HANDBOOK

Tree Conservation
Greenery Provision
Tree Planting
for development projects
Purpose of the Handbook

1. Relevant Sections of Parks and Trees Act (Cap 216)
   - Sections of Parks and Trees Act Relevant to Development
     Control, Building Plan and Certificate of Statutory
     Completion (DC, BP and CSC)
   - Parks And Trees Act (Cap 216) (hyperlink)

2. Definitions

3. Conservation of Trees / Plants
   - Legislation
   - Technical Requirements
   - Plan Submission Requirements
   - TCA maps, Heritage Road Buffers maps (hyperlink)

4. Greenery Provision within Premises
   - Technical Requirements
   - Objective Base Guidelines (hyperlink)
   - Plan Submission Requirements
   - Car Park Lodgement

5. Greenery Provision for Roadside (Includes Pedestrian overhead
   bridges, Covered linkways, Promenades, Pedestrian malls)
   - Technical Requirements
   - Plan Submission Requirements

6. Open Space for Landed Housing Development
   - Technical Requirements
   - Plan Submission Requirements

7. Submission Procedures

8. Submission Forms / Application Forms (hyperlink)
   - Planning (DC) Submission
   - Building Plan (BP) Submission
   - Certificate of Statutory Completion (CSC) Submission
   - BP Lodgement for Tree Planting Provision and Aeration
     Requirement for At Grade Open Surface Parking Spaces
   - CSC Lodgement for Tree Planting Provision and Aeration
     Requirement for At Grade Open Surface Parking Spaces
   - DC Self-declaration Form (for within development)
   - BP Self-declaration Form (for external works)
Contents

- Modification / Waiver of National Parks Requirement
- Tree Planting Provision and Aeration Requirement for At Grade Open Surface Parking Spaces

10. Checklist for Submission of Plans *(hyperlink)*

- DC Submission for Private / Public Building Developments
- BP Submission for Private / Public Building Developments
- CSC Submission for Private / Public Building Developments
- BP Submission for External Works, SWA Section 18 Roads, Promenades, Pedestrian Mall
- CSC Submission for External Works, SWA Section 18 Roads, Promenades, Pedestrian Malls
- DC Submission for Pedestrian Overhead Bridge, Covered Linkway
- BP Submission for Pedestrian Overhead Bridge, Covered Linkway
- CSC Submission for Pedestrian Overhead Bridge, Covered Linkway
- PC Submission by LTA for Pedestrian Overhead Bridge, Covered Linkway Pre-Consultation
- DC Submission for Landed Housing Development with Open Space Provision
- DC Submission for Landed Housing Development with Open Space Provision (Architectural, Civil Structural & Mechanical / Electrical Services CSC Checklists)
- CSC Submission for Landed Housing Development with Open Space Provision (Architectural, Civil Structural & Mechanical / Electrical Services CSC Checklists)
- Click here to download all of the above guidelines in zip format.

Note:
NParks advises applicants to refer to the checklist to ensure that the requisite information and technical requirements are complied with prior to submission of plans for approval. (It is not a requirement to submit the checklist.)

You can download the e-submission forms from CORENET. *(hyperlink)*
The vision of National Parks Board (NParks) is to make Singapore our Garden.

Our mission is to create the best living environment through excellent greenery and recreation, in partnership with the community.

In partnership with the community, NParks strives to create the best living environment through judicious provision of greenery in green recreation spaces.

Through administrative means, NParks regulates greenery provision requirements along public roads and within premises of development projects, and ensures that mature trees within the Gazetted Tree Conservation Areas, vacant lands and Heritage Road buffers, as well as trees maintained by the Board are not felled unnecessarily.
Purpose of Handbook
Purpose of Handbook

This handbook serves to guide architects and professional engineers on greenery provisions, tree planting and tree conservation for development projects, and procedures in submitting development proposals for NParks' clearance. The guidelines set out in this handbook will generally be applied by NParks in the consideration of an application of clearance for development plan approval. NParks reserves the right to re-evaluate the guidelines and impose conditions not included in the handbook on a case-by-case basis.

Nothing herein shall be construed to exempt the person submitting an application or any plans from otherwise complying with the provisions of the Parks and Trees Act or any Act or rules and/or guidelines made thereunder for the time being in force.

