HGI Plan Review: section 32 report for impervious surface controls

1.0 Executive summary

This report summarises the evaluation undertaken by the council to introduce rules for the use of impervious surfaces, in terms of section 32 of the Resource Management Act.

The main conclusions are:

- large areas of impervious surfaces may limit the ability to dispose of the stormwater and wastewater generated on small sites;
- impervious surfaces speed up the flow of stormwater and the opportunity for ground re-absorption is lost;
- when water is discharged from impervious surfaces, slope length and slope angle are critical factors in determining the velocity of runoff;
- long continuous slopes allow runoff to build up velocity and to concentrate flow producing erosion;
- the soil removed by erosion may contaminate adjacent streams and coastal areas. The concentrated flow may also cause flooding or erosion of adjacent properties; and
- runoff from large parking areas and driveways may also carry pollutants from motor vehicles into adjacent waterways.

2.0 Introduction

2.1 Purpose of this report

This report is to meet the section 32 requirements of the Resource Management Act.

2.2 Proposed plan provisions

The plan provisions seek to control the amount of impervious surfaces on small sites in the Hauraki Gulf Islands so that there is adequate room to provide for on-site wastewater disposal and stormwater disposal. Large amounts of hard impervious surfaces can also concentrate stormwater increasing the potential for flooding and erosion both on and off the site. The rules impose limits on the amount of impervious that can be used on sites less than 2000m^2 depending on the slope of land beneath and around the impervious surfaces. Controls are also proposed for commercial 1, 2, 3 and 5 land units recognising that the wastewater volumes from these sites may be less than residential sites and some of these sites may be able to dispose of their water to the street or into wetlands or other suitable areas. The rules recognise that sites in Oneroa may be connected to Owhanake sewage treatment plan and the controls on impervious surface can be relaxed for these properties.

2.3 Consultation

This section of the report briefly outlines the consultation that the council has undertaken to date and identifies any issues raised of particular relevance to the issue of impervious surfaces.

2.3.1 Consultation to date

The council undertook consultation in 2005 in preparation for drafting the proposed Plan.

Initial consultation

The main consultation period was from April to July 2005. Consultation during that period consisted of:

- public meetings, workshops, nga hui, and one on one meetings
- a photographic exercise on Waiheke
- inviting written feedback on a consultation document which contained issues and options papers on a wide range of topics.

Focus groups

At the close of consultation, the council analysed the feedback forms received. From these, key issues were identified that subsequently became topics for focus groups on Waiheke. The four topics for the focus groups were:

- landscape
- transport
- sustainability
- future planning (including subdivision, growth, and providing for business activity).

An additional workshop was also held on Great Barrier to give a further opportunity to discuss issues raised through the feedback forms.

Telephone survey

The council commissioned an independent research company to undertake a phone survey in late 2005. The survey was of a randomly selected sample of 1002 on-island residents and off-island ratepayers of Waiheke, Great Barrier and Rakino. The questionnaire used for the survey was designed to get responses on the key issues that had emerged from the consultation process and stakeholder feedback.

The survey provided a means of canvassing the views of a wide range of people who may not have been previously involved in the consultation process.

Consultation with other stakeholders

During the preparation of a proposed plan, the council has also consulted with the following parties:

- the Auckland Regional Council ('ARC')
- the Department of Conservation ('DOC')
- tangata whenua
- network utility authorities
- Ministry for the Environment (MfE).

Public notification

Notification of the Plan provides an opportunity for further public participation through the formal submission and appeal process.

2.3.2 Issues raised during consultation

The issues and option paper on impervious surface controls discussed the lack of control on impervious surfaces and suggested that a total impervious surface control could be developed for the significant residential land units on Waiheke or for all land units. Eighteen people/groups gave feedback on the issue and all agreed that there should controls on impervious surfaces. Some of those suggested slope should influence the amount of impervious surface allowed. Half of the respondents also thought that the controls should apply to all land units.

