9.6.1.7 Weed management techniques must be carried out in a way which avoids:

- Spreading of weeds by the inappropriate disposal of weed plant material.
- Contamination of waterways or coastal waters with chemical sprays.
- Accidental loss of desirable vegetation through spray drift or physical damage.
- Erosion of cleared ground.

9.7 Choosing Plants

9.7.1.1 The choice of plant species should be based on the micro-climate, soil type and exposure of the particular area. In revegetation and riparian margin areas native, eco-sourced species should be used.

9.7.1.1 Comment *The supply of "island grown" plant specimens is limited; where plants are imported, they should be sourced from areas with similar conditions wherever possible.*

9.7.1.2 Other considerations in determining the plants to use should include:

- The potential to improve land stability.
- Potential food source for birds or insects.
- The use of fire resistant species close to buildings.
- Foliage density to create visual buffers.
- Degree of shade / sun infiltration.
- Appearance.

9.8 Planting to protect significant ridgelines

9.8.1.1 Planting may be required by Council as part of a resource consent for development which is proposed within areas defined as Significant Ridgelines in the District Plan. Where such planting is required, consideration should be given to the matters highlighted in s9.7 above.

Consideration should also be given to the eventual height of species of plants and their role in:

- Creating a backdrop to the development.
- Creating a screen in front of development.
- The potential for interference with views.

9.9 Construction Requirements

9.9.1.1 This section outlines the minimum standards and recommended procedures to be followed to ensure that all landscape works are carried out to an acceptable standard prior to final inspection and release of the bond, if one has been required. Suitably qualified and experienced landscape contractors should be employed to carry out the works (preferably members of Landscape Industries Association of NZ, LIANZ).

9.9.2 Soil and soil fertility

9.9.2.1 Development often involves the stripping and stockpiling of topsoil prior to bulk earthworks being carried out. This should be minimised as far as possible as stripping, stockpiling and storage of topsoil has the potential to destroy the soils structure and fertility.

The use of heavy machinery, particularly when soil is wet, will drive out air pockets, creating anaerobic conditions and poor drainage, which will lead to reduced root growth and potential plant loss.

9.9.2.2 Where topsoil is stockpiled it shall be stored in heaps with a maximum height of 2m and stored for as short a time as possible and never more than 18 months. If bulk earthworks have been carried out, the subsoil should be ripped in dry weather conditions to a depth of 100-200mm prior to the placement of topsoil. Topsoil should be placed close to the prepared subsoil (without driving loaded trucks onto it) and spread at the required depth with an excavator.

9.9.3 Mulch

9.9.3.1 Garden areas and street trees will generally require mulching after planting.

9.9.3.2 Where mulch is used it should be bark, or cambium at a suitable grade for the design. Decorative stone may, on occasion, be used as a mulch as part of a design.

9.9.3.3 On steep slopes mulch may have a tendency to wash off and weed mat may be considered, although it is generally avoided in public areas because of graffiti and long term maintenance problems. Ponga logs pinned across slopes may enable coarse cambium mulch to be used on steep slopes.

9.9.3.4 Mulching should be carried out when the soil is damp. Mulch should be replenished regularly to continue weed suppression and reduce evaporation of soil moisture.

9.9.4 Tree planting

9.9.4.1 Trees for reserves or street areas should be a minimum of pb95 or 54 litre size. Clearances for trees being planted in the street environment are shown in dwg TARS 12908/421 (section 18). Requirements for the planting holes, stakes, ties and trunk protection are illustrated in figure 9.3.

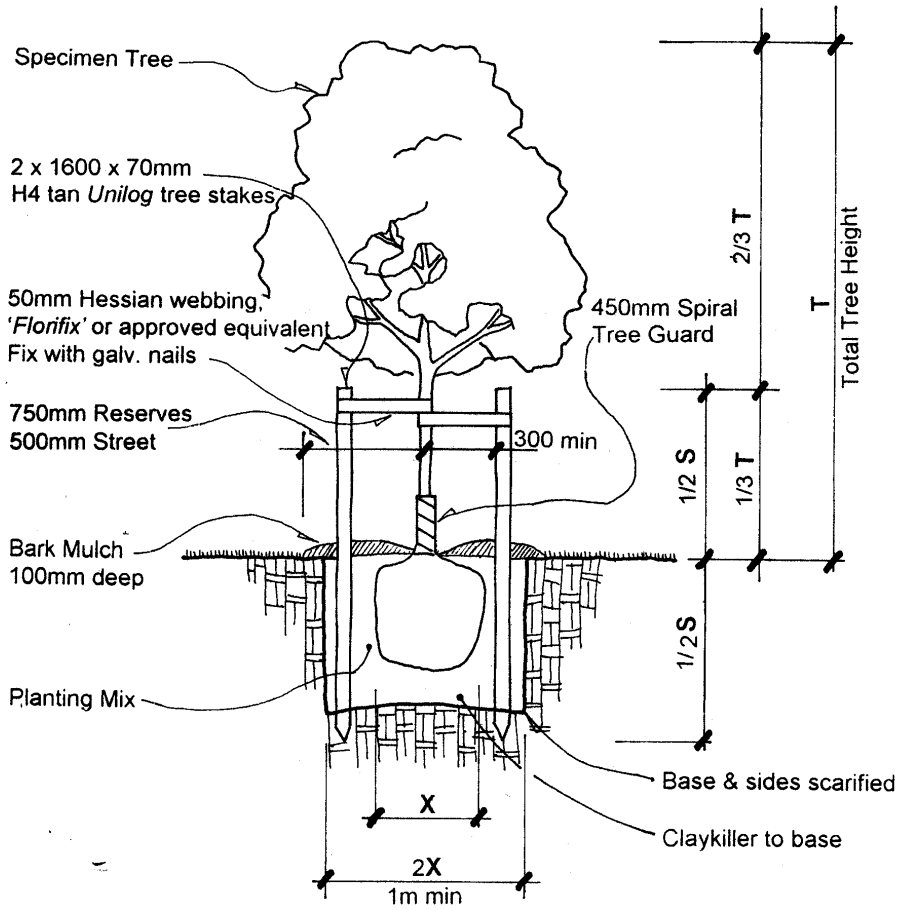


Figure 9.3: Tree Planting detail (NTS)

9.10 Maintenance requirements

9.10.1.1 All planting required by the Council as part of the development shall be maintained by the developer for a minimum of 2 years.

9.10.1.2 Maintenance shall include:

- weed control;
- pest and disease control;
- watering during dry periods, as necessary;
- replacement of tree stakes and ties or protection from wind, where necessary;
- replenishment of mulch, as necessary;
- replacement of dead plants, as necessary.

9.10.1.3 Maintenance will be monitored by Auckland City.

9.11 Revegetation Techniques

9.11.1 Revegetation Options

9.11.1.1 Where existing bush cover remains, revegetation may only involve excluding grazing stock and ongoing weed management, allowing natural regeneration to occur over time.

9.11.1.2 Where revegetation is necessary in a shorter time frame, or where no bush canopy remains, planting of appropriate native species may be necessary. Where riparian margins are being revegetated "Riparian Zone Management" (ARC TP 148) should be referred to.

9.11.1.3 Revegetation can enhance and improve unstable slopes.

9.11.2 Ground preparation

9.11.2.1 In areas infested with kikuyu or other smothering plants such as blackberry and honeysuckle, spot spraying of plant locations is recommended prior to planting being carried out. In other areas of pasture, spot spraying should not be necessary.

9.11.3 Planting

9.11.3.1 Pioneer native eco-sourced species should be chosen according to the specific site conditions including:

- slope,
- aspect,
- exposure to wind and salt,
- proximity to water, likelihood of drought conditions,
- soil types, etc

9.11.3.2 Plants may be supplied as root trainers, enviro-tubes or small grade pbs. In areas where pasture and weed species are likely to rapidly hide small plants they should be planted with a bamboo marker cane to assist with identification during releasing work.

9.11.3.3 Where riparian margins are being revegetated care should be taken to ensure that species chosen are appropriate for the different parts of the stream bank. Riparian margin planting should be undertaken in an area at least 10m wide either side of the stream.

Figure. 9.4 Riparian margin revegetation three years after planting.

9.11.4 Maintenance

9.11.4.1 Regular releasing of plants to prevent smothering from pasture and weed species will be essential until canopy closure is achieved. Once canopy closure has been achieved enrichment planting with climax species may be undertaken. This may not be necessary if existing native bush is less than 300m away, as seeds of other species are likely to be spread naturally into the establishing vegetation by birds.

9.11.4.2 Pests such as possums, rabbits and goats may also need to be controlled. Refer list of contacts, p 5.

10.0 Parks, Community, Streetscape and Reserves

10.1 Introduction

10.1.1 Scope

10.1.1.1 This section deals with all issues relating to Parks and Reserves, Community Facilities and Streetscapes, including:

- Types of Reserves.
- Reserve design.

10.1.1.2 It includes guidelines on meeting reserve contributions by vesting land. The Reserves Act 1977 sets out seven categories for classification of reserve lands. Developers need to bear these classifications in mind when considering their proposed reserve contributions.

10.1.2 Objectives and Desired Outcomes

10.1.2.1 This section aims to:

- Ensure land vested as a Reserve provides maximum benefit to the public.
- Control Council and other landowners ongoing costs.
- Ensure appropriate mechanisms can be put in place to protect the environment and features of reserve land.
- Enhance existing natural features.

10.1.2.2 The following standard is performance based and should be taken as a guide. It is not desirable that all reserves be designed the same. Any feature or aspect small or large that will maintain or create character should be retained. The Council will consider any submissions in respect to development or treatment of reserves.

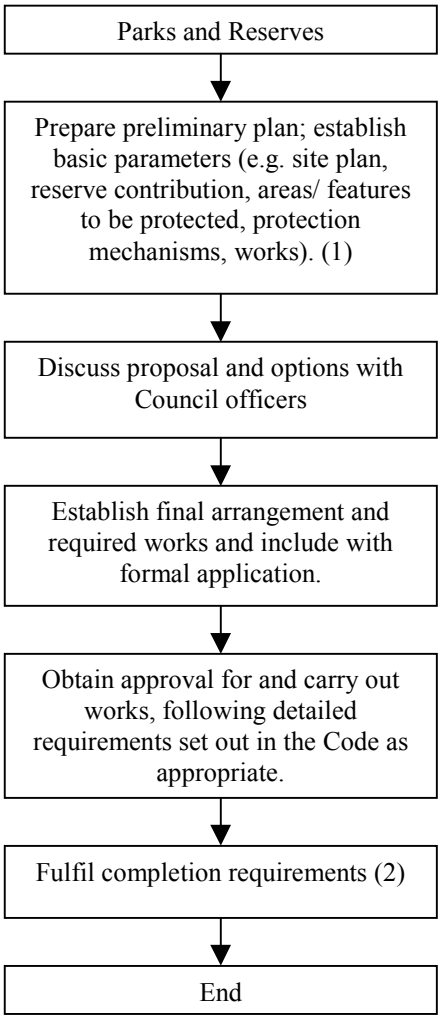
10.1.3 Other Useful Documents

10.1.3.1 This section makes reference to:

- The Reserves Act 1977.
- Parks and Open Space Development Plan – Hauraki Gulf Islands section (ACC).

10.2 Approach to Reserve Land

10.2.1 Simplified Parks and Reserves Process



Notes

1. Council's rules on reserves are set out in the District Plan (refer s2.8, 2.9 of the Code).
Refer also s10.5 "Covenanted Areas".

