



PORT MACQUARIE
HASTINGS

Norfolk Island Pine Strategy



2007

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Norfolk Island Pine Strategy

Objective

The objective of the Port Macquarie-Hastings Norfolk Island Pine Strategy is to maintain and enhance the existing character and amenity of Port Macquarie-Hastings coastal urban areas with appropriate Norfolk Island Pine plantings.

Background

Norfolk Island Pines (NIP) are a signature tree of Port Macquarie and its surrounding coastal villages. The predominant pine species in this Local Government Area are Araucaria hetrophylla (NIP) and Araucaria columunaris (Cook Island Pine).

Historical Port Macquarie photos from around 1935 show a number of the NIP in Clarence and Horton Streets. Based on their size in these photos the current age of these trees is estimated at 100 years. The average expected lifespan of a healthy NIP is 300+ years.

NIP were originally planted on the east coast to be used as masts for the sailing ships. Today these pines are the only large trees that will tolerate strong salt laden winds and given a healthy root system, are also tolerant of prolonged dry conditions.

In a park or streetscape, NIP contribute to the amenity and use of these areas. In particular, the pines provide valuable shade while providing filtered water / landscape views.

NIP have been recently used as the preferred species for Council's centenarian plantings to recognise members of the community who have live past the age of 100 years.

Analysis of current situation

Reactive and adhoc assessments of existing NIP in Port Macquarie-Hastings coastal urban areas has highlighted that there is a number of Pines that are in decline and/or are on an unnatural lean (as shown in Attachment A). This decline and unnatural lean is a result of the urban growth and infrastructure maintenance/upgrades to accommodate this growth.

As detailed above, Council's NIP management is reactive and subsequently decline in health of the pines is not noted or acted upon until reported by Council's Parks Staff or the general public. Such a management approach means that a NIP could be in irreversible decline that possibly could have been prevented through earlier intervention.

Decline of NIP in the Port Macquarie-Hastings coastal urban areas is commonly related to:

- Root disturbance related to infrastructure maintenance / upgrades.
- Soil compaction related to vehicle access to the area under the pine drip zone.
- Poor Park maintenance practices such as applying herbicides or 'whipper snipping' too close to a young pine.
- Changes to soil hydrology due to level changes and redirection of water flows.

In circumstances where NIP have been planted on the fringe of urban coastal areas, they do not necessarily complement the indigenous vegetation communities or provide food for fauna other endemic species. Therefore, the planting of new NIP outside of urban coastal areas should be avoided.

Structure soils are a specified combination of equal sized rocks mixed with some soil and nutrients which provide an appropriate space for a healthy root systems to establish (see Attachment B).

The benefit of using structured soils for NIP planting in pits or trenches are:

- They are load bearing which minimises disruption to traffic and parking space.
- They provide an area for root systems that reduces the risk of tree failure and allows for healthy growth.
- They restrict interaction between tree roots and infrastructure reducing maintenance costs.

Council's current tree-planting budget is limited and can cover the cost of purchasing the replacements. The purchasing of and the installation of structural soil vaults are beyond the ability of our current tree management budget and staff levels.

Strategic Action Plan

The following strategic action plan, and allocated priorities, is to ensure NIP remain a feature of the Port Macquarie-Hastings coastal urban areas.

Strategic Action	Performance Measure	Priority
1. Ensure NIP remain a signature tree of Port Macquarie and its surrounding coastal villages	<ul style="list-style-type: none"> Council commit to the implementation of this Strategy. 	Ongoing
2. Audit the current NIP population to determine the safe useful life expectancy of each individual pine.	<ul style="list-style-type: none"> Current data on the health of the current NIP population and identification of appropriate locations for replacement plantings. NIP identified for removal in the audit program based on highest priority. Annual budgets be allocated to implementing high priority actions identified in this audit. 	High
3. Ensure NIP replacement and future plantings are successful and require minimum maintenance.	<ul style="list-style-type: none"> Replacement NIP are to be located in areas that will allow for the development of healthy root systems. Street plantings are to be carried out within vaults of structural soils. This is to allow the development of a healthy root system and minimise interaction with infrastructure. (Attachment B). All replacements are to be specified from and meet the National Specification (NATSPEC) Purchasing Landscape Trees. This will include <ul style="list-style-type: none"> Height of tree Root ball size, root division and occupancy Trunk diameter. Stem taper Branching structure Health and vigour Free from pest and disease Self supporting 	Ongoing
4. Consider other species of pine similar to the NIP, such as the Hawaiian and the Cook Island Pine, which are have a narrower conical characteristic and are an alternative where space for lateral growth of the canopy is limited.	<ul style="list-style-type: none"> Where appropriate, use the NIP Hawaiian and the Cook Island Pines. 	Medium
5. Ensure periodical maintenance around NIP does not compromise the trees health.	<ul style="list-style-type: none"> Replacements pines to be kept within a timber bordered mulch bed. Programmed watering and weeding are to be carried out as set by 	Ongoing