3.0 Resource management issues and objectives

3.1 Issues

Stormwater is not reticulated on the Islands so in most cases in must be disposed of on-site. With the exception of parts of Oneroa, wastewater must also be disposed of on-site. Sufficient permeable surfaces must be available for every site to dispose of both the stormwater generated from impervious surfaces such as driveways, parking areas and outdoor living areas on the site as well as the wastewater generated on the site.

Hard impervious surfaces:

- concentrate stormwater increasing the potential for flooding and erosion of the site, neighbouring properties, roads and streams and pollution of waterways;
- decrease stormwater infiltration into the soil and the recharging of aquifers, and
- decrease the land available for wastewater treatment and disposal and stormwater disposal.

Stormwater discharged from large driveways, parking areas and roads, collects suspended solids, heavy metals, oil, petrochemicals and other contaminants from motor vehicles. Stormwater discharged onto wastewater disposal fields may damage or affect the efficient operation of these fields.

Apart from controls on gross dwelling area (which controls floor area) and lot coverage (total building coverage on the site) the operative plan does not control the total amount of impervious surfaces such as concrete or tar seal that can be used for driveways, paths, parking areas, barbecue areas, outdoor living courts and other impervious surfaces.

In the proposed district plan island residential land units 1 and 2 are the significant residential land units on Waiheke and in conjunction with commercial 1, 2, 3, 4 and 5 land units, have the smallest allowable lot sizes (1500m^2 for commercial and 2000m^2 for residential land units) of all of the land units. Because of historical subdivision patterns, there are also some sites (e.g. Tryphena) on other land units or settlement areas that are 2000m^2 or less. On these small sites a lack of control on impervious surfaces may have detrimental effects as outlined above.

In some areas the Council will allow stormwater to be discharged onto the road or into areas such as wetlands and streams, but in many cases stormwater must be disposed off within the site.

The degree of vegetation cover and the slope of the land as well as soil type moderate absorption of stormwater. Soils on Waiheke are typically Waitemata sandstone/clay and in the absence of natural vegetation are easily waterlogged.

The length and steepness of land slope substantially affects the rate of soil erosion by water. As a general rule, the erosion rate triples as the slope doubles. Anything that reduces velocity such as reductions in gradient, physical obstructions, vegetation and ponding, reduce the ability of storm water to erode soils and transport sediment.

In other land units where lot coverage is permitted to be very high e.g. greater than 25% of the site area and the existing subdivisions are very small (e.g. less than 2000m^2) controls on impervious surface will be required so that both the wastewater and the stormwater can be disposed of on the site. Commercial land units, as well as the villages at Oneroa and Ostend (commercial 2) are established on flat to moderately sloping ground so the slope of sites in these areas should not significantly affect the disposal of stormwater from impervious surfaces.

The amount of wastewater discharged from commercial/industrial areas is generally less than that from residential areas because they usually do not use showers, baths or clothes washing machines. As a consequence the wastewater treatment of disposal systems in commercial/industrial buildings should require less land than comparably occupied residential buildings. Therefore, it is reasonable to allow an increase in the amount of impervious surfaces in commercial industrial areas where the land by nature is also reasonably flat.

In settlement areas where there is a mix of activities, the amount of impervious surfaces permitted in residential amenity areas should be the same as other residential areas. Similarly the amount of impervious surfaces permitted in local retailing areas within settlement areas should be treated the same as other commercial land units. It is also proposed that the same level of impervious surfaces be permitted in the Claris light industry area within the Claris settlement area.

The proposed Auckland Regional Plan: Air, Land and Water (ALWP) permits (as a permitted activity) the discharge stormwater from less than 1000m^2 of combined impervious surfaces provided that the discharge:

- does not cause scouring at the point of discharge;
- will not cause flooding in a 1 in 100 year storm of habitable floor levels;
- if it occurs outside the metropolitan urban limits of the plan (which includes all but western Waiheke) the average ratio of total impervious area to lot area for the subdivision or development shall be less than 6%; and
- primary sediment treatment is provided by methods such as cesspits or vegetated buffer strips.