2. Refer s13.

10.3 Application Information and Approvals

10.3.1 All Developments Involving Reserve Land

10.3.1.1 Land to be vested as a Reserve or protected by a covenant shall be indicated on the application form and plans.

10.3.1.2 Where any natural features of significant merit are contained within a reserve, such features shall be identified on the application plan of the development and shall, subject to any conditions the Council may impose, be retained intact.

10.4 Considerations for Types of Reserves

10.4 1 Recreation Reserves

10.4.1.1 The suitability of land for recreation use includes the following factors:

- Locality
- Proximity and links to any existing reserves.
- Accessibility and proximity to the roadside (for public access and also access for development of facilities eg. toilets, changing rooms and their servicing).
- Contours of the land.
- Identified need and potential for development as playing fields (organised team, individual sport, or informal areas).
- Existing vegetation types.
- Future maintenance needs.

10.4.1.2 Where Recreation reserves are being created as part of residential subdivision, housing on adjoining sites shall be encouraged to overlook the reserve to increase public safety.

10.4.2 Scenic Reserves

10.4.2.1 Factors for consideration include:

- Contours.
- Vegetation type.
- View aspects, both from the site and as landscape from other positions.

10.4.3 Local Purpose (Community Facilities)

10.4.3.1 These can cover several facility types eg halls, community buildings, public toilets.

10.4.3.2 Principal considerations are:

- Need (present and future).
- Location and access.

10.4.4 Local Purpose (Wetland / Drainage) Reserve

10.4.4.1 These are used for smaller wetland or stormwater catchment areas.

10.4.4.2 Considerations are:

- Upstream and downstream activity.
- Suitability for wetland habitat.
- Type of vegetation type.
- Prior drainage works.
- Water flows and water quality
- Siltation.
- Flora and fauna present.
- Whether the land can be or needs to be fenced.

10.4.5 Historic Reserve

10.4.5.1 This is a classification given to areas that have historical significance such as Maori and European early settlement sites. Examples include battle sites, graveyard and burial sites, and sites of early buildings, churches, homesteads, or events.

10.4.5.2 Significance, access and maintenance are important considerations.

10.4.6 Local Purpose (Esplanade Reserve) and Esplanade Strip

10.4.6.1 Provision of these along Mean High Water Springs, lakesides and along river banks (meeting certain criteria) is mandatory and a 20 metre width is specified as standard. This width is not always adequate and consideration needs to be given to overall requirements.

10.4.6.2 Esplanade areas along tidal inlets, wetlands and streams are ecologically significant and often more than the 20m minimum width is needed for effective protection from stock and inappropriate use, and to achieve protection of the ecosystem as a whole.

10.4.6.3 Esplanade areas often serve as walkways and links between reserves. Consideration for future potential as walkways (eg. formation of footpaths) is also important.

10.4.6.4 Where Mean High Water Springs is abutted by sand dunes, the extent of those dunes is often well beyond 20 metres, and extending the reserve area to incorporate the whole dune area is preferable. As dunes are ecologically sensitive their protection from wandering livestock and inappropriate use is important and consideration needs to be given to potential fence lines.

10.4.6 Comment *Note that Council is not bound to fencing contributions, for Local Purpose Esplanade areas, under Fencing legislation.*

10.4.6.5 Local Purpose Esplanade reserves are often situated along and include coastal cliff formations. In these situations allowing for future natural erosion is essential. The boundary line should be well back from the cliff frontage. This is especially so where walkway tracks are or will be provided.

10.4.6 Comment *Often the additional area required can be met as part of reserve contribution requirements. If not, Council may consider purchasing the additional land, or allowing greater development in other areas.*

10.4.7 Nature Reserve and Scientific Reserve

10.4.7.1 These are significant classifications, best used for larger or more significant areas of ecological importance, eg. whole wetland catchment areas or complete bush areas. As such they often vest in central government (eg. DOC).

10.4.7.2 Factors for consideration include:

- Biodiversity.
- Vegetation types.
- Rareness.
- Flora and fauna present.
- Connection to other reserves.
- Whether the land can be or needs to be, fenced.

10.5 Covenanted Areas

10.5.1.1 Significant ecological or bush areas should be protected with Conservation Covenants. Land contour, stability, vegetation, provision for or exclusion of public access are all factors for consideration.

10.5.1.2 Where covenanted areas extend over two or more properties then the entire area should be protected with stock proof ring fencing. Boundary fencing within the protected area is not required, and should be avoided in order to reduce disturbance to that land.

10.5 Comment

Covenanting methods include:

- *Open Space Covenants: Queen Elizabeth II National Trust*
- *Conservation Covenants under the Reserves Act 1977*

Covenants generally leave land in private ownership, but provide for and may require ongoing conservation by the current and future land owners.

10.6 Community Access Issues

10.6 Comment *Refer also to section 7 for further details on layout for roads and related public access routes.*

10.6.1.1 Within the Gulf Islands horse riding and cycling are popular activities requiring specific consideration for the needs of those participating. Pathways used in these activities should be separate from vehicular traffic, and if possible separate from pedestrian traffic as well.

10.6.1.2 Consideration needs to be given to these as forms of transport and as recreation activities when considering links between reserve areas (refer also s10.6.1.4).

10.6.1.3 Access from a public road to more isolated areas can be provided for by way of easements negotiated with Council rather than specific vesting of the land.

10.6.1.4 Where accessways are to be provided, whether between streets or reserve links or elsewhere, then consideration needs to be given to:

- The types of access which are appropriate to the purpose of the Reserve (eg. protection of sensitive areas).
- Safety Issues – potential entrapment, openness or bush cover in close proximity.
- Sight lines – sharp bends are to be avoided.
- Gradients.
- Widths – a minimum of 3 metres is preferred.
- Surface materials.
- Track gradings – walkway, pathway, route.

It is suggested that any proposals be discussed first with Council officers.

10.6.1.5 Where any reserve is so positioned as to form part of a pedestrian linkage, a footpath shall be provided between streets along such a route. The adjacent ground surface is to be brought level to the footpath in such a manner that normal maintenance operations can be carried out. In these instances lighting in accordance with section 7 shall be provided.

10.7 Existing Vegetation

10.7.1.1 Where, on any proposed reserve, mature exotic or indigenous groundcover, undergrowth or trees exist, the Developer shall clearly indicate on the subdivision application plan:

a) The position or extent of each type of vegetation, together with any existing tree canopy overhang.
b) The full extent of any fill and/or cut proposed in the vicinity of such vegetation or trees, including that required for the installation of underground services
c) The proposed alignment of underground and overhead services and any footpaths, driveways or access points in the vicinity of such vegetation or trees.
d) Where any trees may cause possible shade problems in adjoining lots, a shade zone shall be indicated for the shade that will be cast at midwinter, midsummer and equinox. Should such shade be of such proportion as to significantly adversely affect the adjoining lot or lots, a redesign of the lots in that portion of the subdivision may be requested.

10.7.1.2 As engineering works in close proximity to trees will affect roots and their ultimate health, no fill, cut or trenches for services will be permitted within 2 metres of the outer overhang of such trees (i.e. the dripline) unless prior written approval has been given by the Approving Officer.

10.7.1.3 Where existing vegetation is being retained within a development care must be taken to fence off the vegetation to prevent damage during development works.

10.8 Stormwater Treatment and Detention Ponds

10.8 Comment *Land vested and used for stormwater treatment or detention ponds will not generally count towards any required reserve contribution.*

10.8.1 Pond Design

10.8.1.1 Where stormwater treatment or detention ponds are required as part of the development they shall generally be in accordance with the requirements of the Auckland Regional Council Technical Publication TP 10 "Stormwater Treatment Devices" as well as the following:

(a) The maximum depth of any pond shall be 2m and no more than 10% of the pond area may be more than 1.5m in depth.

(b) A complete set of stormwater pond design calculations shall be submitted with the final design for Engineering Plan Approval (see s2.2).

10.8.1.2 The external slopes of the pond shall be at a maximum gradient of 1:5. A planted shelf with a gradient of 1:15 shall be provided around the perimeter of the pond. The shelf shall be a minimum of four metres wide, extending two metres (horizontally) above the normal water level and two metres below, as illustrated in figure 10.1.

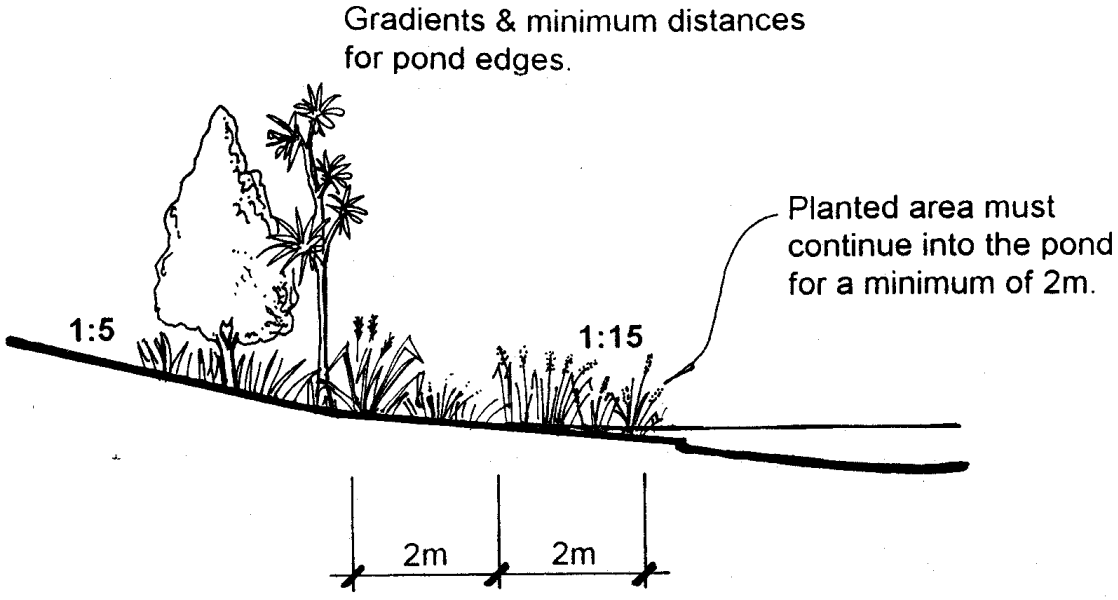


Figure 10.1: Cross Section of Stormwater Pond Edge

10.8.2 Fencing

10.8.2.1 Fencing shall be installed around the pond where required for health and safety reasons and as directed by Auckland City Environments.

10.8.2.2 Where the stormwater pond is within a reserve the fencing shall be located in consultation with Auckland City Environments.

10.8.2.3 Where the stormwater pond is located in a drainage reserve the fencing shall be erected on the boundary of the reserve.

10.8.2.4 Fencing shall be unclimbable but able to be seen through.

10.8.2.5 The fencing shall include gates to allow access for maintenance vehicles close to the forebay and inlet.

10.8.3 De-watering

10.8.3.1 Suitable measures shall be installed to allow the pond to be de-watered for maintenance, using gravity through the outlet manhole(s).

10.8.3.2 Manholes shall, as a minimum, have de-watering outlets at 300mm and 600mm below the normal operating level at the base of the pond. Where the base of the pond is remote from the outlet manhole an inlet pipe shall be run from this point to the manhole. The inlet pipe shall be capable of being opened from within the manhole to allow drainage of the pond.

