 Information and Analysis

Stormwater management has been a significant issue in Auckland for several decades due to the extent of urban development and the high value and sensitivity of receiving environments. As a result, a large body of scientific and technical research has been undertaken to support and refine stormwater management issues and approaches. This work includes:

- The nature of stormwater and sources/loads of contaminants.
- The monitoring of stream water and sediment quality and marine sediment quality, including trends over time.
- Effects on receiving environments including stream health, water and sediment quality and benthic health.
- Computer modelling of the fate and accumulation of stormwater contaminants.
- Methods to reduce stormwater contaminants concentrations and loads including control/reduction at source and treatment devices.

- Methods to manage peak flows and stormwater volumes, including retention and detention.
- Costs of stormwater management/mitigation (generally high level regional assessments).

The information of most relevance to the proposed Unitary Plan provisions has been collated and summarised in Auckland Council (2013). This report is currently being finalised and peer reviewed and will be released for public consideration prior to the notification of the proposed Unitary Plan.

Council is currently continuing with the development of a companion technical report that provides cost estimates associated with meeting the contaminant and flow management requirements of the plan.

Council is also completing work on technical publications that will assist in enabling the stormwater provisions of the proposed plan to be met including:

- GD 01: Auckland Council Guideline for Stormwater Best Management Practice; and
- GD 04: Water Sensitive Design Guideline for the Auckland Region

These documents will be available on the Council website once completed.

Appendices

Appendix 3.24.1 Auckland Unitary Plan stormwater management provisions: Technical basis of contaminant and volume management requirements. Auckland Council technical report, TR2013/035 and appendices.

5.2 Consultation and Decision Making

A summary of the process of the development of the stormwater provisions, including key milestones and decisions is provided below. As can be seen by the table, there has been an extensive process for the development of the stormwater provisions.

TIMELINE OF KEY MILESTONES AND DECISIONS

| Date | Event | Key milestone or decision | Relevant reports/ notes |
|-------------|--|---|-------------------------|
| Dec 2010 | Summary of key stormwater management messages for Auckland Plan approved by stormwater unit (SWU) management and delivered to Auckland Plan workstream leads | Identified key flooding, environmental and infrastructure matters and directions for inclusion in the Auckland Plan, many of which are also implemented through the Unitary Plan | SW001 |
| 21 Jun 2011 | Presentation of draft SWU implementation plan to Environment and Sustainability Forum | <ul style="list-style-type: none"> • Established SWU vision and key principles which direct input to Auckland Plan and Unitary Plan, particularly: <ul style="list-style-type: none"> ○ integrated land use and stormwater planning ○ commitment to water- sensitive design ○ prevention of new adverse effects and prioritised resolution of existing adverse effects | SW002 |

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| | | <ul style="list-style-type: none"> o management of source/at source with prioritised communal/public solutions | |
| 7 Nov 2011 11 Nov 2011 | | Established outcomes sought by SWU in the Unitary Plan through two SWU workshops with environmental strategy and policy representation | SW003 |
| Initial meeting 12 Feb 2011. Regular meetings throughout 2011/2012 | Hydrology and water quality technical parameters workshops with technical specialists within SWU, CLAW and RIMU | Establish parameters for inclusion in policies and rules | SW005 |
| 30 Nov 2011 | | Stormwater input to Unitary Plan outcomes matrix. Approved by R Bannister and J Heijs, 29 Nov | SW006 |
| Jan 2012 | | Unitary Plan outcome matrix | SW006a |
| Feb 2012 | Stocktakes of water and flooding provisions in legacy plans | | SW006a |
| Feb 2012 | Flooding and Stormwater Management Issues and Options Paper delivered to Unitary Plan workstream lead | Establishes preferred approach for flooding and stormwater management policy development, in response to statutory requirements, national policy statements and Auckland Plan | SW007 |
| 28 Feb 2012 31 Jul 2012 | Meeting with Watercare | Establish approach to stormwater management in combined sewer area – agreed no increase in flows for sites discharging to combined sewer. Watercare to provide map of CSA, to be non-statutory information | SW008 |
| 28 Feb 2012 | Meeting with stormwater hydraulic modelling team | Agreed ability to deliver 100-year ARI flood plain maps and flooding maps should not be included in the Unitary Plan | SW009 |
| 1 Mar 2012 | Stormwater management input to engagement workshops with iwi on freshwater | Engagement | SW010 |
| 28 Mar 2012 | First draft flooding and stormwater management RPS and regional/district objectives and policies delivered to Unitary Plan workstream lead | | SW011 |
| 3 Apr 2012 2 May 2012 16 May 2012 | Integration of stormwater RPS and regional/district with Freshwater topic | | SW012 |
| 10 Apr 2012, 20 Apr 2012 | Watercare involvement in integration of stormwater and wastewater discharge provisions | Engagement | SW013 |