For the permitted disposal of wastewater from a dwelling, the ALWP requires a gross lot area to discharge volume equal to or greater than 1.5 m^2 per litre per day. Depending on the number of people on site, water usage, and the wastewater treatment options used the gross site area required using this requirement (1.5m^2 per litre per day) could require a gross site area of over 700m^2. An additional reserve disposal area of 33% - 100% of the gross site area is also required by the ALWP in the event of a failure of the system or an underestimation of daily wastewater production.

3.2 Objectives

- To control the amount of impervious surfaces on small sites to minimise the adverse effects stormwater may have when concentrated by impervious surfaces, including flooding, siltation, erosion and pollution of adjacent properties and streams.

- To control the quality of stormwater discharged from large areas of impervious surface on small sites.

4.0 Statutory requirements under part II, sections 31, 32, 72 and 76 of the Resource Management Act

Section 74(1) of the RMA states as follows:

> A territorial authority shall prepare and change its district plan in accordance with its functions under section 31, the provisions of Part II, its duty under section 32, and any regulations.

Section 31 sets out the council's functions for the purpose of giving effect to the Act. The council's functions include:

(a) The establishment, implementation, and review of objectives, policies and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district:

(b) The control of any actual or potential effects of the use, development or protection of land including for the purpose of-

(i) the avoidance or mitigation of natural hazards; and

(ii) the prevention or mitigation of any adverse effects of the storage, use disposal or transportation of hazardous substances; and

(iii) the maintenance of indigenous biological diversity.

Section 72 states as follows:

> The purpose of the preparation, implementation, and administration of district plans is to assist territorial authorities to carry out their functions in order to achieve the purpose of this Act.

The following provisions of section 76 are also relevant:

(1) A territorial authority may, for the purpose of –

(a) Carrying out its functions under this Act; and

(b) Achieving the objectives and policies of the plan, -

include rules in a district plan.

…

(3) In making a rule, the territorial authority shall have regard to the actual or potential effect on the environment of activities, including, in particular, any adverse effect.

In achieving the purpose of the Act, the council must carry out an evaluation under section 32 of the RMA before publicly notifying a district plan or a plan change. Section 32(3) and (4) state as follows:

(3) An evaluation must examine –

(a) the extent to which each objective is the most appropriate way to achieve the purpose of the Act; and

(b) whether, having regard to their efficiency and effectiveness, the policies, rules, or other methods are the most appropriate for achieving the objectives

(4) For the purposes of this examination, an evaluation must take into account –

(a) the benefits and costs of policies, rules, or other methods; and

(b) the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules, or other methods.

The statutory requirements, including section 32 matters, are assessed below under the following headings:

- The extent to which each objective is the most appropriate way to achieve the purpose of the Act
- Whether the policies, rules, or other methods are the most appropriate for achieving the objectives
  - having regard to their efficiency and effectiveness
  - taking into account the benefits and costs of policies, rules, or other methods
  - taking into account the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules, or other methods.

4.1 The extent to which each objective is the most appropriate way to achieve the purpose of the Act

4.1.1 The purpose of the Act

Section 5 states that the purpose of the Act is 'to promote the sustainable management of natural and physical resources'. Section 5(2) states:

> (2) In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while-
>
> (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
> (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
> (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Environment is defined in Section 2 of the RMA as including:

> (a) Ecosystems and their constituent parts, including people and communities; and
> (b) All natural and physical resources; and
> (c) Amenity values; and
> (d) The social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) of this definition or which are affected by those matters:

Section 6 of the RMA identifies matters of national importance, which need to be recognised and provided for in achieving the purpose of the Act.