10.8.3.3 De-watering pipes in the manhole shall comprise short lengths of SN 16 uPVC pipe with a puddle flange on the exterior of the manhole wall and a screwed cap on the inside of the manhole. The cap shall protrude no more than 150mm into the manhole.

10.8.4 Planting

10.8.4.1 Eco-sourced native wetland plants appropriate for the particular site conditions shall be planted around the 4m wide shelf of the stormwater pond. They will be chosen for their ability to withstand periodic or permanent inundation and to facilitate sediment deposition.

10.8.4.1 Comment

Factors to be considered in choosing appropriate species include:

- *Response to cold weather.*
- *Tolerance to changes in water depth.*
- *Mature height.*
- *Growth rates.*

Final selection will require input from a landscape architect familiar with the site.

10.8.4.2 Planting should be designed to become self-sustaining and to accommodate a range of aquatic and terrestrial animals. Where possible pond perimeter planting should be extended to connect with other native habitats.

10.8.5 Appearance

10.8.5.1 The visual appeal of the stormwater pond may be improved by the following techniques:

- fencing located within dense planting to reduce its visibility;
- rocks used at inlet and outlet to screen engineered structures and create a more natural appearance;
- placement of large branches at the pond edge to provide perches for birds while other planting establishes;
- incorporation of small islands within ponds to provide predator free habitats.

10.8.6 Maintenance Access

10.8.6.1 Access shall be provided to the pond for maintenance, including the removal of sediment from the forebay.

10.8.6.2 The width and gradient of vehicle access routes shall be adequate for maintenance vehicles and machinery to reach the pond and immediate environs.

10.8.6.3 Vehicle access routes shall be surfaced to avoid erosion. This may be achieved by the use of appropriate erosion matting or reinforced grass.

10.9 Works and Services

10.9.1 General Works Requirements

10.9.1.1 All engineering works carried out on parks and reserves and land intended to be set aside for parks and reserves shall comply with the requirements in this Code.

10.9.1.2 The requirements in s10.9 are applicable to neighbourhood reserves. They do not generally apply where undeveloped land is taken for future development into recreation reserves by Council.

10.9.1.3 Utilities shall not be routed through or sited within reserves, except:

- As required to service that reserve.
- With the express approval of the Parks Manager.

10.9.2 Earthworks and Filling

10.9.2.1 Where extensive filling is undertaken in any reserve then such fill shall be free of inorganic material, stumps, branches, timber and other similar debris.

10.9.2.2 Where a fill area within any reserve has been used for disposing of organic material such as stumps, tree and shrub branches, or inorganic material such as car bodies, concrete and other assorted debris, then the extent of such fill areas shall be clearly indicated and this information shall be provided prior to valuation of the lots for reserve contribution purposes. This shall apply to both "historical" filling and to filling approved by Council. All relevant information shall be shown on the As-Built Plans.

10.9.3 Stormwater

10.9.3.1 The treatment for watercourses shall be in accordance with the Development and Connection Standards, the Stormwater Management bylaw and the Watercourse Guidelines Manual, and comply with relevant resource consent conditions.

10.9.3.2 Where any surface water run-off from a developed reserve may create a nuisance to any adjacent existing or proposed lots, provision is to be made to adequately manage the stormwater flows.

10.9.3.3 All reserves are generally to be provided with a suitable stormwater outfall or outfalls as dictated by contour, dimensions and any amenities Council may have proposed.

10.9.3.4 Wetland areas and natural hollows are encouraged to be retained where they can be an asset to the reserve and where stormwater management provisions are acceptable to Council.

10.9.4 Wastewater disposal

10.9.4.1 All Recreation and Local Purpose (Community Facilities) reserves shall have provision for wastewater disposal to the satisfaction of the Approving Officer (in consultation with the Parks Manager).

10.9.5 Electrical and Telecommunications Utilities

101.9.5.1 If lighting is to be provided within the reserve the power cables shall be reticulated underground.

10.9.6 Survey Pegs

10.9.6.1 All survey pegs are to be present, including pegs that may form the common boundary to adjoining land which may or may not be a portion of the development site.

10.10 Vehicle Access

10.10.1.1 Access for heavy duty vehicles shall be provided to all reserves (for maintenance vehicles), except where the Approving Officer expressly advises that such access is inappropriate or otherwise not required.

10.10.1.2 Vehicle barriers shall be provided at entrances to reserves to prevent unwanted public access. Barriers shall be either lockable gates, removable lockable bollards or linked bollards. Barriers shall be appropriately marked with reflectors.

10.11 Fencing

10.11.1.1 Where an access to a rear allotment abuts a reserve, then the common boundary of such access and the reserve is to have a timber fence (refer Standard Drawing TARS 12908/309; section 18) for the total length of such boundary. Refer also 10.4.1.2.

10.11.1.2 Where livestock will be carried on adjacent land, the Developer must provide adequate fencing (at the Developer's cost).

10.11.1.3 In all other cases, where the common boundary of the reserve and abutting land is not fenced and the abutting land forms part of the land being subdivided, the subdivider shall either:

i. Fence the common boundary with a 1.20m high fence timber (see Standard Drawing TARS 12908/309; or
ii. Place a memorial on the titles of the abutting land to the effect that the Council, as owner of the reserve, will not be liable for a contribution towards any fencing costs of the common boundary.

10.12 Completion and Presentation of Reserves

10.12.1.1 On completion of the development the reserve shall be passed over to Council in a clean condition, clear of all debris and deleterious material. The preparation operations shall have been carried out in a professional manner.

10.12.1.2 The Council will accept responsibility for maintenance of reserves from subdivisions only when they are fully developed to an acceptable standard. Responsibility for maintenance will begin only when other engineering works of that stage of the subdivision have been accepted as complete.

10.12.1.3 Those areas planted in indigenous or exotic growth which are to be retained, shall be:

a) clear of all environmentally damaging weed growth
b) clear of all fences (except those required to protect particular features, eg. stormwater ponds)
c) clear of all unwanted material (including construction debris)
d) made safe by felling and removal of dead or dying trees or large limbs.

10.12.1.4 The developer shall ensure that all dead or dying trees or tree branches are removed by a reputable qualified contractor according to accepted arboricultural standards and to the satisfaction of Council's arborist. Where such approval is not part of the subdivision consent, a separate resource consent may be necessary for work on trees within the height/size limits prescribed in the District Plan for protected trees.

10.12.1.5 Grassed areas shall:

a) Be smoothed to an even contour and provided with a minimum of 150mm depth of topsoil.
b) Have a surface free from all unwanted material.
c) Have a grass cover established using an acceptable turf type rye grass mixture and shall be even and generally free of weed and in a close mown condition ready for routine maintenance.

10.12.1.6 Council may require that the developer undertake development of the reserve, eg. tree planting, and then maintain that reserve for a period of time, eg. 2 years until Council assumes responsibility for maintenance.

10.12.1.7 Asbuilts meeting the requirements of s13 must be submitted.

10.12 Comment *Species selection is critical to the long term development of any reserve. Low maintenance species must be used. Developers should note that a ready supply of water is generally not available.*

11.0 Hazards

11.1 Introduction

11.1.1 Scope

11.1.1.1 This section deals with all issues relating to development driven Hazards not covered elsewhere, including:

- Wild Fire (rural fire).
- Coastal and Sea level hazards (erosion, tsunami, sea level rise, storm surge, wave action).

Other relevant hazards dealt with in other parts of this Code are:

- Land instability (covered in the Earthworks section).
- Flooding (covered in the Stormwater section).
- Drought (covered in the Water Supply section).

11.1.1.2 This Code does not deal with other land or sea based hazards such as:

- Use of contaminated sites, or previous landfill or tip sites.
- Hazardous facilities or storage of hazardous goods (refer s6B1.4.1 of the District Plan).

11.1.2 Objectives and Desired Outcomes

11.1.2.1 The design of the development should avoid or mitigate these hazards and therefore safeguard people and property.

11.1.2.2 Developments which are designed, constructed and maintained in accordance with this section should:

- Not cause wild fire.
- Be relatively unsusceptible to wild fire.
- Allow their occupants opportunities to escape wildfire.
- Be relatively unsusceptible to the effects of sea level changes and other coastal hazards.

11.1.3 Other Useful Documents

11.1.3.1 This section makes reference to:

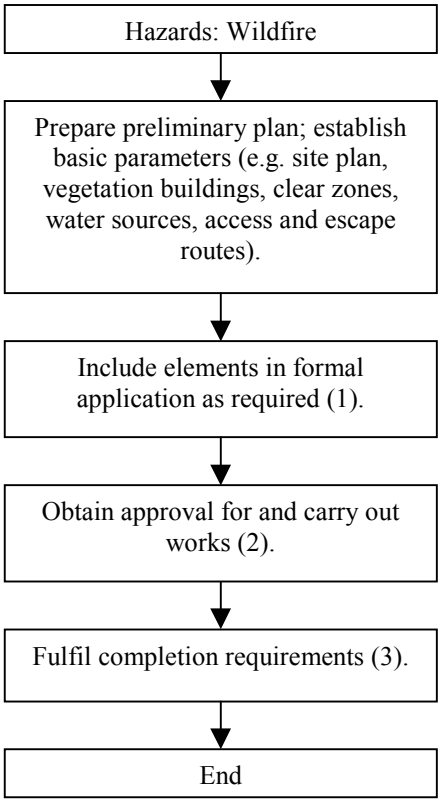
- New Zealand Coastal Policy Statement.
- Intergovernmental Panel on Climate Change (IPCC 2001).
- Auckland Regional Council Technical Publication TP 130 (Coastal

Hazard Strategy / Coastal Erosion Management Manual).

- NZ Fire Service "Code of Practice for Fire Fighting Water Supplies".
- Ministry for the Environment "Planning for Climate change effects on Coastal Margins", 2001.