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| 17 May 2012 | Meeting with stormwater technical services regarding Technical Publication 10 (GD01) alignment with Unitary Plan | | SW014 |
| 8 Jun – 9 Jul 2012 | Series of workshops with SWU, RIMU and CLAW technical specialists on aspects of stormwater management and flooding rules | Topics include flooding, land use rules for quality and quantity, stormwater discharge rules, network discharges and BPO, growth, structure planning, infrastructure | SW015 |
| 25 Jul 2012 16 Aug 2012 | Presentation of flooding and stormwater management provisions to Unitary Plan senior management group | Strong focus on flooding constraints associated with intensification areas. SWU agree to assess constraints in Terraced Housing and Apartment Buildings zone | SW016 |
| 3 – 15 Aug 2012 | Stormwater Management Area – flow mapping and moderation by catchment management planning and hydraulic modelling | | SW017 |
| Aug 2012 | Delivery of amended integrated freshwater RPS and regional/district objectives | | SW019 |
| 31 Aug 2012 | Stormwater management and flooding objectives, policies and rules delivered | | SW019 |
| 6 Sep 2012 | Presentation to PWP | Information only – no direction from PWP | SW020 |
| 7 Sep 2012 | Presentation to annual stormwater seminar | Engagement – no feedback sought | SW021 |
| 19 Sep 2012 | Response to legal opinion on excluding natural hazard maps from the Unitary Plan | SWU provide justification for exclusion of flood plain maps from the Unitary Plan while making them publicly available | SW022 |
| 25 Sep 2012 7 Nov 2012 5 Dec 2012 12 Dec 2012 | Engagement workshops with NZTA and AT about stormwater quality, quantity and discharge rules | | SW023 |
| 28 Sep 2012 | Internal workshop with cross-council freshwater special interest group | Engagement. Biodiversity teams raised concern that SMAFs aren't extensive enough. Initial feedback that flow effects on fish need to be included | SW024 |
| 1 Oct 2012 | Presentation of assessment of flooding constraints in Terraced House and Apartment | Decisions re apartments | SW025 |

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| | Buildings zone to Penny Pirrit and John Duguid | | |
| 31 Oct 2012 | Delivery of SWU feedback on 31 August draft Unitary Plan | | SW02x |
| 31 Oct 2012 | Presentation of stormwater management and flooding provisions to PWP | Supported directions of proposed stormwater approach but seeking further information on implications for development in floodplains, and extent of application of stormwater provisions at mapping workshops | SW026 |
| Oct 2012 | Stormwater management area flow shape files delivered to Unitary Plan GIS | | SW027 |
| 8 Nov 2012 | Meeting with John Duguid re delivery of flooding provisions | <ul style="list-style-type: none"> • Agreement to remove maximum impervious areas from Stormwater Management provisions and include in zones. <ul style="list-style-type: none"> ○ Agreement for GIS to amend zone maps as advised by SWU Terraced Housing and Apartment Buildings flooding constraints assessment and recommendation | SW028 |
| 20 Nov 2012 | Riparian margin provision review workshop | | SW029 |
| 30 Nov 2012 | Policy Advisory Group meeting with NZTA, AT and Watercare | <ul style="list-style-type: none"> • SWU and natural environment workstream advised to work with NZTA and AT to reach agreement on stormwater quality, quantity and discharge provisions prior to year end. | SW031 |
| 7 Dec 2012 | ICON formatted stormwater management and Flooding provisions delivered | <ul style="list-style-type: none"> • Amendments to stormwater management provisions: <ul style="list-style-type: none"> ○ Table 1 Maximum impervious areas removed as they are now in zone activity tables and cross-referenced to stormwater management rules. Wording of the relevant rules amended ○ One line in Table 1 did not refer to a zone but to sites that are not connected to the public stormwater network. The zone activity tables now point these sites straight to SW rules with no trigger specified in the activity tables, so stand alone rules have been added ○ <i>'Not connected to the public stormwater network'</i> is used instead of unserved, as unserved definition relates to wastewater and water supply not stormwater. A definition for public stormwater network is being submitted with definition amendments ○ Rules relating to the road network are included... noting these are still in negotiation with NZTA/AT as decided by the PAG until the end of December | SW032 |
| 14 Dec 2012 | Delivery of RPS and regional/district | <ul style="list-style-type: none"> • SWU feedback on the 31 August working draft Unitary Plan noted shortcomings in | SW032a |