Section 7 deals with 'other matters' which, in achieving the purpose of this Act, persons exercising functions and powers under the Act shall have particular regard to. The matters of are of particular relevance to impervious surfaces are identified below:

Clause		
(a)	Kaitiakitanga	
(aa)	The ethic of stewardship	✓
(b)	The efficient use and development of natural and physical resources	✓
(ba)	The efficiency of the end use of energy	
(c)	The maintenance and enhancement of amenity values	✓
(d)	Intrinsic value of ecosystems	✓
(f)	Maintenance and enhancement of the quality of the environment	✓
(g)	Any finite characteristics of natural and physical resources	✓
(h)	The protection of the habitat of trout and salmon	
(i)	The effects of climate change	
(j)	The benefits to be derived from the use and development of renewable energy	

Section 8 provides that in achieving the purpose of the Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti O Waitangi).

4.1.2 Appropriateness in achieving the purpose of the Act

Objective: To control the amount of impervious surfaces on small sites to minimise the adverse effects stormwater may have when concentrated by impervious surfaces, including flooding, siltation, erosion and pollution of adjacent properties and streams.

Objective: To control the quality of stormwater discharged from large areas of impervious surface on small sites

The first objective is consistent with section 5(2) of the Act, because managing the amount of impervious surfaces on land will manage the use, development and protection of natural resources in a way, which safeguards the life-supporting capacity of air, water, soil and ecosystems.

The second objective is consistent with Section 7 of the RMA because controls on the quality of the stormwater discharged from large areas of impervious surface on small sites will contribute to the maintenance and enhancement of the quality of the environment.

4.2 Whether the policies, rules, or other methods are the most appropriate for achieving the objectives

The proposed policies are the most appropriate means of achieving the objectives because they seek to control the amount of impervious surfaces on small sites to prevent the adverse effects that stormwater may have when concentrated by those impervious surfaces. The policies also seek to control the amount of impervious surfaces on sites to minimise the contamination of stormwater by land use activities and motor vehicles.

The proposed rules will limit the total amount of impervious surfaces on sites less than 2000m^2:

- to 20% of the gross site area if the slope of the land around buildings and other impervious surfaces is greater than 1 in 4 (14^0);
- to 30% of the gross site area if the slope of the land is less that or equal to 1 in 4

For commercial 1, 2, 3, and 5 land units, the Claris light industry area and local retailing areas the total amount of impervious surface must not exceed 50% of the gross site area or 1000m^2 whichever is the lesser area. Where a site in Oneroa is connected to the Owhanake sewerage treatment plan the total amount of impervious surfaces may be increased to 75% of the gross site or 1000m^2 whichever is the lesser. Impervious surfaces on other land units or settlement areas are a permitted activity but will be controlled by the provisions of the proposed Auckland Regional Plan: Air, Land and Water.

The following options are the main alternatives which the council has considered as a means of achieving the objectives:

4.2.1 Option 1

Do nothing - have no provision in the district plan to address impervious surfaces, rely solely on the provisions of the Building Regulations 1992:

Benefits	**Costs**
No cost to land owner or developer in absence of rules; developers have greater flexibility for development. Avoids the need to apply for and the costs of a resource consent.	Potential increase in erosion and flooding if no controls on impervious surfaces. Potential contamination of streams and other water bodies from sediment created by concentrated water running off impervious surfaces. Potential loss of land available for on-site disposal of wastewater – especially likely

	loss of potential reserve areas needed in case of disposal failures with existing disposal systems. Potential loss of land required for on-site disposal of stormwater.
Clause E1 of the Building Regulations 1992 requires that buildings and site works to be constructed in a way that protects people and other property from the adverse effects of surface water. As a performance requirement the regulations require that surface water resulting from a storm having a 10% probability of occurring annually and which is collected or concentrated by site works must be disposed of in a way that avoids the likely hood of damage or nuisance to other property. This provision could be used instead of the district plan rules.	Site works are defined as work on a building site, including earthworks, preparatory to, or associated with, the construction, alteration, demolition or removal of a building – the performance standard does not specifically regulate the discharge of stormwater from driveways or parking areas.