11.2 Approach to Hazards

11.2.1 Simplified Hazards Process: Wildfire



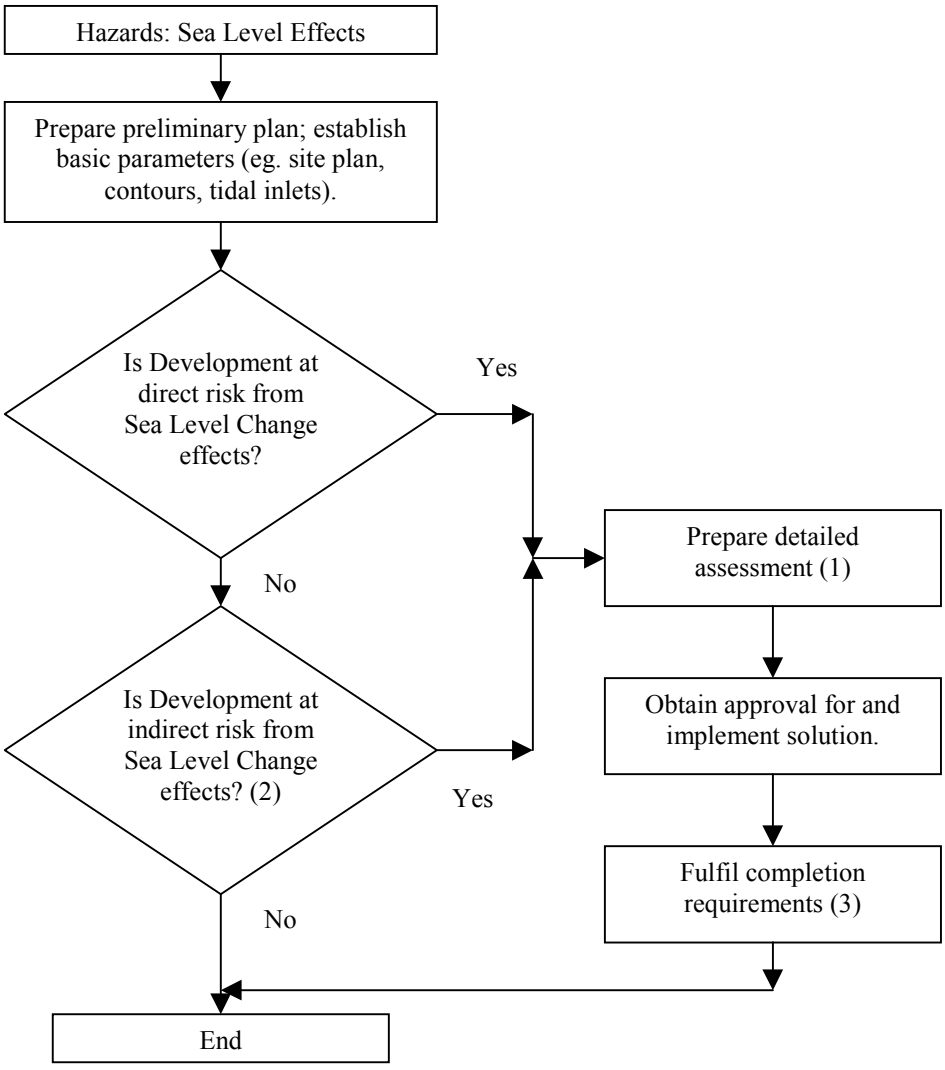
Notes

1. Note Auckland City Council Resource Consents for works involved may be included in the subdivision resource consent if sufficient information is provided with that application.

2. Engineering Plan Approval will also generally be required (see section 2.2).

3. See s13.

11.2.2 Simplified Hazards process: Sea Level Effects



Notes

1. Refer to s12 for coastal issues.

2. For example, Sea level and tidal effects may impact on flood risk analysis; see s11.5.

3. See s12, 13.

11.3 Application Information and Approvals

11.3.1 Developments in Bush or using Generators

11.3.1.1 All developments located in bush or relying on locally generated electricity must:

- Indicate on the application the generator site, any proposed clear zones around buildings, fuel stores, emergency water supplies, access and escape routes.

11.4 Design for Wildfire

11.4.1 Defensible Space

11.4 1 Comment *The "Defensible Space" as described here is a recommendation only. These fire prevention and mitigation methods are not part of the District Plan, and Resource Consent may be required to achieve them.*

It would be prudent, however, to try and achieve an appropriate Defensible Space at subdivision or development stage where possible.

Nothing in this section overrides the District Plan rules relating to tree and vegetation protection. Vegetation removal also needs to recognise the other effects (eg. erosion) which may arise from inappropriate land clearance.

11.4 1.1 The "Defensible Space" is a buffer zone to protect the bush from house and generator fires, and protect the houses and buildings from bush fires. It will typically involve an outer area of reduced fuel and an inner exclusion zone.

11.4.1.2 Buffer zone (outer zone): The extent of this zone is determined primarily by slope but other factors (eg. prevailing wind direction, fuel type, aspect) should also be considered. It may be from 10m (flat ground) to 50m (up to 20° slope).

11.4.1.3 In this zone:

- Vegetation must not be continuous.
- Where ever possible, low flammability fuels and plant species should be used. Refer to National Rural Fire Authority brochure: "Flammability of Native Plant Species: A guide to reducing fire hazard around your home" and section 9 of this Code.
- This brochure suggests a defensible space should be 10 to 30m on low slopes and/or light fuels, and 30 to 50m on steep slopes and/or heavy fuels. It also states that "overseas experience has shown that the

preferred option is for this area to extend for 100m".

- Dry grass, small and dead branches, and other potential fuels must be removed on an ongoing basis.

11.4.1.4 Building Protection Zone (inner zone): The distance for this varies between 20m (flat) and 40m (20° slope). This zone comprises lawns, paths, swimming pools etc.

11.4.1.5 In this zone:

- No storage of firewood, building materials or rubbish is allowed.
- Remove all dead tree branches over hanging roofs.
- Remove all tree branches within 3 metres of chimneys.

11.4.2 Access and Escape

11.4.2.1 Access must be provided which is sufficiently wide and strong to support fire vehicles, including bridges and culvert crossings. These accessways should have:

- Adequate provision for passing bays, and turning around points along their length.
- Sufficient vehicle manoeuvring at "dead ends".

11.4.2.2 Where possible two access and escape options should be provided. Emergency escape routes are to be kept accessible at all times.

11.4.2.3 Street numbers or other suitable property identifiers should be visible and legible from the road.

11.4.3 Fire fighting water supply

11.4.3.1 A supply of water, either reticulated or static must be available for fire fighting purposes.

11.4.3.2 Where a reticulated supply is provided it shall:

- Meet the prescribed minimum flows set out in the "NZ Fire Service Code of Practice for Fire Fighting Water Supplies".
- Have outlets compatible with fire fittings.

11.4.3.3 Where a dedicated static water supply is provided it shall:

- Be at least 10,000 litres per dwelling.
- Have outlets compatible with fire fittings.
- Be within 250 metres of all buildings it is intended to protect.
- Be contained within fire resistant materials.
- Be readily accessible.

11.4.4 Generators and Generator Sheds

11.4.4 Comment *Refer also to Building Code Acceptable Solution C/AS1, Table 2.1, Purpose Group 1D.*

Generator exhaust noises must comply with the standards set out in the District Plan.

11.4.4.1 Generator sheds shall:

a) Have a floor of concrete or other non-combustible permanent material, and walls and roof of fire retardant material.

11.4.4.2 Generator sheds shall have exhaust and ventilation arrangements which minimise:

a) The risk of heating any flammable material.
b) Build up of toxic or hot gases.
c) The risk of sparks igniting flammable material.

11.4.4.3 Generator sheds shall be located:

a) At least 5 metres from any boundary.
b) At least 10 metres from any dwelling or other major building.

11.4.4.4 Each allotment which will use an onsite generator shall have:

a) Provision for an appropriate fuel storage facility.

11.5 Design for Coastal Hazards and Sea Level Effects

11.5 Comment *Sea level hazard studies for the Auckland Region are currently underway, and more detailed guidelines are expected to be available in 2004. It is expected that this section of the Code will be revised then.*

In the interim, the following are recommended for consideration when developments are proposed near the coastline. Developers should also refer to the ARC's TP130 and Proposed Regional Plan: Coastal.

The requirements of s36 of the Building Act must also be considered where these hazards may affect the development.

11.5.1 Useful Guidelines

11.5.1.1 Developments should be designed taking into account:

a) The IPCC 2001 estimate of 0.31m to 0.49m for sea level rise by the year 2100. This is the "business as usual" scenario published by the Intergovernmental Panel on Climate Change.
b) Mean High Water Springs (MHWS) of 1.4m (DOSLI datum).
c) Highest recorded tide of 2.25m (DOSLI datum).
d) An appropriate storm wave run up height.

Items (b) and (c) are for the Ports of Auckland; water levels vary around the Waitemata Harbour and Hauraki Gulf.

11.5.1.2 Tidal and Sea level changes may also need to be considered for flood risk analysis. See also s4.4.

11.5.1.3 Developments near the coast should be designed taking into account the non-structural and structural approaches presented in the ARC's TP130 and MfE (2001). This includes protection of coastal land, location of new subdivisions, revegetation, beach nourishment, dune reconstruction, seawalls, groynes and breakwaters. Refer also s12, and Chapter 21 of the ARC's Proposed Regional Plan: Coastal.

11.5.1 Comment *The NZCPS states (3.4.5) that new development should be located and designed to avoid the need for hazard protection works.*

Coastal protection works should be used to protect existing development only where they are the best option for the future.

12.0 Coastal Access

12.1 Introduction

12.1.1 Scope

12.1.1.1 This section deals with all land based issues relating to Coastal Access and Coastal Land Transport, including:

- Wharves, piers, boat ramps and jetties.
- Sites without road access.
- Coastal and foreshore roads, access ways and walkways.

12.1.2 Objectives and Desired Outcomes

12.1.2 Comment *The preservation of the natural character of the coastal environment, and its protection from inappropriate subdivision, use and development are identified as matters of national importance under the RMA (s6).*

12.1.2.1 Developments which are designed, constructed and maintained in accordance with this section should:

- Have appropriate pedestrian, water and vehicle access.
- Have minimal negative effect on the coastal environment.

12.1.2.2 This section also aims to maintain consistency with the ARC's Proposed Regional Plan: Coastal.

12.1.2.3 The maintenance and enhancement of the public's access to the coast is identified as a matter of national importance under the RMA (s6). Ways of preserving and enhancing this access should be considered early in the development design.

The public will have access to coastal structures (including wharves) constructed as part of a Development, unless good reason can be given at the time of the application why access should be restricted. Refer to Chapter 7 of the ARC Proposed Regional Plan: Coastal.

12.1.3 Other Useful Documents

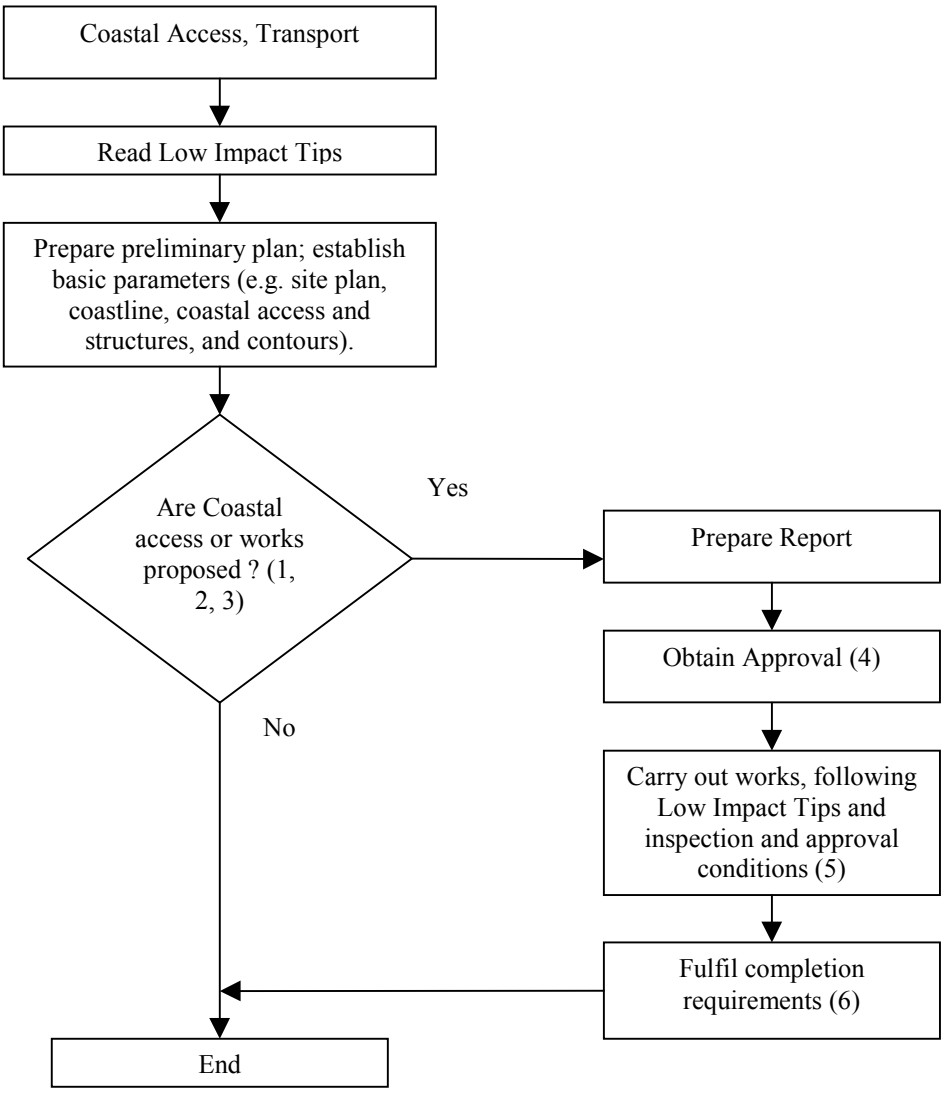
12.1.3.1 This section makes reference to:

- ARC Regional Policy Statement (RPS).
- ARC Proposed Regional Plan: Coastal (PRPC).
- ARC TP130 Coastal Hazards Strategy / Coastal Erosion Management Manual.
- New Zealand Coastal Policy Statement.
- Hauraki Gulf Marine Park Act 2000.
- Ministry for the Environment "Planning for Climate Change effects on Coastal Margins", (2001).
- US Army Corps of Engineers (1984); Shore Protection Manual.
- CIRIA 183 (1991); Manual on the use of rock in coastal and shoreline engineering.
- AS 3962 (1991); Guidelines for design of marinas (includes design considerations for boat ramps).
- BS 6349: Maritime Structures (includes loading and design requirements for wharves and piers).
- Onetangi Coastal Management Strategy (ACC / ARC, in preparation).

This is a short list of key references, and many other references can be used to assist in the design of coastal structures. However, there is no single New Zealand reference document that provides all the information required.

12.2 Approach to Coastal Access and Transport

12.2.1 Simplified Coastal Access and Transport Process



1. A Resource Consent from Auckland City Council for Coastal works may be required. Note that those undertaking such works are responsible for ensuring that all required consents are obtained. Refer to s6B.1.3 and 6C.1.3 of the Plan.

2. In most instances, works along or within the coastal margin will also require consents from or consultation with the Auckland Regional Council (as a consent authority and a potentially affected party). The designs should therefore provide sufficient information to meet the requirements of Council and the ARC.

3. Approvals may also be required from the Minister of Conservation, who has responsibility for Restricted Coastal Activities (eg. seawalls longer than 200m, wharves longer than 100m).
Refer list of contacts, page 5.

4. Engineering Plan Approval or a Building Consent will also generally be required (see section 2.2). The Hauraki Gulf Marine Park Act 2000 will form part of the assessment criteria.

5. See s12.2.

6. See s13.

12.2.2 Achieving Low Impact Coastal Works

12.2.2.1 The ARC's TP130 includes a range of non-structural and soft and hard structural methods to avoid, remedy and mitigate adverse effects of coastal development. Refer also s11.5.

12.2.2.2 Useful non-structural (non-asset) approaches include:

- Development location (i.e. avoiding hazard and sensitive areas).
- Development design (e.g. locating buildings away from coastal systems).
- Recognising and preserving natural systems (designing with nature).

12.2.2.3 Structural approaches which may be appropriate for some developments include:

- Beach nourishment.
- Revegetation.
- Dune reconstruction.
- Seawalls.
- Groynes.
- Boardwalks.

12.3 Application Information and Approvals

12.3.1 All Developments

12.3.1.1 The design of coastal access, transport and related structures requires specialist experience and training. The Developer's Representative(s) must be suitably qualified and experienced in coastal amenity, processes and engineering so a solution which is appropriate to the given site can be found.

12.3.2 Developments using Coastal Access

12.3.2.1 Coastal Access includes all infrastructure associated with water based access to the land area being developed.

12.3.2 Comment *Coastal Access arrangements will almost certainly involve works within the Coastal Marine Area. These are likely to require resource consent under s12 of the RMA.*

12.3.2.2 Developments proposing to access one or more sites from the coast shall include with the application:

a) A description of the site, including the coastal values of the site.
b) Identification of the coastal processes and hazards that exist at the site and the general environment, including consideration of potential climate change effects including sea level rise.
c) A demonstration that coastal access is the best practicable option for the area being developed.
d) Appropriate plans indicating where and how access will be provided and maintained.
e) An assessment of environmental effects of the proposed development, including on the natural character and landscape (see section 7 CEMM (TP 130)).
f) Appropriate description of the construction methodology.
g) Appropriate description of the potential maintenance considerations, and methodologies to carry out the required maintenance.
h) A schedule of consents required for any corresponding structure, and the consent authority and status of each consent. Note this is likely to include coastal permits, land use permits, earthwork consents and building consents.

12.3.2.3 To reduce the adverse effects on the environment within any particular area coastal access structures and formations shall be shared where possible.

12.3.2.3 Comment *Where facilities are shared, it must be clear who the Consent Holder is. Refer also s2.11.*

12.3.3 Developments with no Road Access

12.3.3.1 Allotments without road access may be permitted where road access is clearly not feasible. Notices shall be placed on the relevant titles noting that the land has no road access, and that Council has no obligation to provide such access.

12.3.3.2 Information requirements are as scheduled in 12.3.2.2.

12.3.3.3 Coastal access structures and formations shall be shared where possible.

12.3.3 Comment *Consents for any proposed coastal works or structure still need to be obtained in the usual way after Council's approval of an allotment without road access.*

12.4 Design of Wharves and Piers

12.4.1.1 The structure must be designed to withstand the various hydraulic forces of waves and tide as well as berthing forces and other loads on the structure.

12.4.1.2 Coastal access structures should be designed for vehicle loadings unless vehicles are physically unable to access the structure (eg. too narrow).

12.4.1 Comment *OSH and Building Act requirements need to be considered, especially in regard to provision of handrails. It is likely that hand rails will be required along all sides of non-commercial wharves and jetties apart from the berthing area.*

12.5 Design of Coastal Roads

12.5 Comment *Refer to the ARC's TP 130 for detailed design information.*

12.5.1.1 Coastal roads shall generally not be permitted within the land area likely to be affected by coastal hazards, including erosion and inundation taking into account climate change impacts to 2100 (refer MfE, 2001).

12.5.1.2 Where coastal roads are the only practical option the roads shall be situated as landward as possible with the minimum practical carriageway width.

12.5.1.2 Comment *The minimum widths for the road reserve and carriageway set out in section 7 still apply. Note that the road reserve must be wide enough for future re-alignment, even though the formed carriageway may be narrow.*

12.5.1.3 Should the road require protection from the forces of the sea, low impact protection measures (e.g. provision of an erosion buffer, vegetation and beach replenishment, where appropriate) shall be used in preference to structural solutions such as revetments and seawalls.

12.6 Design of Coastal Accessways

12.6 Comment *Refer to the ARC's TP 130 for detailed design information.*

12.6.1.1 All significant development and assets shall be landward of the areas likely to be affected by coastal hazards, including erosion and inundation taking into account climate change impacts to 2100 (refer MfE, 2001).

Only works that have a function associated with the marine based aspects of the development (eg. headworks, revetments or land abutments) shall be located within the area likely to be affected by coastal hazards.

12.6.1.2 Any headworks, revetments or other land abutments for any coastal access structure are to be installed above the highest annual spring tide where feasible. The dimensions of these structures should be as small as practicable.

Reclamations below Mean High Water Springs are to be avoided unless no practicable alternative exists.

13.0 As-built Requirements

13.1 Introduction

13.1.1 Scope

13.1.1.1 This section deals with all issues relating to providing certified as-built plans and documents for completed assets and works which are either shared or Community Based Facilities, or which will be owned or operated by Council.

It includes:

- Graphical requirements for the plans, and conventions to be followed.
- Documentation required.

13.1.1.2 Development assets and works will often be private, and covered by a building consent. In this case, the as-built and certification requirements relating to that consent apply, unless specifically stated otherwise. This section may still be referred to as a guide to good practice.

13.1.1.3 As-built and completion requirements for public or Community Based stormwater, wastewater or water supply assets, or other similar works carried out under an Engineering Plan Approval are given in the Development and Connection Standards.

13.1.1 Comment *City wide as-built and asset information standards are currently under review, and the completion documentation required is likely to change when that review is complete.*

13.1.2 Objectives and Desired Outcomes

13.1.2.1 The objectives of this section are to:

- Ensure that adequate plans, documentation and certification are obtained on completion of any works.
- Allow confirmation that all required works have been completed satisfactorily.
- Ensure that future asset management can be carried out with correct and adequate information.

These as-built plans are used to keep asset information (Council's GIS) up to date for all users.

13.1.2.2 Developments which are designed, constructed and maintained in accordance with this section should:

- Have their corresponding works completed in accordance with the approvals issued.
- Be left ready for use.
- Be able to be maintained and operated to give the required levels of service for the life of the development.

13.1.3 Other Useful Documents

13.1.3.1 Useful Drawing standards include:
NZS/AS1100 Technical Drawing
Part 101: 1992 and A1: General Principles
Part 401: 1984 and A1: Engineering survey and engineering survey design drawing
Part 401: Supplement 3: 1984 Sewerage and Water Supply
Part 401: Supplement 4: 1984 Roads
Part 501: 1985 Structural Engineering Drawing
Part 501: Supplement 1 : 1986 Structural Engineering Drawings

13.2 Application Information

13.2.1 All Developments

13.2.1.1 This section applies to all developments where the given works are included. Not all developments will include all works covered by this section.

13.3 Common As-built Standards

13.3.1 General Requirements

13.3.1.1 As-builts which do not meet the required standards will be returned to the originator for correction and re-submission. Projects will not be considered completed until the as-builts have been received, checked and approved.

13.3.1.2 As-Built drawings and records of all subdivisions are required with all details of drainage, water, roading, traffic signals, cut and fill areas (including depths), final land contours and pumping stations.

13.3.1.3 The As-Built drawings must be submitted and approved prior to the issue of a Certificate of Practical Completion, a certificate under section 224(c) of the Resource Management Act 1991, or any other completion confirmation.

13.3.1.4 The person responsible for the as-builts must submit:

- One or more as-built plans to identify all the works carried out. Different types of works may be on the same plan as long as the plan is clear.
- Two paper copies of each as-built plan.

That person will also preferably submit:

- The as-built drawing file(s) (DXF or DWG format), on disk or by email. These files should contain information on all works as well as any other information (e.g. landbase, title etc.).

13.3.1.5 **This specification encourages electronic drawing files to be submitted. This gives significant benefits for all parties in minimising processing times and conversion errors.**

As-builters should also be aware that Auckland *City* is monitoring industry developments for exchange of GIS data. It is likely that electronic submission of data in an appropriate format will be a requirement of future versions of this as-built specification.

13.3.1.6 The As-Built Plan – literally *"as it was built"* – shows the physical results of the completed work activity, including how it affects existing assets in the vicinity. Each as-built plan must clearly show details of:

- All new assets, including how they connect to the existing system.
- Any existing assets that are part of the project or are in any way changed by the work.
- Any assets that have been abandoned or removed as part of the work.
- Service connections and private assets as appropriate (e.g. in road reserve).

