

# LET'S DO THE NPS DANCE - INTEGRATING THE NEW STORMWATER REQUIREMENTS

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## **ABSTRACT**

This paper discusses the combined stormwater planning implications of the national freshwater, coastal and development policy requirements in the National Policy Statement on Freshwater Management 2014 (NPS-FM), the NPS on Urban Development Capacity 2016 (NPS-UDC) and the New Zealand Coastal Policy Statement 2010 (NZCPS). It also considers the potential NPS on Natural Hazards (NPS-NH).

The RMA requires national policy statements such as these to be implemented by territorial authorities as part of their business-as-usual practices.

The Parliamentary Commissioner for the Environment's 2015 report on coastal hazards adds the essential climate change context to this discussion.

Key questions that the genesis of this paper was based upon are:

- How can this be effectively done?
- What are, or should be, the goals of implementing these policy statements?

The authors propose that the best way to achieve an integrated approach to implementation of these policy documents is to deal with stormwater under three inter-related headings:

- Quantity — flood management, plan zones and rules, freeboard and modelling;
- Quality — stream health, ecosystem services, values and limits; and
- Community — interaction, recreation, amenity, health and linkages.

Integrating the requirements of the national policy statements under these three headings will enable councils to achieve more optimum outcomes than considering the individual documents separately.

## **KEYWORDS**

**Stormwater, National Policy Statement, Natural Hazards, Climate Change, Freshwater, urban development, infrastructure, planning**

## **PRESENTER PROFILE**

Ian is a 3-waters infrastructure planning engineer, until recently with Tasman District Council. Over his 25-year career he has developed a keen interest in stormwater and hazard management. He is now exploring the quality of our responses to the challenging world we face.

# 1 INTRODUCTION

This paper discusses the combined stormwater planning implications of the national freshwater, coastal and development policy requirements in the National Policy Statement on Freshwater Management 2014 (NPS-FM), the NPS on Urban Development Capacity 2016 (NPS-UDC) and the New Zealand Coastal Policy Statement 2010 (NZCPS). It also considers the potential NPS on Natural Hazards (NPS-NH).

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- Quantity — flood management, plan zones and rules, freeboard and modelling;
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- Community — interaction, recreation, amenity, health and linkages.

This paper also summarises the key emphasis of each document

## 2 THE KEY DOCUMENTS

This section discusses the key documents and Table 1 summarises the main emphasis of each.

### 2.1 NPS-FM

This NPS requires the management of freshwater in a way that provides for all the environmental, social, cultural and economic values of freshwater that are important to New Zealanders. Timeframes for improvements can be staged where there are economic impacts of making changes to current approaches. Each region needs to set enforceable quality and quantity limits related to freshwater. A key component of this NPS is the need to maintain water quality above national baselines — and unrestricted urban development is unlikely to achieve this.

### 2.2 NPS-UDC

Councils' resource management plans must actively enable development, and this must be supported by the provision of the infrastructure the new developments will need. Extra requirements apply for medium and high growth areas, including more detailed assessments of development capacity. Councils with high growth areas must create a future development strategy, and these strategies are also encouraged for medium growth areas.

## **2.3 NZCPS**

The purpose of the NZCPS is to provide more detailed objectives and policies on how to achieve the sustainable management of the coastal environment. Stormwater is specifically mentioned in Policy 23. It requires councils to avoid adverse effects from stormwater discharges to the coastal environment by taking the following steps:

- avoiding cross contamination of sewerage and stormwater systems;
- reducing contaminant and sediment loadings at source;
- promoting integrated management of catchments and stormwater networks; and
- promoting design options that reduce stormwater quantity.

## **2.4 RMA REFORMS**

The Government proposes to change the RMA to:

- add the management of significant risks from natural hazards to the list of matters of national importance to be recognised and provided for, under section 6;
- streamline consenting processes;
- adopt national planning standards to reduce complexity and cost;
- streamline planning processes to improve responsiveness;
- give discretion for councils to exempt an activity from consent requirements;
- add a new 10-day consent category for minor activities;
- provide a new requirements for councils to free up land for housing; and
- enable stock exclusion from waterways.

This Bill has reached its second reading and is expected to be supported through the remaining process in 2017. (Smith, 2017)

## **2.5 NPS-NH**

The changes to the RMA is likely to be supported by a national policy statement providing guidance on managing significant risks from natural hazards. The Government aims to complete this NPS by late 2018 (MfE, 2016). With the significant number of flood events that have occurred across the country in the last 5 years, a focus on flooding is expected in this NPS.