The risk of acting or not acting

Whilst Clause E1 of the Building Regulations has a general requirement that the surface water from buildings and siteworks does not damage other property, the risk of acting on this option is an uncontrolled increase in impervious surfaces and a lack of control on the way stormwater is discharged from these surfaces. As noted previously a significant area of small sites is required for wastewater disposal and may be required for stormwater disposal. Large areas of impervious surface will decrease the area available for wastewater and/or stormwater disposal and may increase erosion and flooding on and off site. Erosion can cause the discharge of sediment into streams and waterways and the smothering of benthic organisms.

The risk of not acting on this option is possible confusion between the requirements of the Building Act and the requirements of the rules within the proposed plan.

4.2.2 Option 2

Education: This relates to the issuing of pamphlets, advocacy to developers and owners of sites:

Benefits	Costs
Lesser cost to Council, public and developers than developing district plan rules	No requirement for land owners or developer to comply with suggestions of education material. May be lack of acceptance of the importance of the issue if only voluntary acceptance is required.

The risk of acting or not acting

The risk of acting on this option is that property owners will either not read the information, will not refer to the information when they are increasing the area of impervious surfaces, or will ignore the information, Another risk of acting on this option, is how the information is delivered and the timing on when the information is delivered, e.g. will it be delivered too early and forgotten, or delivered too late to avoid incorrect decisions being made.

The risk of not acting on this option is that information may not be made available to persons who might use it when constructing new premises or when considering increasing the amount of impervious surfaces on their site.

4.2.3 Option 3

Have only a paved impervious surfaces that covers paths, driveways etc but excludes roofs of buildings.

Benefits	Costs
Benefit to owner because the paved impervious surface rule would not limit the size of roofs of buildings on sites even if site had maximum amount of paved impervious surfaces - roof area would be controlled by building coverage rule.	Because of lack of stormwater reticulation, may have adverse effects if water discharged from roofs is not adequately stored for reuse or not adequately disposed of on site. Roof areas may be largest part of impervious surfaces on site and can have potentially the largest effect if storage capacity undersized because of high rainfall in winter or lack of use.

The risk of acting on this option would be the lack of control on the discharge of stormwater from roof areas which may be the largest area of impervious surfaces on a site. Whilst nearly all sites may collect rainwater from roofs , the storage capacity may be undersized and/or it may not be collected from all roof areas. If houses or buildings are only used periodically and water consumption is low, water storage tanks may overflow particularly in the winter months.

The risk of not acting on this option is that other controls such as building coverage can control the area of roofs and clause E1 of the Building Code can control the discharge of water from buildings.

4.2.4 Option 4

Option 4: Use of proposed objectives, policies and rules.

Benefits	Costs
Provides certainty to users of the plan on what Council considers to be an acceptable level of impervious surfaces.	May reduce the potential size of buildings on the site or the amount of parking or other impervious surfaces.
More likely to provide sufficient area on site for waste water disposal and treatment and/or stormwater disposal. More reserve land available if existing on-site wastewater disposal system fails.	

Benefits	Costs
Should lessen flooding and erosion both on-site and off-site and decrease the siltation of rivers and waterways. Will increase stormwater infiltration and recharging of aquifers. Will decrease the discharge of suspended solids, heavy metals, oil, petrochemicals and other contaminants from parking areas.	Does not take fully into account site variation in soakage and ability to dispose of stormwater produced on-site.
Takes into account slope of land for all small sites except commercial 1, 2, 3 and 5 land units – erosion rate can triple as the rate of slope doubles.	Method to determine slope may not be true indication of potential for erosion to occur on all sites. Slope of land not included in rules for commercial 1, 2, 3, and 5 land units because of assumption that most sites in these areas are relatively flat.