While every endeavour is made to ensure that the information provided is correct, the Commissioner of Parks & Recreation and the National Parks Board disclaim all liability for any damage or loss that may be caused as a result of any error or omission.

Important Note:
You are advised not to print any page from this handbook as it is constantly updated.
Relevant Sections of Parks and Trees Act (Cap 216)
Relevant Sections of The Parks And Trees Act (Cap 216)

For easy reference, the provisions relevant to development proposals are as listed:

<table>
<thead>
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<th>Section in Parks &amp; Trees Act</th>
<th>Title of the Section</th>
</tr>
</thead>
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<td>36</td>
<td>Liabilities of Plans or Documents</td>
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<td>39</td>
<td>Investigation Powers</td>
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<td>40</td>
<td>Power of Entry</td>
</tr>
<tr>
<td>46</td>
<td>Default in Compliance With Notice/Conditions</td>
</tr>
</tbody>
</table>
Definitions

- Green Buffer
- Peripheral Planting Verge
- Roadside Green Verge
- Tree Conservation Areas
- Heritage Roads
- Tree Protection Zone
- Open Spaces
- Vacant Land
- Aeration for trees
Definitions

Green Buffer

This refers to the planting area within a premises along the boundary adjoining or abutting a public street. It is a segment within the building setback from the road reserve line that is meant for the planting of trees, plants and turfing only. Minor structures, e.g., guardhouse, flagpoles, lamp posts may be permitted. The width of the green buffer varies according to the road classification by Land Transport Authority.

Peripheral Planting Verge

This refers to the planting area within a premises along the boundary not adjoining or abutting a public street. It is a green space between neighbouring developments meant for the planting of trees, plants and turfing only. Minor structures, e.g., guardhouse, flagpoles, lamp posts may be permitted.

Roadside Green Verge

This refers to the planting area within a public street - along the centre median or side of a public street, or a traffic island, which is provided for the planting of trees, plants and turfing.

Tree Conservation Areas

These are two gazetted geographical areas in central and eastern Singapore designated by the Government to safeguard mature trees against unnecessary felling.

Heritage Roads

These are roads with tall "green walls" of mature trees and multi-layered vegetation, designated by the Government as Heritage Roads for the conservation of mature greenery along both sides of the roads. The gazetted Heritage Roads to date are South Buona Vista Road, Mount Pleasant Road, Mandai Road, Lim Chu Kang Road, and Arcadia Road.
Definitions

Tree Protection Zone

A Tree Protection Zone (TPZ) is an area identified to protect the tree and its roots from disturbance. The objectives of the Tree Protection Zone (TPZ) are to minimize the impact of construction activities on trees, including but not limited to mechanical injury to roots, trunks and branches; compaction of soil that degrades functioning roots and inhibits the development of new ones; and changes in grade that can cut off or suffocate roots.

Open Space

A fraction of land, within a new landed (land title) housing development site, that is required to be set aside for the recreational need of the community within the vicinity. It is generally to be equipped with basic park amenities, and playground or fitness equipment to suit the needs of the community. The open space is to be vested in the State.

Vacant Land

Any land upon which no building or other structure exists; or any land where the Commissioner of Parks & Recreation has reasonable grounds to believe is not occupied by anyone, as well as any land with any building/structure which is constructed or used contrary to any written law.

Aeration for Trees

Aeration means the exchange of air between the soil and atmosphere. Good soil aeration reduces soil compaction, improves nutrients availability, allows air and moisture to penetrate the soil which encourages deep rooting of trees.
Conservation of Trees / Plants

- Legislation
- Requirements on Conservation of Trees / Single-stem Palms
- Plan Submission Requirements
Conservation of Trees / Plants

National Parks Board recognises the utmost importance of community participation in achieving our mission to create and maintain the best living environment through excellent greenery and recreation areas.

Cooperation and contribution are needed from the general public and the construction industry players such as architects, engineers and developers, including Statutory Boards and Government Agencies, to strive to balance between sustainable development of our scarce land resources and the conservation of mature trees as well as the greenery and recreation areas, maintained and created through the decades.

The Parks and Trees Act helps to protect mature trees from being removed unnecessarily, and makes provision to keep and care for the remaining natural environment for future generations to enjoy.
Conservation of Trees / Plants

4.1 Legislation

4.1.1 Tree Conservation Areas / Vacant Land

Prior written approval must be obtained from the Commissioner of Parks & Recreation for removal or cutting of any tree with girth exceeding 1.0m (measured half a metre from the ground) growing on a designated Tree Conservation Area (TCA) or vacant land.