Sufficient details of the existing assets in the area need to be shown to explain how these interface with the new works. Full information **must be supplied for each existing asset that is modified in any way** (including being connected to).

Private drainage and private water supply features (except connections where appropriate) will not generally be shown on the as-built. Where they are required, they must be placed on an appropriate "Private" layer in any drawings.

13.3.1.7 Any deviation from the originally approved design plan must be highlighted, and a note explaining the change and its approval included on the plan.

13.3.1.8 If "DRAFT" versions are prepared they must be clearly labelled as such, and not submitted as an as-built.

13.3.1 Comment *Other information may also be required when the works are completed. See also s14.*

13.3.2 Common Information

13.3.2.1 The following information and details shall be shown on all as-built plans.

Category	Types of Information	Comment
Plan view of work affected area	Property & road boundaries, road kerb lines, street names. House numbers. For Parks, the location should be marked on a GIS Plot.	Show the site in context of local roads existing assets and property boundaries. Lot numbers for new subdivisions
Tabular Information	Coordinates, Levels Private Connections	
Asset Identification	Asset Name (see below)	
References	Project title, as-builter's name and company details, scales, revision details, north point, date of plan, drawing title, the words "As-built", Engineering Plan or Consent number.	Note if any symbols used. Give works covered by as-built (e.g. Earthworks).
Labels	Asset Names, Reduced levels, pipe diameters or dimensions, lengths, materials. Asset Names, Asset location or extent, Asset types and lengths if needed.	Measurements are critical, please indicate lengths and widths of paved areas, paths and playgrounds.
Locality Plan	Showing work area in relation to main roads and the local suburb.	This is additional to the detailed work plan above.
Sheet Index Plan	Full work area with sheet boundaries shown.	Required when several sheets make up the as-built information.

13.3.2.2 All structure dimensions should be in millimetres or metres as appropriate, and all levels and asset lengths in metres.

All pipe diameters given must be nominal internal diameters.

13.3.2.3 Each Asset is to be identified on the As Built plan by an Asset Name. The as-builter will assign unique temporary asset names to all new assets, including service connections. Any reference format can be used as long as it uniquely identifies assets on the plan, e.g. 3 bus shelters could be labelled BS1, BS2, BS3.

Asset Names for existing assets in the affected area must also be shown; these are available from Auckland *City*'s GIS system.

For road works, the RAMM ID section number and route position are required.

Linear assets (e.g. pipes and watermains) need not be individually named if they can be referred to unambiguously by giving the named nodes at each end.

13.3.2.4 Coordinates for all new and changed existing assets shown on the as-built plan may be listed in a Coordinate Table on the plan, identified by asset name.

13.3.2.5 All private connections installed as part of the as-builted work must be shown on the plans. The details of each connection are listed in the Private Connections table on the plan.

13.3.3 Paper, Scales and Colours

13.3.3.1 The paper as-built plans are to be submitted on standard ISO metric plan sheets, drawn at a scale of 1:100, 1:200, 1:250 or 1:500. The information should fit on one sheet where possible; if this is not possible at A1 size, then multiple plan sheets may be required.

Sheet sizes can range from A3 to A1, but must be the same for all plans in the set. When more than one sheet is required, an index sheet must be included. Join lines may be used. Plans must be readily understood when printed or copied in black and white.

13.3.3.2 A4 may be used if the entire site and works can be shown at the above scales on one or two sheets.

13.3.3.3 Each service or feature shall be distinguished by a different legend as shown on the Standard Engineering Detail Sheets or a suitable legend included with the as-builts.

13.3.4 Coordinates and Accuracy

13.3.4.1 All levels shall be provided in terms of the DOSLI datum. All co-ordinates shall be supplied in terms of the national grid (NZMG, not Mt Eden).

13.3.4.2 All assets should be drawn (in the electronic drawing file) at their true X, Y, Z spatial positions.

Spatial information must:

- For **Coordinates** (X, Y), be in terms of NZMG on NZGD 1949, and be within ± 50mm.
- For **Levels** (Z), be in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and be within ± 25mm.

13.3.5 Documentation for Complex or Mechanical Assets

13.3.5.1 Full operation and maintenance manuals must be supplied for any complex or mechanical asset and for any asset which requires regular servicing to maintain required levels of service (e.g. pumps).

13.3.6 Certification Requirements

13.3.6.1 Certification by a Registered Engineer or Registered Surveyor that the information supplied on the As-Built Plans is accurate within the given survey tolerances shall be provided. As-Built Plans prepared by a person holding a NZ Certificate in Engineering and/or Surveying will be accepted provided the person is working under the direction of a Registered Engineer or Surveyor. The form for Certification is shown in appendix 13A.

13.3.6.2 The receipt of As-Built Plans and Council's acceptance thereof does not absolve the Developer of any responsibility for their accuracy. In the event of a connection not being provided, although shown on the As-Built Plan, or a connection not being in the position shown on the As-Built Plan, it shall be the responsibility of the Developer to provide or locate the connection for the owner of the lot.

Any work initiated by Council to rectify problems arising will be at the expense of the Developer.

13.3.6.3 The construction aspects of the works must be certified as being to the required standard. The forms for certification are shown in appendices 13B (Contractor) and 13C (Developer's Representative).

13.3.6.4 There are specific engineering standards or Building Act or Building Code requirements that must be adhered to for the construction and plans of certain asset types, e.g. Structures. Provision of certification or producer statements for these works is outside the scope of this Code.

13.3.6.5 The paper copies of the as-built plan must include (on each plan) a signed certification statement by the Registered Engineer or Registered Surveyor responsible for the as-built, in the following manner:

I certify that these as-built plans are accurate and that:

- *The **Coordinates** (X, Y) are in terms of NZMG on NZGD 1949, and are within ± 50mm.*
- *The **Levels** (Z) are in terms of the Auckland 1946 (MSL) LINZ datum (DOSLI datum), and are within ± 25mm.*

Signed: _____
Registered Engineer / Registered Surveyor

Date: _____

Name: _____

Address: _____
_____

Contact Phone: _____

Email: _____

13.3.6.6 This general certification does not preclude or override the professional responsibility of the certifier to ensure that any specialist design and construction techniques, outside his/her area of expertise, are certified by a suitably qualified and experienced person.

13.3.7 Minor Works

13.3.7.1 For minor works associated with development, Council will accept As-Built plans from Registered Drainlayers and Registered Plumbers.

13.3.7.2 As-builts for minor works shall meet all of the requirements for normal as-builts as outlined in this Code, except for the following:

- Surveyed coordinates are not required.
  Horizontal distances from adjacent property boundaries shall be shown and shall be ± 50mm.
  Vertical heights are not required, but where they are provided, they may be relative to a suitable fixed level on or adjacent to the site, and shall be ± 50mm.
- A4 plans may be submitted if the entire site and works can be shown clearly at the above scales on 1 or 2 sheets.

13.4 Earthworks As-built Information

13.4.1.1 Plans of appropriate extent showing cut and fill and depths from original contours at vertical intervals of 1m or as appropriate, along with the type of fill material and any areas where buildings or foundations will require specific design shall be provided.

13.5 Drainage As-built Information

13.5.1.1 The detailed requirements for testing, completion, as-builting, certification, connection and hand over of new public and shared wastewater and stormwater works included in the "Development and Connection Standards" shall be met in all cases for those works. Those requirements take precedence for those systems over the requirements included in this Code.

13.5.1.2 As-builts for private drainage works must meet the requirements of the building or other consent they were constructed under. These will be specified with the consent approval.

13.6 Water Supply As-built Information

13.6.1.1 The detailed requirements for testing, completion, as-builting, certification, connection and hand over of new public and shared water supply works included in the "Development and Connection Standards" shall be met in all cases for those works. Those requirements take precedence for those systems over the requirements included in this Code.

13.6.1.2 As-builts for private water supply works must meet the requirements of the building or other consent they were constructed under. These will be specified with the consent approval.

13.7 Roading As-built Information

13.7.1 Road Construction Details

13.7.1.1 Details of road carriageway construction as described in Section 7 shall be provided.

13.7.1.2 Final construction drawings showing roading details such as layout and construction details shall be provided.

13.7.1.3 Details of Earthworks as presented above shall be provided in the context of the road reserves and road.

13.7.1.4 The following Roading Details shall be shown. Points on and along these assets shall be spaced as required to accurately define their position but the distance between plotted points shall not exceed 20m.

- Road geometry showing carriageway dimensions and alignments.
- New kerb and channel.
- Footpath alignments.
- Driveways, vehicle crossings.
- Pavement construction for new road carriageway; and footpath construction. This shall include metal source, depth of basecourse and sub-base, undercutting, remedial treatment for poor strength.
- All existing site features with an overlay of new works to ensure that changes can be easily identified.
- Sub-grades and details of the bitumen and stone used for the road and footpath surfacing.
- Surfacing types such as asphalt, concrete, chip seal, slurry, interfacing blocks etc.
- Drainage.
- Road/footpath typical cross-sections.
- Survey boxes/stations.
- Parking bays/Bus bays.

13.7.2 Roading Assets Information

13.7.2.1 Council requires the following information concerning new road construction for its Roading Asset database (RAMM): metal source, depth of basecourse and sub-base, undercutting, remedial treatment for poor strength sub-grades, and details of the bitumen and stone used for the road surfacing.
This information shall be submitted to Council along with the other As-Builts information. The format for the information required is shown in appendix 13D.

13.7.3 Traffic Details and Roading Inventory

13.7.3.1 Drawing details showing traffic management details such as traffic islands, signals, pedestrian crossings and road markings shall be provided. Points on and along these assets shall be spaced as required to accurately define their position but the distance between plotted points shall not exceed 20m.

These shall include:

- Traffic islands and roundabout details.
- Traffic signals including pole numbers/mast arms, aspects, underground ducting, toby boxes, chambers, detector loops, controllers, cabinets and phasing details.
- Pedestrian crossings, paved areas, paths.
- On-street parking signs and road markings.
- All road markings and signs.
- Road inventory and street furniture, street lights.
- Barriers and guard rails.
- Landscaping features within the road reserves.
- All public utility services equipment on public roads.
- Bus shelters/bus stops.

13.7.4 Roading Drainage Assets Information

13.7.4.1 The following information must be shown on the as-built plan for each of the following assets.

- Measured positions of all manholes, soakholes, culverts, inlets, outlets and catchpits on or draining public roads and any other drainage structures relative to boundary pegs and showing the survey co-ordinates and lid levels.
- Longitudinal sections for all drainage lines showing finished ground levels, pipe sizes, materials, types and class, invert levels which show the drop through each manhole, and the distance between manholes.
- The distance to all stub connections provided is to be shown along the appropriate pipe.
- The plan position of all manholes, soakholes, culverts, inlets, outlets

and catchpits on or draining public roads and any other drainage structures (including watercourses), any junctions and bends (either horizontal or vertical) with the survey co-ordinates shown as close as practical to the structure or bend. Invert levels for every entry and exit pipe at structures and every change in direction (horizontal or vertical) are to be shown as close as practical to the appropriate structure and bend, as well as the lid level of any structure.

- If the drawing will become too cluttered through displaying the co-ordinates near the feature then the co-ordinates may be tabulated provided both the co-ordinates and the feature they reference have a clear identifier.
- The plan position of any existing feature connected to must also be shown along with all the information detailed above.