The risk of acting or not acting

The Council is required to consider the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules or other methods. Anecdotal evidence by residents on Waiheke suggests that there are ongoing problems with the discharge of stormwater. Suggested causes have been insufficient rainwater storage capacity, causing the overflow of storage tanks in winter and the discharge of stormwater from steep driveways causing erosion of street channels and subsequently siltation of roads and streams. The slope of the land as a factor in erosion is widely recognised. The increase in stormwater runoff and peak flows in streams during rainfall events as an effect of increasing amounts of impervious surfaces in a catchment is also widely recognised.

The discharge of stormwater from large lots outside of urban areas is dealt with by the proposed Auckland Regional Plan: Air, Land and Water. Permitted activity rule 5.5.1 permits the discharge of stormwater from impervious surfaces from a new subdivision or development outside urban areas provided that the average ratio of total impervious area to lot area is less than 6%. The exceptions to this rule is where the land is zoned for future urban growth in the district plan and the development is in accordance with a structure plan (incorporated into the district plan) and an integrated catchment management plan; or the land is designated for a local road.

The risk of not acting on this option is lack of control on the amount of impervious surfaces that can be used on a site and/or a lack of recognition on how the slope of the land affects stormwater discharges.

4.2.5 Conclusion

Option 4 is considered to be the most appropriate to achieve the objectives as it can properly control the use of impervious surfaces so as to minimise stormwater runoff, runoff velocities and peak flows as well as the erosion, siltation and pollution of streams and waterways.

4.3 Whether the proposed rules assist the council to carry out its function of control of actual or potential effects of the use, development or protection of land

The proposed rules will help to avoid, remedy or mitigate the adverse effect of activities on the environment by restricting the area of impervious surfaces on small sites within the gulf islands. The inclusion of slope on all small sites except the commercial 1, 2, 3 and 5 land units, the Claris light industry area and local retailing areas (which by nature are generally flat) recognises the effect slope can have on stormwater runoff and the potential for erosion and flooding.

5.0 National planning documents

Section 75(3) of the RMA states:

> (3) A district plan must give effect to –
>
> (a) any national policy statement; and
>
> (b) and any New Zealand coastal policy statement; and
>
> …

5.1 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement 1994 states (policy 3.2.2) that the "adverse effects of subdivision, use or development in the coastal environment should as far as practicable be avoided. Where complete avoidance is not practicable, the adverse effects should be mitigated and provision made for remedying these effects, to the extent practicable."

Policy 3.2.7 states that policy statements and plans should identify any practicable ways whereby the quality of water in the coastal environment can be improved by altered land management practices, and should encourage the adoption of those practices.

The proposed objectives, policies and rules for impervious surfaces will give effect to policies 3.2.2 and policy 3.2.7 of the Coastal Policy Statement.

5.2 Hauraki Gulf Marine Park Act 2000

Section 9(3) of the Hauraki Gulf Marine Park Act 2000, requires the council to ensure that:

> … any part of a district plan that applies to the Hauraki Gulf, its islands, and catchments, does not conflict with sections 7 and 8 of this Act.

Section 7 recognises the national significance of the Hauraki Gulf and notes that the life supporting capacity of the environment of the Gulf and its islands included the capacity to maintain the soil, air, water and ecosystems of the Gulf and Section 8 provides management direction for the Gulf. Section 10 of the Act requires that sections 7 and 8 be treated as a New Zealand coastal policy statement under the RMA. Sections 7 and 8 are attached as **appendix A**.

The proposed objectives, policies and rules for impervious surfaces give effect to maintaining the soil, water and ecosystems of the Gulf [sections 7(2)(c)] and the protection of the life-supporting capacity of the environment of the Hauraki Gulf, its islands and catchments [section 8(a) of the Hauraki Gulf Marine Park Act 2000].