## **2.6 PREPARING NEW ZEALAND FOR RISING SEAS: CERTAINTY AND UNCERTAINTY**

The Parliamentary Commissioner for the Environment's 2015 report provides useful context for the impact of climate change on future stormwater management in New Zealand. The confluence of increased tidal flooding, river flooding, and higher water tables will present many challenges over the coming years. These influences were evident in the South Dunedin flooding of June 2015. (PCE, 2015)

Table 1: The emphasis of the documents

Document	Water Quality	Water Quantity	Community
NPS-FM	Maintain or enhance	Maintain or enhance	Recognise and manage the social, cultural and economic values of water
NPS-UDC	Manage effects of development	Manage effects of development	Development facilitation
NZCPS	Protect or enhance	Minimise inundation, hazards and stormwater	Community impact
RMA reform	Stock exclusion	Hazard management	Process and land release
NPS-NH		Minimise inundation	Community impact
PCE		Increased inundation risk	Community impact

### 3 THE CHALLENGES

#### 3.1 THE TENSION BETWEEN THE NPS-FM AND THE NPS-UDC

Upgrading urban streams and rivers to protect existing and new development, and to ensure these waterways have the capacity to contain increased flows from development (particularly as climate change increases flood risks) has significant potential to adversely impact on the aquatic values of New Zealand's urban streams.

Developers are likely to be encouraged to provide Low Impact (Water Sensitive) Design Infrastructure as part of their subdivisions to intercept contaminants and sediments before stormwater discharges to freshwater. However, "encouragement" is probably insufficient from an environmental perspective. Most Councils are still in the process of setting limits for waterbodies under the NPS-FM and hence current developments will probably not be required to achieve the necessary levels.

From our observations and conversations, many in the development community are insufficiently educated about ways to incorporate sustainable water management features into development. They still tend to see it as a cost and design burden.

There are also concerns around who is responsible for the maintenance of this infrastructure, and who is liable for any failures of these systems in the event of a significant flood event.

### **3.2 THE TENSION BETWEEN NATURAL HAZARDS AND THE NPS-UDC**

Most of New Zealand's cities (including almost all of the medium and high growth areas listed in the NPS-UDC) are located near the coast, and so are potentially affected by the interaction between flood and coastal hazards. This increases the importance of understanding these hazards both individually and cumulatively.

The effects of sea level rise will include stormwater surge (flooding due to seawater inflow into the stormwater network). This is already evident in Nelson, Dunedin, Christchurch and other coastal cities. Sea level rise also has significant potential to result in discharges of contaminated stormwater (due to inundation of wastewater and stormwater networks).

In urban areas, existing and new development is often located within a natural floodplain, creating flooding risks. Increased rates of stormwater run-off also result from the increased surface areas of roofs and paved surfaces associated with urban development.

As growth of cities intensifies it will become more difficult to carry out upgrades to river and stream channels in a way that provides for environmental and recreational values. Identifying and protecting corridors for future works is likely to be an important aspect of urban development strategies. However, isolation of large areas of land for future stormwater could undermine efforts to increase housing.

*Note:*

Medium growth cities near the coast are: New Plymouth, Nelson/Richmond, Kapiti and Wellington (not Palmerston North).

High growth cities near the coast are: Auckland, Tauranga and Christchurch (not Hamilton or Queenstown).

### **3.3 PROTECTING AGRICULTURAL LAND PRODUCTIVE VALUE**

Although a side issue from the main themes of this paper, the correlation of easily developable land and good productive soils is high and the unchecked expansion of urban areas onto adjacent farmland is another concern for the future.

## **4 TRADEOFFS**

Another key aspect is discussing the tradeoffs. E.g. Greater Wellington Regional Council, Hutt City Council and the NZ Transport Agency's *Hutt River City Centre Upgrade Project* has resulted in a decision to sacrifice 117 houses for a more durable solution, which involves widening the river flood channel to accommodate the 440-year event. This is a step in the right direction and particularly notable as most discussions are struggling to protect properties from a 100 year event, due to the 50-year minimum life provision in the Building Code. (LG, 2016)

The Government has suggested that councils self-insure for up to a 500 year event. The aim of this move is to reduce the Government's exposure to large events such as the Canterbury earthquake series. However, this will cause councils to consider what and how they do things from a financial risk perspective rather than from the angle of achieving the best results for the community, and this may not always lead to the most desirable outcomes.