The two Tree Conservation Areas are: TCA1 - bounded by the Pan Island Expressway, Clementi Road, Pasir Panjang Road, Telok Blangah Road, Lower Delta Road, Kampong Bahru Road, Ayer Rajah Expressway, Alexandra Road, River Valley Road, Clemenceau Avenue, Fort Canning Road, Orchard Road, Prinsep Street, Selegie Road, Dunearn Road, Whitley Road, Mount Pleasant Road, Thomson Road and Lornie Road.

TCA2 - bounded by Netheravon Road, Cranwell Road, Loyang Avenue, Loyang Way, Upper Changi Road North and Changi Village Road.

Note:
Tree Conservation Areas are geographical areas in central and eastern Singapore designated by the Government to safeguard mature trees against unnecessary felling. These areas contain valuable stands of mature trees worthy of preservation for our future generations to enjoy.

Vacant Land means any land upon which no building or other structures exists; or any land where the Commissioner, Parks & Recreation has reasonable grounds to believe is not occupied by anyone and includes any land upon which exists any building or other structure which is constructed or used contrary to any written law.
Conservation of Trees / Plants

Tree Conservation Area 1
Conservation of Trees / Plants

Tree Conservation Area 2
4.1.2 Heritage Road Green Buffer

4.1.2.1 Written approval must be obtained from the Commissioner of Parks & Recreation for the cutting or removal of any tree or plant within a designated heritage road green buffer, and/or for any -

a. altering, closing up or removal of any heritage road green buffer;

b. erecting or placing of any structure or object (whether temporary or permanent) in, above, across or under any heritage road green buffer;

c. erecting, constructing or laying within any heritage road green buffer any fence, retaining wall, foundation, manhole, pipe, cable, mains or any obstruction or structure (whether temporary or permanent).
Conservation of Trees / Plants

Note:
The Heritage Roads scheme was implemented by the Government in 2005 to recognise and protect roads with lush roadside trees and multi-layered vegetation that create "green walls" and "green tunnels" effects along certain roads.

The gazetted Heritage Roads to date are South Buona Vista Road, Mount Pleasant Road, Mandai Road, Lim Chu Kang Road and Arcadia Road.
Arcadia Road

The shaded areas shown in the heritage road plans comprise the green verges of the specified roads, and are designated as Heritage Road Green Buffers.
Lim Chu Kang Road

The shaded areas shown in the heritage road plans comprise the green verges of the specified roads, and are designated as Heritage Road Green Buffers.
Mandai Road

The shaded areas shown in the heritage road plans comprise the green verges of the specified roads, and are designated as Heritage Road Green Buffers.
Conservation of Trees / Plants

Mount Pleasant Road

The shaded areas shown in the heritage road plans comprise the green verges of the specified roads and are designated as Heritage Road Green Buffers.
South Buona Vista Road

The shaded areas shown in the heritage road plans comprise the green verges of the specified roads, and are designated as Heritage Road Green Buffers.
4.1.3 **Roadside Trees**

Written approval must be obtained from the Commissioner of Parks & Recreation for the removal of or cutting of any tree or plant within a road reserve.

4.2 **Requirements on Conservation of Trees / Single-stem Palms**

Purpose

Successful tree conservation within a development site occurs when the design, development and construction process has taken into consideration the interior and surroundings of the site, so that impact to trees is minimized or prevented. It requires the commitment of everyone involved in the development process.

The purpose of this module is to provide plan submission requirements and technical guidelines to support the tree conservation efforts and minimize the unnecessary removal of trees.

Examples of tree damage due to construction activities:
4.2.1 Tree Protection Zone (TPZ) For Retained Tree / Single-Stem Palm

A Tree Protection Zone (TPZ) refers to an area identified to protect the tree and its roots from disturbance.

The objective of the TPZ is to minimize the impact of construction activities on trees, including but not limited to mechanical injury to roots, trunks and branches due to contact with equipment, materials, debris or other activities. It also aims to minimize compaction of soil which results in poor functioning of roots, and changes in grade that can cut off or suffocate roots.