13.7.5 Other Structures and Services within Road Reserve

13.7.5.1 Items required to be included on as-built Plans include: cables, ducts, valves, meters, overland flow paths (with contours and flood levels) and other surface and buried features within the road reserve.

13.7.5.2 Dimensions and other information shall be provided as above for all fire hydrants, valves and other surface features within the road reserve or relating to Traffic or Roading.

13.7.5.3 Other structures within the road reserve are to be shown as appropriate.

13.8 Reserves As-built Information

13.8.1 General Requirements

13.8.1.1 Items required to be included on as-built Plans include kerb and channel, vehicle crossings, sign posts, street or path lights, buildings, paved areas, paths and trees (including species) and furniture (including play equipment), fences and gates, and pipelines (including type, material and size of all drains and their inlets and outlets), manholes, ducts, valves, meters, ponds, overland flow paths (with contours and flood levels) and other surface and buried features within any reserve.

13.8.1.2 Dimensions and other information shall be provided as above for all manholes, inlets, outlets, fire hydrants, valves and other surface features within or relating to the use or operation of any reserve.

13.8.1.3 Accurate locations and dimensions shall be shown for all assets.

13.8.1.4 Details of Earthworks as presented above shall be provided in the context of the reserves.

APPENDIX 13A: As-built Certification

This form is not for public or community based drainage or watermains certification; refer "Development and Connection Standards" for requirements relating to those services.

CERTIFICATE FOR AS-BUILT DRAWINGS

I, _____ Registered Engineer / Registered Surveyor hereby certify that the:

Earthworks	Roading
Public Accessways	Reserve Development
Rights of Way	Common Access Lots

Wastewater and Stormwater Drainage, and Water reticulation, and other services

are correctly shown on the attached plans numbered _____, prepared by _____ for the work on the development or subdivision at the property specified below.

I accept responsibility for the accuracy of the information and agree to paying reasonable costs to Council to rectify problems arising from inaccuracy as from items not being constructed.

Property Description/Title

_____

_____

Address of Property

_____

_____

_____ _____

Registered Engineer / Registered Surveyor Registration Number

Date _____

APPENDIX 13B: Certification of Works being to Standard (Contractor)

This form is not for public or community based drainage or watermains certification; refer "Development and Connection Standards" for requirements relating to those services.

CONTRACTOR'S CERTIFICATE UPON COMPLETION OF LAND DEVELOPMENT WORK

ISSUED BY:……...
(Contractor)

TO:……...
(Principal)

TO BE SUPPLIED TO:……...
(Territorial Authority)

IN RESPECT OF:……
(Description of development/subdivisional work)

AT:……
…….....
(Address)
……..has contracted to…….
(Contractor) (Principal)
to carry out and complete certain development work in accordance with a contract, titled Contract No……..
for……..("the contract")
I……... a duly authorised representative of …….
(Duly Authorised Agent) (Contractor)
hereby certify that …….
(Contractor)
has carried out and completed the development works, other than those outstanding works listed below, in accordance with the contract.

……Date……
(Signature of Authorised Agent on behalf of)

……
(Contractor)
……
……
(Address)
Outstanding Works
……...
……...
……...

APPENDIX 13C: Certification of Works being to Standard (Developer's Representative)

This form is not for public or community based drainage or watermains certification; refer "Development and Connection Standards" for requirements relating to those services.

ENGINEER'S CERTIFICATE UPON COMPLETION OF LAND DEVELOPMENT WORK

ISSUED BY:……..
(Suitably qualified professional)

TO:……
(Developer)

TO BE SUPPLIED TO:……
(Territorial Authority)

IN RESPECT OF:…….
(Description of development /subdivisional work)

AT:……
……...
(Address)
…….has been engaged by…….
(Engineering / Survey Firm) (Developer)
to provide construction observation, review and certification services in respect of the above development work which is described in the specification and shown on the drawings numbered ……
approved by ……..
(Territorial Authority)
I have sighted the …….. consent and conditions of consent
(Territorial Authority)
to the subdivision and development works and the approved specifications and drawings.

As an independent professional I or personnel under my control have carried out periodic reviews of the development work appropriate to the engagement and based upon these reviews, information supplied by the contractor during the course of the development works and the contractor's certification upon completion of the development works (copy attached) IT IS MY OPINION (not to be construed as a guarantee) that the development works, other than those outstanding works listed below, have been completed in the accordance with the above consent and sound engineering practice.

…….Date……
(Signature suitably qualified Professional)
…… Member CSNZ NZIS
(Professional Qualifications)
..... ACENZ IPENZ
(Address)
Outstanding Works
……
……
……

APPENDIX 13D: Roading Construction Data

ROADING CONSTRUCTION DATA

(To be completed for Each Road)

1 GEOMETRY

ROAD NAME _____ SUBDIVISION _____

Start Reference Location (precise)_____ End Reference Location _____

Length (metres) _____ Width (m) _____

2 CONSTRUCTION LAYERS

BASECOURSE LAYER (LAYER 1)

Date Completed_____

Depth _____

Metal Grading _____

Quarry _____

Metal Type Basalt/Greywacke

SUB-BASE LAYER (LAYER 2)

Date Completed _____

Depth _____

Metal Grading _____

Quarry _____

Metal Type Basalt/Greywacke

SUBGRADE (LAYER 3)

Test Date _____

Material _____

CBR (%) _____

Soaked/ Depth

Unsoaked/Field _____

Stabilised Yes/No

Method (Agent) _____

Amount (%) _____

UNDERCUT (LAYER 4) (if required)

Location _____

Length _____

Width _____

_____

Backfill Material _____

Depth _____

APPENDIX D TO SECTION 13 Cont.

SURFACING DETAILS

3 WATERPROOFING

Membrane Chip Seal

Date _____ Material _____

Width (m) _____ Aggregate Size _____

Area Sealed (sq m)_____ Aggregate Source _____
(Company and Quarry)

Binder Type & Grade _____

Cutter Quantity (pph) _____Type _____

Adhesion Quantity (pph) _____Type _____

Additure Quantity (pph) _____ Type _____

Flux Quantity (pph) _____

Residual Appl. Rate _____ l/m^2

Spray Temperature _____ ^oC

Litres at Spray Temperature _____

Sealing Notes _____

Preceding Weather
_____

APPENDIX D TO SECTION 13 Cont.

SURFACING DETAILS

4 SURFACING (ASPHALTIC CONCRETE OR CHIP SEAL)

Date _____ (A/C or Chip Seal)

Material _____

Length (m) _____ (State if precoated)

Aggregate Grade _____

Width (m) _____

Aggregate Source _____ (Company and Quarry)

Area Sealed (sq m) _____

Binder Type & Grade _____

Cutter Quantity (pph) _____ Type _____

Adhesion Quantity (pph) _____ Type _____

Additure Quantity (pph) _____ Type _____

Flux Quantity (pph) _____

Binder Residual Appl. Rate _____ l/m^2

Mix Spray Temperature _____ ^oC

Contractor _____

Litres at Spray Temperature _____

Sealing Notes _____

5 FOOTPATH SURFACING

Date _____

Material _____

Side (m) _____

Depth _____

Length (m) _____

Size/Grade _____

Width (m) _____

Binder Type _____

Contractor _____

Sealing Notes _____

14.0 GST and Subdivisions

14.1 Introduction

14.1.1 Scope

14.1.1.1 This section deals with issues relating to GST and Subdivisions, including:

- Completion of a Schedule of land and assets to vest in Council.
- Barter tax invoices (and the circumstances these apply under).

14.1.1 Comment *This information must be supplied before the 224c or other project completion certificate can be issued. Refer also s13.*

14.1.2 Objectives and Desired Outcomes

14.1.2.1 The objectives of this section are to:

- Ensure that the required information is provided to Auckland City and to the Developer.
- Set out Auckland City's position on invoicing arrangements for vested assets.

14.2 Inland Revenue and Council Requirements

14.2.1.1 Where land or services are vested in Council the transaction is subject to GST. However, the IRD have declared the transaction is GST neutral and that a "barter" is involved in which the vesting of these facilities (transferring them to Council) is the consideration for the Council's supply of subdivision or development approval.

14.2.1.2 On a subdivision the supply is considered to occur at the issuing of the Certificate of Compliance or Completion (generally the date of the 224(c) certificate).

14.3 Documentation

14.3.1.1 The Developer must submit a schedule of land and assets to vest in Council along with the as-built plans. This schedule must be in the form of Appendix 14A, and needs to include both land and infrastructure to vest in Council.

14.3.1.2 Where the Developer is registered for GST, Council will issue:

- Its own Tax Invoice to the Developer for the value of the vested assets.
- A buyer created Tax Invoice (on behalf of the Developer) for the same value. The Developer's agreement that Council will issue a buyer created Tax Invoice is included on the schedule.

These invoices will be issued on the same date (so they both fall into the same GST period), and are dealt with as any tax invoice would be by both parties. No money changes hands and no net GST liability is incurred by either party.

14.3.1.3 Where the Developer is not GST registered no Tax Invoices will be issued. No money changes hands as a result of this vesting.

14.4 Values for Vested Assets (Land and Services)

14.4.1.1 The value to be shown on the schedule for the land being vested is the open market value. This could be from valuation rolls on a per square metre basis. This value is to exclude GST.

14.4.1.2 The value to be shown on the schedule for the works or services being vested is the total cost to the Developer (excluding GST). This information could be from the contract schedule relating to that work.

14.4.1.3 Where the land being vested has also been improved, (eg. a road reserve, on which a road has been formed) the schedule needs to separately show the value of the land and the cost of the improvement works.

14.4.1.4 Auckland City Environments will review the values and costs provided, and may ask for further information or supporting documentation if these appear significantly higher or lower than costs for similar works on other sites.

14.4 Comment *Costs given for works should include direct costs only (eg. material, installation / construction and reinstatement)*

Appendix 14A: Schedule of Land and Assets to Vest in Council

Developer's Name and Address	Reference Transmittal
	Notice for Assets Vested from a Development at:
	Site Address
	Suburb
	Subdiv / Land Use Consent / /
Is Developer GST Registered ? Yes/No	Eng Plan Consent EP / /
If Yes, Developer's GST Reg No. - -	Completion Date / /

All Values are to be exclusive of GST

Land to Vest			
Land Use	*Area (m2)*	*Value*	*Council's Contribution*
Roading			
Reserves			
Other			
Land Total			
Assets to Vest			
Category	*Measure*	*Cost*	*Council's Contribution*
Buildings	Item		
Street Lighting	No.		
Roading	Length		
Footpaths	Length		
Catchpits	No.		
Kerb & Channel	Length		
Retaining Walls	Item		
Fences	Item		
Playgrounds	No.		
Trees, Shrubs	No.		
Sanitary Sewer Pipes	Length		
	Dia		
Manholes	No.		
Watermain	Length		
	Dia		
Sluice Valve	No.		
Fire Hydrant	No.		
Stormwater Pipes	Length		
	Dia		
Manholes	No.		
Pumpstations - Sewer	No.		
Pumpstations - Other	No.		
Total Assets			
Total Land and Assets			

This information is certified as being true and correct	
Name	
Company	
Position of Signatory in relation to Developer	
Signed	
Dated	/ /
If the Developer is GST Registered, this document acknowledges that Council will be issuing a Buyer Created Tax Invoice for these assets, and that the Developer will not issue a tax invoice for them.	