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| | objectives stream and riparian management policy | policy relating to stream loss and riparian areas. Amendments to stream and riparian management policy were offered to Unitary Plan workstream leads. | |
| 15 Jan 2013 | Delivery of provisions for stormwater management including updated road network provisions | | SW033 |
| 18 Jan 2013 | Unitary Plan Oversight Group feedback on stormwater management and flooding provisions | Removal of maximum impervious areas from commercial and some industrial zones (retained in business centres) | SW035 |
| 22 Jan 2013 | Delivery of unitary plan provisions for stormwater management and flooding amended in response to Unitary Plan Oversight Group to Unitary Plan editorial team | | SW036 |
| 1 Mar 2013 | Flood prone area meeting with stormwater hydraulic modelling | Agreement to prepare policy proposal for flood prone areas to present to Unitary Plan oversight group and PWP for inclusion in notified proposed plan | SW037 |
| 15 March 2013 | Draft Plan released for public submission | Milestone | |
| 25, 27, 28 Mar 2012 3 Apr 2013 | SWU workshops on stormwater management and flooding provisions in the Unitary Plan | Internal engagement | SW038 |
| 8 Apr 2013 | Stormwater industry engagement workshop on stormwater management and flooding provisions in the draft Unitary Plan | Engagement | SW039 |
| 22 Apr 2013 | Workshop with Water NZ. Stormwater special interest group to clarify questions for their feedback on the Unitary Plan | Engagement | SW040 |
| 10 May 2013 | Presentation to Water NZ. Conference breakout group focussing on Unitary Plan feedback | Engagement | SW041 |
| 10 May 2013 | SWU feedback across Unitary Plan presentations with infrastructure providers and with Council | | SW042 |

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| | sections | | |
| May to July | Amendment of SMAF overlay in response to internal technical advice | Development and application of methodology to incorporate fish susceptibility to flows in SMAF overlay identification | SW043 |
| May to July | Amendments in response to SWU technical advice and review | Inclusion of SMAF hydrology mitigation requirements Amendments to high contaminant generating activities and treatment requirements | SW044 |
| May to July | Consideration of comprehensive, internal, legal, and general public feedback on draft Plan and amendment of provisions in response | Amendments to feedback. Key amendments include: <ul style="list-style-type: none"> • Inclusion of a permitted activity for stormwater diversions and discharges from existing impervious areas; • Clarification of flow management and stormwater quality requirements; • A reduction in the consent status for some activities that cannot meet controls to restricted discretionary; • A reduction in repetition and clarification where possible; • Separation of stormwater management from wider integrated freshwater management objectives and policies; • Exclusion of farm tracks from impervious area calculations in rural areas; • Incorporation of a range of minor changes and amendments. | SW045 |
| 16 July 2013 | SWU consideration of key feedback requests | Response to feedback | SW046 |
| 31 July 2013 | Delivery of updated stormwater management provisions for Unitary Plan review group | Response to feedback and updating plan provisions | SW047 |
| 12 August 2013 | Unitary Plan review group | Final amendment and approval of stormwater management provisions | SW048 |
| 15 August – 23 August | Amendments to SMAF overlay | Amendments to align SMAF overlay with the Rural Urban Boundary, and to exclude Future Urban Zones and certain precincts which already have sufficient locally specific stormwater management provisions | SW049 |