## **SUGGESTED PROCESS**

The following process steps are suggested to optimise the chance of an optimum, integrated outcome:

- 1. 30 year growth needs*
- 2. Level of protection*
- 3. Hazard overlays*
- 4. Environmental protection needs*
- 5. Infrastructure interventions*
- 6. Growth infrastructure roll out*
- 7. Proposed planning rules*
- 8. Community discussion*
- 9. Final District Plan rules and Infrastructure Strategy*
- 10. Cyclic process every 3 years.*

### **4.1 30 YEAR GROWTH NEEDS**

The growth needs for a district or region will be determined by the population growth forecast, modified by any additional council research and the requirements of the NPS-UDC. Developers will often have a better feel for the current and near future market than councils or Statistics NZ, and improved means of incorporating this knowledge is vital to successful outcomes.

### **4.2 LEVEL OF PROTECTION**

The level of natural hazard protection required for new development is a strategic decision for councils, based on knowledge of local hazards, guidance from central government and local issues such as affordability.

We are currently awaiting the update for the 2009 MfE guidance documents. The ongoing media discussion of major ice melts in Greenland and Antarctica is expected to result in guidance to plan for higher and faster sea level rise, than previously predicted. As retrofitting engineering protection is vastly more expensive than avoiding hazardous areas, the avoidance of development in hazard prone areas is theoretically the obvious choice.

However, skipping over seemingly prime but flood-prone sites requires strength by councils, both in terms of setting policy and making decisions on consent applications for new development. In the situation where there will be short-term economic losers and long term red zoned properties, the stakes are high. In these types of situations, is there a "right" average recurrence interval to be avoiding, for example monthly coastal inundation likely to be occurring in 50, 100, 200, 440, 500 or 1000 years' time?

### **4.3 HAZARD OVERLAYS**

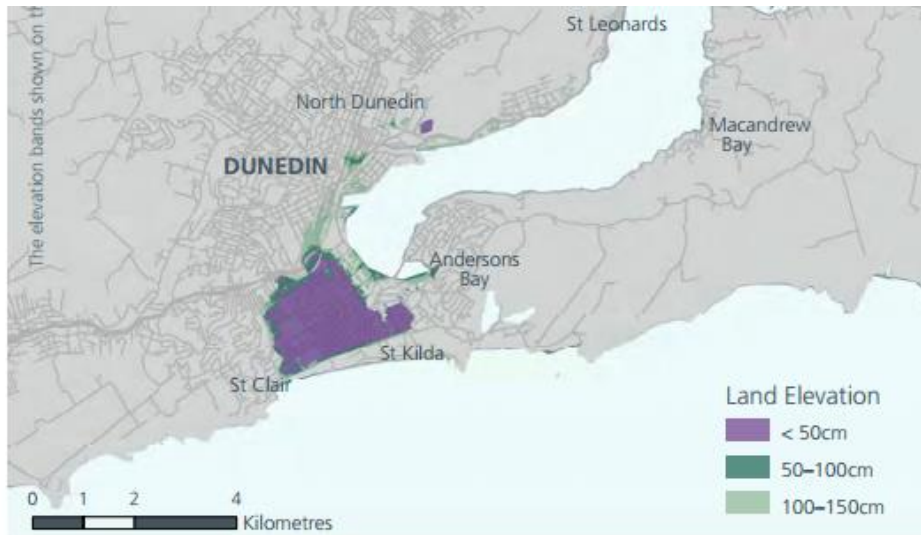
Councils are required to manage risks from natural hazards through resource management plans. Many councils include flood and inundation overlays in their plans, which link to rules, which either avoid development, or set conditions for development occurring within these overlays.

This could be an effective mechanism for implementing protection and can specify land levels, floor levels and additional requirements that address uncertainty. However, councils need central government support to establish firm planning regimes as the

perceived loss of capital value can drive residents to challenge proposals, such as the coastal hazard lines proposed at the Kapiti Coast. (refer <http://www.kapiticoast.govt.nz/coastal-hazards>).

Figure 1 is an example of the significant low lying urban areas identified in 2015.

*Figure 1: Low Lying Coastal land in Dunedin (PCE, 2015)*



#### **4.4 ENVIRONMENTAL PROTECTION NEEDS**

The need for the protection and (attempts at) restoration of important habitats such as riparian corridors, wetlands and mangroves needs to be factored into the planning process early, to avoid insufficient or unviable provision for natural ecosystems. Avoidance of disturbance is the only viable path — while there have been many visually successful restoration projects, the full native biodiversity is unlikely to ever return to disturbed areas.