15.0 Maps of the Hauraki Gulf Islands

15.1 Introduction

This section contains maps of the Hauraki Gulf Islands Ward and of some of the individual islands and groups of islands.

15.1.2 Maps

15.1.2.1 The following maps are provided.

1. Hauraki Gulf Islands.
2. Inner Hauraki Gulf Islands.
3. Outer Hauraki Gulf Islands.
4. Waiheke Island.
5. Great Barrier Island.
6. Rakino Island.

16.0 Definitions and Glossary

16.1 Definitions

In this Code, unless the context requires otherwise or the term is redefined in the particular section, the meanings given below apply.

AEP	Annual Exceedance Probability. A rainstorm (eg. the 1% AEP storm) that has indicated probability (in this case, 1%) of being exceeded in any given year.
Allotment	As defined by s 218 (2) of the Resource Management Act 1991.
Approving Officer	A Council Officer, or an agent for a Council officer, who approves the design of one or more aspects of the development, or accepts that the works have been carried out to the required standards.
Community Based Treatment Facility	A Facility owned or operated by or on behalf of more than one person (eg. a local wastewater plant).
Council	Auckland City Council
Development	Any activity which alters the value, use or characteristics of land, including building, subdividing, and carry out works.
Developer	The person undertaking, or controlling the Development. This person will typically be the owner of the land, and the applicant for any required consents.
Developer's Representative	An appropriately qualified and suitably experienced professional who is responsible for the delivery of one or more aspects of the development to the required standards, and for certification of this in a form acceptable to Council.
District Plan	Auckland City Council, District Plan: Hauraki Gulf Islands Section (Operative, 1996).
Dwelling	A "Household Unit" as defined by s2 of the Building Act 1991.
Eastern SMA	The Eastern Strategic Management Area (of Waiheke Island) as defined in part 5.19 of the District Plan.
Eco-sourced	Sourced from a similar location and environment (of a plant specimen).

GIS	Council's Geographic Information System (which shows maps of the roads, properties, and some planning and hazard information).
Hauraki Gulf Islands	The part of the Auckland City District covered by the HGI section of the District Plan.
Islands	*See* Hauraki Gulf Islands.
Land Unit	A Land Unit as defined in the District Plan.
MPD	Maximum Probable Development. Development to the most intense level as allowed under the current District Plan.
NIWA	National Institute of Water and Atmospheric Research.
Pioneer (species)	Species which are naturally early colonisers and which can withstand harsher conditions.
Subdivision	"Subdivision of land" as defined by s218 of the Resource Management Act 1991.
Western SMA	The Western Strategic Management Area (of Waiheke Island) as defined in part 5.18 of the District Plan.

16.2 Glossary

Benthic	Living on the bottom of a lake, river or sea.
Cambium	The inner bark layer of trees, used as a mulch.
CBR	California Bearing Ratio.
Pbs	A measure of tree size (Plastic Bag Size).
Perennial	Lasting throughout the year (ie. permanent).
Riparian	Relating to the banks of a river.
Wingwall	A stormwater inlet or outlet structure.

17.0 References and Bibliography

17.1 Referred to Documents

17.1.1 Council Documents

Document	**Outline of Relevant Contents**
District Plan	Details of land units, designations and building lines, development rules, lot sizes and shape factors, and details of financial contributions required.
The Auckland City Council/ Metrowater "Development and Connection Standards for Stormwater, Wastewater and Water Supply" (referred to as the "Development and Connection Standards")	Detailed requirements for Stormwater, Wastewater and Water Supply aspects of development. *On-site stormwater measures are being developed to supplement this manual, and will form part of this Code when issued*.
Traffic and Roading Services Standard Engineering Details	Standard details and relevant New Zealand and overseas standards.
Waiheke Island Wastewater Management Plan	
Auckland City Council Consolidated Bylaw 1998	Wharves (Part 8); Stormwater Management (18); Refuse (21, 22); Waiheke Wastewater (29)
Biodiversity Management Strategy	
Parks & Open Space Development Plan – Hauraki Gulf Islands section	

Copies of these documents are generally available from Auckland City Environments. The Auckland City / Metrowater "Development and Connection Standards" manual is available from the Metrowater office. See list of contacts, page 5.

17.1.2 New Zealand and Other Standards

The following standards are referred to in this code, or have useful information.

Standard	Title
AS/NZS 1158.0: 1997	Design and Maintenance of road lighting. See also 1158.1.1; 1158.1.1A1; 1158.1.3; 1158.3.1.
AS/NZS 1546.1:1998	On-site Domestic Wastewater Treatment Units - Part 1 Septic Tanks.
AS/NZS 1546.2:2001	On-site Domestic Wastewater Treatment Units - Part 2 Waterless Composting Toilets.
AS/NZS 1546.3:2001	On-site Domestic Wastewater Treatment Units - Part 3 Aerated Wastewater Treatment Systems.
AS/NZS 1547:2000	On-site domestic wastewater management.
NZS 3604:1999	Timber Framed Buildings.
NZS 4404:1981	Code of Practice for Urban Land Subdivision.
NZS 4431:1989	Code of Practice for Earthfill for Residential Development.
HB 44: 2001	Subdivision for People and the Environment.

17.1.3 Auckland Regional Council Documents

Document	Title
TP 10	"Stormwater Treatment Devices", Technical Publication 10.
TP 53	"The Environmental impacts of Urban Stormwater Runoff", Technical Publication 53, ARC, 1995.
TP 58	"On-Site Wastewater Disposal from Households and Institutions", Technical Publication 58, ARC.
TP 90	"Erosion and sediment control guidelines for land disturbing activities", Technical Publication 90, ARC (this has replaced TP 2).
TP 124	"Low Impact Design Manual for the Auckland Region", Technical Publication 124, ARC, April 2000.
TP 130	"Coastal Hazard Strategy, Coastal Erosion Management Manual", Technical Publication 130, ARC, 2000.
TP 148	"Riparian Zone Management"
TR 5	"Methods and Options for Stormwater Management", Technical Report 5, ARC.
	Pest*fact* sheets
	Friendly Alternatives
	National Surveillance Plant Pests

17.1.4 Other Documents

Reference may also be made to the following documents.

Document	Outline of Relevant Contents
The New Zealand Fire Service "Code of Practice for Firefighting Water Supplies" (June 1992).	Fire fighting water supply requirements (flow rates, storage volumes, hydrant distances).
The Hauraki Gulf Marine Park Act 2000	Provides a forum to assist in integrating the management of the resources of the Hauraki Gulf.
The Building Act 1991	Regulates procedures around building works, including building consents.
The Building Code	Regulations, requirements and acceptable solutions for building works.
IPENZ procedure for Hydrological design	Outlines a stormwater design approach.
Revegetation Manual – Boyden Evans – QEII National Trust.	
Native Forest Restoration – Tim Porteous, QEII National Trust.	
Flammability of Native Plant Species – A guide to reducing fire hazard around your home, National Rural Fire Authority, NZ Fire Service Commission and Forest Research.	

17.1.5 Access to Documents

The documents referred to in this Code can generally be obtained from the contact details list.

18.0 Roading Drawings

18.1 Location of Roading Drawings

18.1.1.1 The following drawings are included as an interim measure for the convenience of users of this version.

Once these drawings are finalised they will be re-drafted and included in the Traffic and Roading Services Standard Engineering Details folder, which provides a single source of that information.

It is expected that they will also be available from the Council's website so that all users have ready access to up to date copies at all times.

18.2 List of Roading Drawings

Dwg Num	Title
TARS 12908/103/2	Standard Service Locations
TARS 12908/104	Street Lighting
TARS 12908/105	Typical Frangible Base Detail (Exploded View)
TARS 12908/106	Rural Roading Typical Cross Section
TARS 12908/106/1	Urban Roading: Typical Cross Section
TARS 12908/107	Defined Road Boundaries
TARS 12908/108	Private Way : Service Trench Detail
TARS 12908/109	Waitemata Harbour Datums
TARS 12908/212	Cast Iron Catchpit Gratings and Frames – 660 x 460 and 455 x 455
TARS 12908/213	Street Catchpit – 660 x 460
TARS 12908/215	Stormwater Inlet/Outlet Structures – Normal Structures
TARS 12908/216	Stormwater Inlet/Outlet Structures – Skewed Structures
TARS 12908/241	Typical Soakhole
TARS 12908/242	Centre Part for Single and Double Splay
TARS 12908/243	Splay Catchpit
TARS 12908/244	Lid Information Double Splay Catchpit
TARS 12908/245	Lid Information Single Splay Catchpit
TARS 12908/246	Rain Garden Standard Detail
TARS 12908/247	Batter Drain Detail
TARS 12908/248	Side Drain Construction
TARS 12908/249	Side Drain Culvert Inlets
TARS 12908/250	Culvert Outlet Gabion Seepage System
TARS 12908/251	Culvert Outlet Rip-Rap Dissipation Basin
TARS 12908/301/1	Kerbs & Channels
TARS 12908/302/2	Urban Vehicle Crossing
TARS 12908/303	Vehicle Crossing Construction Notes
TARS 12908/304	Pram Crossing

Dwg Num	Title
TARS 12908/306	Pedestrian Accessway – Type B
TARS 12908/308	Fence Type A, B, C
TARS 12908/309	Fence Type D and E
TARS 12908/310	Fence Type F
TARS 12908/312	Guard Rail
TARS 12908/314/1	Stabilised Subgrade Zone Design Chart
TARS 12908/317/1	Subsoil Drain Details
TARS 12908/318/1	Footpath Construction Typical Sections
TARS 12908/327	Bridged Vehicle Crossing
TARS 12908/330	Cul de sacs Dimensions
TARS 12908/331	Turning areas for Cul de sacs
TARS 12908/332	Horizontal Sight Bench
TARS 12908/333	Horizontal Curve Types – Circular Arc, Spiral, Composite
TARS 12908/334	Alternative Cul de sac Head
TARS 12908/335	Boardwalk – Abutment Elevations
TARS 12908/336	Boardwalk – Sections & Notes
TARS 12908/401/1	Standard Turning Areas – Residential Private Ways & Business Service Lanes
TARS 12908/402	Typical Traffic Island
TARS 12908/403/1	Urban Private Way : 3 or Less Dwellings
TARS 12908/404/1	Urban Private Way : 4 or More Dwellings
TARS 12908/406	Access Barriers
TARS 12908/408/1	Typical Vehicle Crossing Slope Details
TARS 12908/410	Vehicle Tracking Curves – 99% Car
TARS 12908/411	Vehicle Tracking Curves – 90% Truck
TARS 12908/412	Vehicle Tracking Curves – 99% Truck
TARS 12908/413	3.00m Bus Bay
TARS 12908/414	3.5m Bus Bay
TARS 12908/415	On Street Car Parking Areas
TARS 12908/416	Roundabout and Traffic Island Slip - Formed Kerbs
TARS 12908/417	Street Signs Policy
TARS 12908/418	Fingerboard Signs – Signpost Installation Details
TARS 12908/419	Fingerboard Signs – Sign Layout Details
TARS 12908/420	Landscaping Canopy
TARS 12908/421	Street Tree Placement
TARS 12908/422	Vehicle Crossing For Use Where Road Drainage is via Grass Berm
TARS 12908/423	Rural Vehicle Crossing
TARS 12908/424	Rural Private Way : 3 or Less Dwellings
TARS 12908/425	Rural Private Way : 4 or More Dwellings
TARS 12908/426	Traffic Sight Lines – Non Signalised Intersections