4.2.1a The minimum protection zones from centre of tree / single-stem palm (within a development site) are as shown in Table 4.2.1a:

<table>
<thead>
<tr>
<th>Girth (m)</th>
<th>Minimum Protection Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 1.0m</td>
<td>2.0m</td>
</tr>
<tr>
<td>1.0m but ≤ 1.5m</td>
<td>3.0m</td>
</tr>
<tr>
<td>&gt;1.5m but ≤ 2.0m</td>
<td>4.0m</td>
</tr>
<tr>
<td>&gt;2.0m</td>
<td>5.0m</td>
</tr>
</tbody>
</table>

Table 4.2.1a

Note:
The TPZ in Table 4.2.1a serves as a general guideline for tree conservation. Depending on the root spread, especially for trees with a girth of more than 2.0m, a larger tree protection zone may be required as determined on a case-by-case basis.

NParks advises the developer to engage a Certified Arborist to provide conservation guidelines on trees that are identified for retention, to monitor the condition of the trees throughout the developmental stage and to regularly maintain the conserved trees after the completion of the project.
4.2.1b The minimum clearance required between a proposed roadside element to the centre of an existing roadside tree/palm, as shown in Table 4.2.1b and Illustration 4.2.1b.

<table>
<thead>
<tr>
<th>Clause</th>
<th>Proposed Roadside Elements</th>
<th>Required minimum clearance of proposed roadside elements from the centre of an existing palm</th>
<th>Small to medium size tree</th>
<th>Large tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Splay corner of: Entrance, Bin centre driveway, Substation driveway, MDF room driveway, Fire Engine Access</td>
<td>1.0m 1.5m 2.5m</td>
<td>1.5m</td>
<td>2.5m</td>
</tr>
<tr>
<td>2</td>
<td>Roadside drain (from its external wall)</td>
<td>0.8m 0.8m 1.5m</td>
<td>0.8m</td>
<td>1.5m</td>
</tr>
<tr>
<td>3</td>
<td>Road kerb</td>
<td>0.8m 0.8m 1.5m</td>
<td>0.8m</td>
<td>1.5m</td>
</tr>
<tr>
<td>4</td>
<td>Scupper pipe / drain</td>
<td>1.0m 1.5m 2.5m</td>
<td>1.5m</td>
<td>2.5m</td>
</tr>
<tr>
<td>5</td>
<td>Lamp Post</td>
<td>4.0m 4.0m 6.0m</td>
<td>4.0m</td>
<td>6.0m</td>
</tr>
<tr>
<td>6</td>
<td>OG box</td>
<td>2.0m 2.0m 2.5m</td>
<td>2.0m</td>
<td>2.5m</td>
</tr>
<tr>
<td></td>
<td>TAS manhole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sewer line manhole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fire hydrant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCV box</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lighting control box</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traffic control box</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traffic Light</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cement crossing (e.g. pushcart ramp for bin centre)</td>
<td>2.0m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Linkway / pedestrian overhead bridge column footing</td>
<td>at least 1.0m at least 1.5m at least 2.5m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Linkway roof eaves to the lowest branching of a tree</td>
<td>at least 0.3m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
Table 4.2.1b serves as a guideline for tree conservation and on the basis that no major root (girth more than 0.2m) will be affected.

Depending on the root spread, especially for tree with a girth of more than 2.0m, a larger tree protection zone may be required on a case by case basis.

Table 4.2.1b
Required minimum clearance of proposed roadside elements from the centre of an existing single stem palm / tree
Conservation of Trees / Plants

Legend
- cl: Clause
- Tree
- Lamp Post
- Fire Hydrant
- Traffic Light
- Scupper
- SCV Box (and other service boxes)

Illustration 4.2.1b Diagrammatic Plan View
Required minimum clearance of proposed roadside elements from the centre of an existing single stem plant / tree

Required minimum clearance between roadside elements and centre of an existing tree
4.2.2 Tree Protective Fencing / Hoarding
(Within development site)

Tree protective fencing / hoarding is to be provided along the limits of the protection zone around the tree to identify the TPZ in which activities are restricted.

There must be no excavation, raising/lowering of soil level, compaction or any form of construction activities including temporary works within the hoarded area.

No dumping of excavated materials and/or storage of construction materials is allowed within the Tree Protection Zone.

Tree Protection Zone

Drawing Notes:

Protection hoarding is required, unless otherwise stated, and should be installed prior to site works; install at point B around the edge of the protection area.