6.0 Regional planning documents

Section 75(3) and (4) of the RMA state:

(3) A district plan must give effect to –

…

(c) any regional policy statement.

(4) A district plan must not be inconsistent with –

…

(c) a regional plan for any matter specified in section 30(1).

See **appendix B** for the relevant provisions from regional planning documents. The proposed objectives, policies and rules for impervious surfaces are not inconsistent with the Regional Policy Statement, the Regional Plan: Coastal or the proposed Auckland Regional Plan: Air, Land and Water – see **appendix B**.

7.0 Other documents

The Auckland Regional Plan: Sediment Control also outlines the adverse effects of sediment discharges to waterways, including biological effects, the transport of pollutants by sediment, stream blockage, effects on consumable water resources, aesthetic values, damage to property and public utilities and the effects on matters of significance to Tangata Whenua. Technical publication 90 also produced by the Auckland Regional Council notes the effects of slope length and slope angle on erosion – refer to appendix B.

Essentially Waiheke (adopted October 2000) notes in Section 3.1.1 that "….it is essential that inshore waters are not polluted by contaminants carried to the sea with stormwater." It also notes that "impermeable surfaces speed up the flow of stormwater and the opportunity for ground re-absorption is lost." The proposed rules on impervious surfaces will lessen the pollutants carried to the sea by stormwater and will there for be contribute to the outcome sought by section 3.1.1.

8.0 Procedures for monitoring

The council will monitor the effectiveness of the proposed provisions as a means of achieving the objectives and policies by:

- Monitoring resource consents including the number of applications granted consent, compliance with consent conditions, and the effectiveness of those conditions;
- Monitoring complaints about flooding and erosion including the flooding and erosion of road side drains.

9.0 Conclusions

The plan provisions seek to avoid the effects that large area of impervious surfaces may have on small sites. In most of the islands, wastewater must be treated and disposed of on site and stormwater may also have to be disposed of on sites. Large areas of land may be required to accomplish this and on small sites, large areas of impervious surfaces may limit the ability to dispose of the stormwater and wastewater generated. Impervious surfaces speed up the flow of stormwater and the opportunity for ground re-absorption is lost. When water is discharged from impervious surfaces, slope length and slope angle are critical factors in determining the velocity of runoff. The proposed rules seek to include slope as a determinant in how much of the site can be covered by impervious surfaces. Long continuous slopes allow runoff to build up velocity and to concentrate flow, producing erosion. The soil removed by erosion may contaminate adjacent

streams and coastal areas. The concentrated flow may also cause flooding or erosion of adjacent properties. Runoff from large parking areas and driveways may also carry pollutants from motor vehicles into adjacent waterways.

Appendix A

Hauraki Gulf Marine Park Act 2000

Section 7 states as follows:

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

Section 8 states as follows:

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.

Appendix B

Relevant provisions from regional planning documents

Regional Policy Statement

Chapter 8: Water Quality

The overall vision for water quality stated in chapter 8 includes "natural ecosystems, valued for their own sake will function without adverse effects." "Work towards this vision will seek to achieve a steady reduction of sediment sewage overflows and other contaminants into our waterways."

Issue 8.2 notes that development and redevelopment processes associated with urbanisation, have adverse effects on water quality. "Removal of vegetation, and increases in the extent of impervious surfaces, greatly increase the speed and volume of runoff. Modifications such as these change the patterns of stormwater runoff, and have profound effects on the amount of contaminants and sediments carried by stormwater." It also notes that "urban activities, especially industrial and transport activities, are the main contributors of contaminants into stormwater." The resulting stormwater flows after heavy rainfall "carry high levels of contaminants including heavy metals, micro organisms, and organic material to the Region's water bodies and coastal waters.

Issue 8.2.4 states that the "Hauraki Gulf is of high priority to the Tangata Whenua and the matters of significance include the adverse effects of siltation on ecosystem, in particular the habitats of shellfish."