#### **4.5 INFRASTRUCTURE INTERVENTIONS**

Infrastructure interventions can include traditional river stop banks, and coastal walls (with both stormwater pumping solutions and river barrages) but it is questionable whether they are affordable for low-density New Zealand cities. Also, the UK experience (Cobby & Sheppard, 2016) is that this can just increase the investment behind the intervention and repeat the cycle.

A better alternative is to take a more integrated planning approach such as urban Blue-Green spaces (Lawson et al, 2014) that plan for flooding in certain public spaces that are effectively used for other community functions most of the time, when not flooded. Integrated 3-waters, transportation and structure planning is needed, rather than letting hazard management or growth override the other needs.

In many existing areas such as East Motueka, East and South Christchurch and South Dunedin, traditional infrastructure interventions are probably going to be favoured due to the risks to the valuable existing built infrastructure. However, East Christchurch and future greenfield areas offer more potential for Blue-Green solutions. Borck Creek in Richmond is an example of this in progress as shown in photograph 1. (Blythe & Tomlinson, 2016)



*Photograph 1: Part of Borck Creek floodway*

“Managed retreat” is the alternative, but this is potentially a very dangerous phrase for a politician to use as the public awareness of this as a realistic option is not seen as sufficiently developed — yet! The rate of sea level rise is key information for decision makers, but we will only have this in hindsight. The PCE’s 2015 report identifies more than 10,000 Christchurch homes and businesses within 1.5m of the spring high tide mark.

#### **4.6 GROWTH INFRASTRUCTURE ROLL OUT**

Both infill and greenfield development need a rollout of infrastructure to support significant growth. Planning for water, sewer, stormwater, gas, telecommunications, transportation corridors, recreational space, education and other needs is not a trivial task. Knowing what infrastructure is desirable, and it will be needed as a starting point.

Councils and the other providers need to budget and plan many years in advance to have the necessary infrastructure in place in time for development. The Government’s \$1 billion infrastructure fund partly addresses this challenge but the planning, design and construction work must follow. (English, Smith 2016)

#### **4.7 PROPOSED PLANNING RULES**

The Council will need to set planning rules that seek to resolve the tensions described above and provide safe and (dare we say it) ecologically sustainable development. As an example, the Auckland Unitary Plan (AUP) is the most recent plan to be developed, and other councils around the country are likely to take notice of Auckland’s approach to flood risk and other natural hazards.

The RPS objectives for natural hazards follow the approach of:

- avoiding new subdivision and development in natural hazard areas; and
- managing subdivision and development in existing, developed natural hazard areas

The RPS policies commit to:

- assessing hazard risks over at least the next 100 years; and
- considering the combined effect of hazards.



The policies also distinguish between urban areas (managing risks) and outside urban areas (avoiding risks). Chapter E of the AUP contains citywide policies and rules and this is summarised more fully in Appendix 1 to this paper. The key points are:

The Plan takes different approaches for:

- urban areas;
- rural areas; and
- greenfield areas.

#### **4.7.1 IN URBAN AREAS**

New buildings need to be outside of the area within the 1% AEP floodplain, or if they are inside this area, have safe evacuation routes/refuges.

When redeveloping sites, where residential/visitor accommodation/overnight healthcare facilities are within the 1% AEP floodplain, the development needs to address:

- flood hazard risk;
- location of habitable rooms above flood levels; and
- safe evacuation.

Less vulnerable activities can be in the 1% AEP floodplain where the development avoids affecting other properties. This includes commercial, community (including schools), industrial and rural activities.

#### **4.7.2 IN RURAL AREAS**

The AUP states that developers should avoid locating more vulnerable activities (dwellings) in 1% AEP floodplain areas, where practicable.

#### **4.7.3 GREENFIELD AREAS**

Developers must avoid locating buildings in the 1% AEP floodplain. They can locate flood tolerant activities in this area, which includes:

- informal recreation;
- public amenities;
- parks structures;
- car parks; and
- network utility buildings. (Whilst this is a common exception, we can't really tolerate widespread loss of power, wastewater, water or communications services. Hence a link to Civil Defence Lifelines Assessment and Activity Management Planning criticality assessment is needed as a caveat on this.)

This is essentially guiding developers towards Blue-Green thinking.