	<p>Council's Tree Management Officer.</p> <ul style="list-style-type: none"> • No machinery is to enter the mulched areas. • No chemicals are to be used on the mulched areas. 	
6. Ensure infrastructure and landscape works around NIP does not compromise the trees health.	<ul style="list-style-type: none"> • Any proposed works that are to be carried out within 8 meters of any NIP or replacement is to be referred to Council's tree management section for review at the design stage. • Alternatives to damaging root systems by asphyxiation or severing are to be employed. These solutions can include design, location, work processes and technology such as under boring. 	Ongoing
7. Train staff in the best practices for design and construction around existing NIP.	<ul style="list-style-type: none"> • Relevant Council staff be trained in the best practices for design and construction around existing NIP. 	Medium
8. Training staff in the use of structured soils	<ul style="list-style-type: none"> • Relevant Council staff be trained in the use and application of structured soils via workshop with specialist. 	Medium
9. Planting of NIP outside of urban coastal areas to be avoided.	<ul style="list-style-type: none"> • Planting of new NIP to only occur within urban coastal areas. 	Ongoing
10. Ensure adequate annual funding for implementation of this Strategy.	<ul style="list-style-type: none"> • Adequate annual funding for implementation of this Strategy. 	Ongoing

Priority summary

High = 1-2 years

Medium = 3-5 years

Low = 5 plus year

Ongoing = An ongoing commitment for Council

Attachments

A - Photos

1. Senescing Norfolk Island Pines at corner of Lord and William Street PMQ
2. Infrastructure adjacent at corner of Lord and William Street PMQ
3. Dead NIP Settlement Point.
4. Damaged root system of dead NIP at Settlement Point
5. Leaning – unstable NIP corner Clarence and Hay PMQ
6. Leaning – unstable NIP corner Clarence and Murray
7. Healthy NIP – Park situation

B - Structural Soil specifications

Attachment A. - Photos



1. Senescing NIP's corner Lord and William St. PMQ



2. Adjacent Infrastructure corner Lord and William St. PMQ



3. Dead NIP Settlement Point Park.



4. Damaged roots – Dead NIP Settlement Point



5. Leaning NIP corner Hay and Clarence St PMQ. Damaged root system.



6. Leaning NIP corner Clarence and Murray.



7. Healthy Norfolks at Oxley Oval

Attachments B. - Structural Soil specifications

NEW TREE PLANTING IN CARPARK

Excavation for Tree Pits

Excavate tree planting pits to the required depths. Remove all excavated material from site. Do not disturb services, excavate by hand around services.

Excavation depths

Tree pits : 1000 mm from underside of concrete base slab

Subgrade Preparation

Confirm that excavated tree pit is free draining, if not install subsoil drainage lines and connect to available stormwater system.

Test subgrade soils for suitability to support plant growth, incorporate any additives that may be required. Manually cultivate subgrade to base of tree pit and link channel excavations to a depth of 150mm.

Structural Soil Mix

Structural soil mix shall be a thoroughly combined mix of 5 parts aggregate to 1 part filler soil as described below.

Filler Soil : shall be a thoroughly combined mix of 1 part sandy loam to 1 part dolerite and 5% by volume of composted green waste, screened to less than 12mm with the following properties :

organic matter < 1% by weight

pH in water 5.5 - 6.5

electrical conductivity < 1.2 dS/m

ammonium 20 - 200 mg/kg

phosphorous 10 - 50 mg/kg

Additives : to the above filler soil components, the following additions are required (to be confirmed during testing of samples for approval)

magnalime or a 50/50 lime/dolomite mix to bring pH to 5.5 - 6.5

trace element mix 100g / cubic metre

potassium nitrate 300g / cubic metre

nitram (ammonium nitrate) 300g / cubic metre

superphosphate 300g / cubic metre

iron sulphate 500g / cubic metre

controlled release fertiliser 1.5kg / cubic metre

gypsum 300g / cubic metre

magnesium sulphate (epsom salts) 150g / cubic metre

These additives must be mixed with the filler soil and tested for compliance prior to blending with the crushed aggregate. Provide a copy of the tests as per samples schedule.