Policy 8.4.4(1) states that "land use intensification in urban areas shall only occur where adequate provision is made for:

i. control of sediment discharges;
ii. control of stormwater discharges;
iv. protection of the quality of groundwater recharge especially into aquifers used for water supply purposes
v. protection of water quality and riparian margins."

Policy 8.4.7 requires that "all new developments discharging stormwater, whether allowed as a permitted activity or by a resource consent, shall adopt appropriate methods to avoid or mitigate the adverse effects of urban stormwater runoff on aquatic receiving environments."

Regional Plan Coastal

Section 20: Discharge of Contaminants

Section 20 includes stormwater as a contaminant.

This section notes as an issue (20.2.1) that water and sediment quality is probably the major environmental issue for the Auckland coastal marine area. Amongst the reasons noted is that "water quality and sediment quality and quantity are major components of natural character in the coastal marine area. Contaminants may change the appearance, smell and life-supporting capacity of marine environments, thereby affecting their viability and the natural character of the entire coastal marine area."

Objective 20.3.2 seeks "to adopt the best practicable option for avoiding, remedying or mitigating the adverse effects from stormwater and wastewater discharges on the coastal environment."

Proposed Auckland Regional Plan: Air, Land and Water **(as amended to incorporate decisions on submissions).**

Chapter 5: Discharges to Land and Water and Land Management
Issue 5.2.3 notes that "rainfall on impervious surfaces can become contaminated as it washes off a variety of contaminants that have been deposited by natural and human activities. These contaminants can then accumulate within urban water bodies, and particularly estuaries and harbours, leading to adverse environmental effects."

Issue 5.2.6 notes that "the diversion of run off by impervious surfaces reduces the amount of rainfall that soaks into the ground, affecting groundwater recharge and altering flow regimes in rivers and streams, with consequent adverse effects on water availability and aquatic life."

General objective 5.3.1 seeks to protect, maintain or enhance the quality of land and water in the Auckland region by (amongst other things) avoiding or minimising the adverse effects from the discharge of sediment. General objective 5.3.3 seeks "to minimise, as far as is practicable, changes to natural infiltration rates and stormwater runoff volumes, thereby preventing river erosion and protecting aquifer outflows including river and stream base flows.

Permitted activity rule 5.5.1 allows the diversion and discharge of stormwater from impervious surfaces existing at 23 October 2001 or from areas less that 1000m^2 of combined impervious surfaces subject to a number of conditions including:

- That it does not cause scouring at the point of discharge;
- The discharge shall occur with a minimum of nuisance and damage and in particular shall avoid more than minor effects on any downstream neighbouring property;
- Modifications to existing drainage patterns shall be minimised; in particular stormwater shall be discharged to land in a manner that disperses the flow and prevents scour and point discharges forming;
- Where the discharge arises from a subdivision or development that is located outside urban areas the average ratio of total impervious surface to lot area for the subdivision or development shall be less than 6%; unless the land is zoned for future urban growth in the relevant district plan and the development is in accordance with a structure plan (incorporated into the district plan) and an integrated catchment management plan; or unless the land is designated for a local road;
- Primary sediment treatment shall be provided by methods such as cesspits or vegetated buffer strip.

Auckland Regional Plan: Sediment Control

This plan controls the discharge of sediment-laden runoff from land use activities such as vegetation removal, earthworks, roading, trenching and tracking activities and quarrying. Section 4.2 of the plan outlines the adverse effects of sediment discharges to waterways, including biological effects, the transport of pollutants by sediment, stream blockage, effects on consumable water resources, aesthetic values, damage to property and public utilities and the effects on matters of significance to Tangata Whenua.

Technical publication 90: Erosion and Sediment Control notes that slope length and slope angle are critical factors in erosion potential because they play a large part in determining the velocity of runoff. It also note that vegetation is the most effective long term form of erosion control for protecting surfaces that have been disturbed.