#### **4.7.4 CITY WIDE POLICY**

A policy that applies in all areas is that development in the 1% AEP floodplain is not to impact on flood hazards for other properties.

#### **4.7.5 RULES**

Auckland's rules are summarised in Appendix 1 and place some additional controls on activities such as car parking that don't meet the permitted standard.

Interestingly, the **restricted discretionary activities** within the 1% AEP floodplain include:

- new structures bigger than 10m<sup>2</sup> that don't comply with the standard (structures or buildings to be located where the depth of flood waters in a 1% AEP event does not exceed 300mm above ground level)
- use of new buildings to accommodate more vulnerable activities (residential, healthcare facilities with overnight stays, and visitor accommodation).

These rules appear to be an attempt to bridge the risk-benefit gap. Instead of freezing development in infrequently flooded areas, a risk-based approach is used. It would be ideal to have complementary building control rules that had a higher freeboard for floor levels or a minimum level for electrical fittings.

#### **4.7.6 ALTERNATIVE PLANNING REGIME FOR VULNERABLE SITES**

The traditional, "prudent" planning approach has merit in an environment where councils can't change the settlement pattern. However, if a council maintains sufficient control of land through the titles or consents so that it can effectively evict people/houses when necessary due to inundation or loss of practical access, then a more accommodating approach to zoning could be acceptable. Appendix B summarises an approach that would facilitate temporary residential occupation of land that is expected to be inundated within the 100 year planning horizon required by the NZCPS. This offers an opportunity for a lower land cost and build specification and hence lower cost housing.

#### **4.8 FINAL DISTRICT PLAN RULES AND INFRASTRUCTURE STRATEGY, AND COMMUNITY DISCUSSION OF THE IMPLICATIONS**

The tensions between urban development, environmental and cultural values and managing the risks of natural hazards will need to be resolved through the next iteration of resource management plans.

Most of the public discussion on these issues is likely to occur in relation to proposed natural hazard overlays and associated rules in the resource management plans, through the consultation process required by the First Schedule of the RMA.

Strong alignment between the final district plan rules, urban development strategies (for high growth areas) and infrastructure strategies will be essential, in order to provide a consistent message to the community about how the tensions between development, freshwater quality, natural hazards and the effects of climate change are proposed to be managed.

Is this going to be enough? It depends on the circumstances and how many people are impacted. With low lying urban and potential urban areas at potential threat from glacial-melt-driven sea level rise of, say, three metres, a normal LTP consultation process is not going to suffice. Councils will be looking expectantly at central government to guide these discussions and to provide support for prudent council decisions.

#### **4.9 THREE YEAR CYCLE**

Councils' 30-year Infrastructure Strategies must be reviewed every three years, as part of the LTP cycle, but infrastructure planning can't be changing that often, as it usually takes longer than that to plan, design and implement medium and large projects. An associated problem is that if growth is under-forecast, the necessary infrastructure budget is often not included in the LTP at all and so bringing it forward is not an option.

Councils can be tempted not to include uncertain projects in their budgets to keep rates and development contributions lower. These are the kinds of issues the NPS-UDC and \$1 billion fund are seeking to address.

## 5 CONCLUSIONS

The interactions between the Government's guidance documents are complex and this paper is merely a brief summary of some aspects. However, despite the depth and potential difficulty, councils are obliged to act upon all of the current and future material in an integrated way.

This paper suggests a cyclic planning process that will facilitate an improved integration of a council's obligations.

However, there needs to be sustained senior level oversight to ensure that the process does not miss key elements, particularly as the people working at a Council changes over time. There is a danger that some elements are pursued more strongly by the more experienced or influential staff within a council and the integration, so needed for optimal outcomes across the set of goals, could be lost.

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## **APPENDICES**

- A. Summary of example rules from Auckland
- B. Possible rules for building on vulnerable coastal land

## **APPENDIX A: SUMMARY OF EXAMPLE RULES FROM AUCKLAND**

### **Chapter E – Auckland-wide policies and rules**

The Plan takes different approaches for:

- urban areas;
- rural areas; and
- greenfield areas.

#### ***In urban areas***

New buildings need to be outside of the area within the 1% AEP floodplain, or if they are inside this area, have safe evacuation routes/refuges.

When redeveloping sites, where residential/visitor accommodation/overnight healthcare facilities are within the 1% AEP floodplain, the development needs to address:

- flood hazard risk;
- location of habitable rooms above flood levels; and
- safe evacuation.