Aggregate : shall be 40mm crushed Nepean River gravel or crushed basalt. Gravel shall be clean and free from clay and other matter. The aggregate shall be of the following particle size distribution :

AS Sieve Percent Passing

53.0 100

37.5	90 - 100
26.5	0 - 75
19.0	< 15
13.2	< 2
9.5	< 2
6.7	< 2
4.75	< 2
2.36	0

Transporting

Soil mixes must be delivered to site pre-blended. The soil mix must be transported in a moist condition to prevent segregation of components.

Contamination

Where diesel oil, cement or other phytotoxic material has been split on the subsoil or soil mix, excavate the contaminated material, dispose of it off the site, and replace it with new soil mix, as directed, to restore design levels.

Placing Soil Mix

Backfill and compact soil mix in tree pits and link channels between tree pits in layers 150mm maximum thickness. The soil mix components must remain in a thoroughly blended composition and be kept moist during backfilling and compaction to prevent segregation of soil mix components. Watering in of the mix is not permitted. If any segregation of the aggregate and filler soil occurs, excavate the segregated material and remix the material to an even and uniform consistency prior to continuing with backfilling and; compaction.

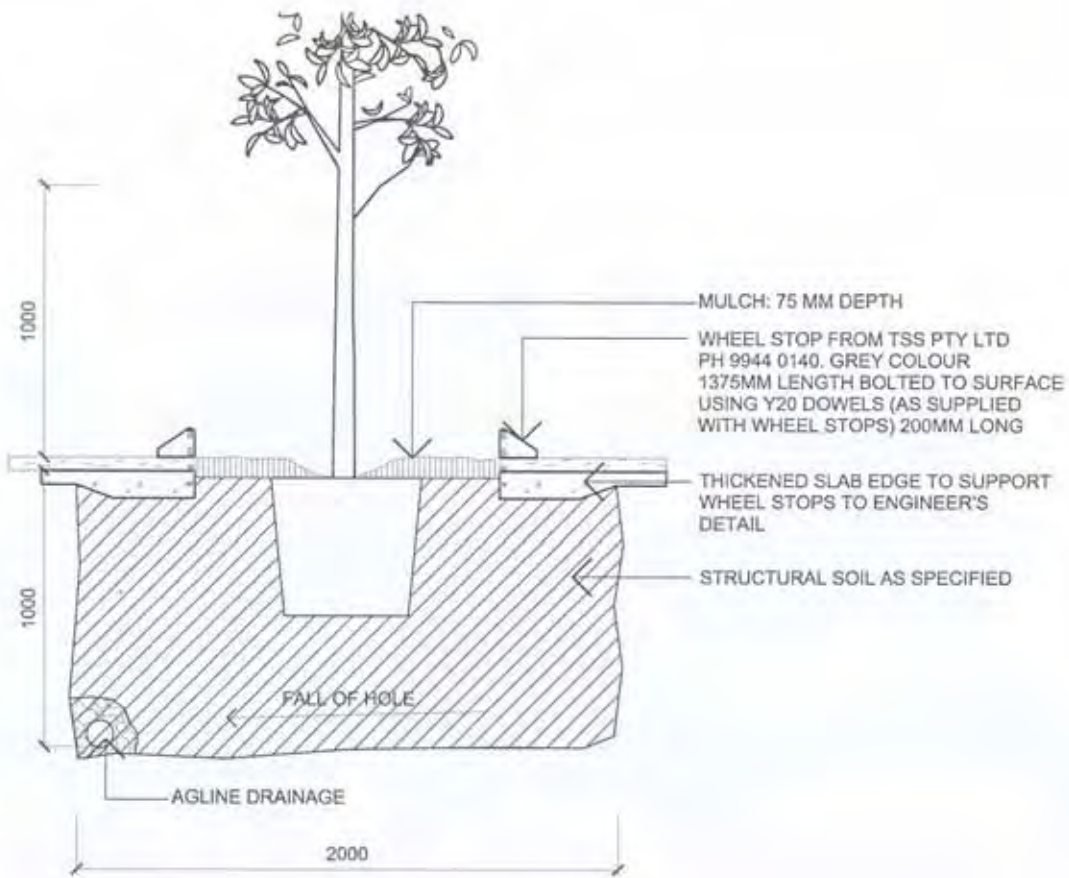
Compaction of Soil Mix

Thoroughly and evenly consolidate each layer to achieve a uniform density of not less than 95% maximum dry density as determined by AS 1289.5.5 at design levels.

Install wheel stops as specified

Wheel Stops

Installation: To new trees in carpark install 4No. recycled plastic wheel stops available from Traffic Safety Systems (TSS) PH 9944 0140. Grey colour 1375mm length bolted to surface using y20 dowels (as supplied with wheel stops) 200mm long.



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4601
75L TREE IN CARPARK
TYPICAL SECTION SCALE 1:20