The following list of less vulnerable activities can be in the 1% AEP floodplain where the development avoids affecting other properties:

- commerce;
- community (including schools, but excluding health care facilities where people stay overnight);
- industry; and
- rural.

#### ***In rural areas***

Developers should avoid locating more vulnerable activities (dwellings) in 1% AEP floodplain areas, where practicable.

#### ***Greenfield areas***

Developers must avoid locating buildings in the 1% AEP floodplain. They can locate flood tolerant activities in this area, which includes:

- informal recreation;
- public amenities;
- parks structures;
- network utility buildings; and
- car parks.

#### ***City wide policy***

A policy that applies in all areas is that development in the 1% AEP floodplain is not to impact on flood hazards for other properties.

## **Rules**

**Permitted activities** within this 1% AEP floodplain are:

- fences;
- parking;
- private roads and access ways;
- storage of goods and materials;
- minor infrastructure, stormwater devices and flood mitigation works;
- stormwater management/flood mitigation devices to be vested in the Council (if these are not to be vested in the Council, they are a restricted discretionary activity);
- new structures and buildings up to 10m<sup>2</sup> in size; and
- new structures and buildings designed to accommodate flood tolerant activities (up to 100m<sup>2</sup> in size).

The full list of flood tolerant activities for the purpose of the Plan are:

- informal recreation and leisure;
- organised sports and recreation including structures in parks;
- public amenities;
- farming and intensive farming and artificial crop protection structures and crop support structures;
- forestry;
- mineral extraction;
- car parking and loading areas; and
- buildings for network utilities.

Car parking that doesn't meet the standard E36.6.17 (which is that flood waters in a 1% AEP event are not to exceed 200mm above ground level) is a **controlled activity**.

**Restricted discretionary activities** within the 1% AEP floodplain are:

- below ground parking;
- storage of hazardous substances;
- on-site septic tanks/wastewater treatment and disposal systems, and effluent disposal fields;
- new structures bigger than 10m<sup>2</sup> that don't comply with the standard E36.6.1.9 (structures or buildings to be located where the depth of flood waters in a 1% AEP event does not exceed 300mm above ground level);
- new structures and buildings designed for flood tolerant activities up to 100m<sup>2</sup>;
- new structures and buildings (and external alterations) up to 10m<sup>2</sup> in size that do not comply with E36.6.1.9 (1% AEP flood waters not exceeding 300mm above ground level);
- all other new structures and buildings; and
- use of new buildings to accommodate more vulnerable activities (residential, healthcare facilities with overnight stays, and visitor accommodation).

## **APPENDIX B: PROPOSED REGIME FOR BUILDING ON COASTAL LAND VULNERABLE TO SEA LEVEL RISE**

This Appendix summarises a possible regime that would allow for subdivision and building on low-lying coastal land that is projected to be inundated within the next 100 years. The aim is to utilise land while it can be, and not sterilise land for development prematurely in the light of uncertainty about the rate of sea level rise.

1. Determination by a council-approved process of suitable floor level for houses not to be inundated within the next 50 years (based on latest Government guidance). This may include the requirement to have a Building Act S72-3 Hazard Notice on title.
2. Subdivision of land by developer into titles with adaptive conditions on title. This may be done as Leasehold, or else Unit Title, Landuse Consent or some other way that Council can exercise control without accepting liability for inundation or maintenance of vulnerable services in perpetuity. Conditions could include:
  - minimum (finished) floor level;
  - notification that lease renewals will be 10 yearly;
  - capped maximum 1%/year increase in lease fee;
  - triggers for Council right of non-renewal are:
    - 2 x coastal inundation events of floor within previous 10 years; or
    - ground inundation by seawater more than 3 times in any 12 month period during previous 10 years; or
    - loss of practical road access or other services to property due to erosion or inundation during previous 10 years (Council would restore and maintain services till end of current 10 year cycle of lease);
  - houses to be owned by lessee, built on piles and fully transportable; and
  - removal of house and all other above ground improvements by lessee at non-renewal of lease.
3. Construction by developer of:
  - sealed pressure sewer system with pump electrics above floor level;
  - minimal standard roading network (no arterial roads);
  - full plastic water network or household water tanks with fire fighting capacity and fittings;
  - above ground power and UF broadband network or solar/satellite;
  - no gas or phone network;
  - no coastal protection works; and
  - salt tolerant landscaping.
4. Vesting of leasehold titles and subdivision to the council.
5. Sale of leases to house owners/builders (managed by the developer).