No construction equipment, materials and/or debris within the tree protection zone.

Illustration 4.2.2
Sample of a Tree Protection Hoarding (within a development site)
4.2.3 Tree Protective Fencing / Hoarding (Within Road Sidetable)
Bright orange polyethylene fencing or other effective tree protection fencing should be put up around the Tree Protection Zone of roadside trees. There must be no excavation, raising/lowering of soil levels, compaction and any form of construction activities including temporary works within the fencing.
4.2.4 **Tree Protection Specification – During Construction Stage**

a. Tree protective fencing / hoarding is to be provided along the limits of the protection zone around the tree to identify the Tree Protection Zone in which activities are restricted.

b. If major roots (each >0.2m in girth) are encountered during excavation, the applicant must contact NParks’ officer for a joint site meeting. Wherever possible, alternative proposals should be explored to avoid the need to cut the roots. Nevertheless, if approval is granted by NParks to cut the roots, this must be done with a clean cut using a chainsaw. Corresponding pruning of tree branches may be required to ensure tree stability. In addition, temporary support to the trees may be required to ensure the stability of the tree.

c. The demolition of drains, structures etc. within the Tree Protection Zone should be carried out manually and backfilled with loamy soil immediately.

d. All building debris and chemical wastes are to be hauled away from the trees / other plants and they should not be burned or buried on the site.

e. Loamy topsoil is to be filled immediately around the tree base after the nearest proposed structure is built, e.g. a retaining wall.

f. Trees are to be watered regularly if rainfall is inadequate.

g. Trees are to be fertilized if soil tests or deficiency symptoms indicate they are nutrient stressed.

h. Roots system bridges may be installed to prevent soil compaction or damage to exposed roots.
### 4.3 Plan Submission Requirements

4.3.1 The plans should comprise:

- **a.** Key and location plans of the development site (scale 1:10000 or 1:5000) with access to the site from a street or road
- **b.** Site plan (scale 1:500, 1:200 or 1:100)
- **c.** Address, lot and/or plot number of the development site and neighbouring lots
- **d.** 1st storey plan (scale 1:500, 1:200 or 1:100)
- **e.** Basement plan (scale 1:500, 1:200 or 1:100)
- **f.** Survey plan (survey done less than 2 years at the point of application and endorsed by a qualified surveyor). This requirement is not applicable for Alteration & Additions proposal.

4.3.2 General site information should be provided as follows:

<table>
<thead>
<tr>
<th></th>
<th>Site Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Development boundary verged in red</td>
<td>Indicate</td>
</tr>
<tr>
<td>(b)</td>
<td>Proposed development layout</td>
<td>Indicate</td>
</tr>
<tr>
<td>(c)</td>
<td>Existing and proposed road reserve line verged in red</td>
<td>Indicate</td>
</tr>
<tr>
<td>(d)</td>
<td>Width of proposed road</td>
<td>Indicate</td>
</tr>
<tr>
<td>(e)</td>
<td>Category of existing and proposed roads</td>
<td>Indicate</td>
</tr>
<tr>
<td>(f)</td>
<td>Existing and proposed road sidetable</td>
<td>Indicate</td>
</tr>
<tr>
<td>(g)</td>
<td>Existing and proposed levels of the development site</td>
<td>Indicate</td>
</tr>
<tr>
<td>(h)</td>
<td>Basement line highlighted in brown dotted line</td>
<td>Indicate</td>
</tr>
<tr>
<td>(i)</td>
<td>Boundary / retaining wall is to be highlighted in orange</td>
<td>Indicate</td>
</tr>
<tr>
<td>(j)</td>
<td>Fire engine access and fire hardstanding areas</td>
<td>Indicate</td>
</tr>
<tr>
<td>(k)</td>
<td>Schematic engineering drawing with dimensions of retaining / boundary wall and foundation</td>
<td>-</td>
</tr>
<tr>
<td>(l)</td>
<td>Tabulation of existing trees with species and girths</td>
<td>Indicate</td>
</tr>
</tbody>
</table>
4.3.3 Information on Trees / Single-stem Palms within Development Site

a. The site and survey plans should show existing trees / single stem palms within the development boundary and up to 5m from the boundary with the following information provided:

i. species
ii. girth – measured 0.5m from the ground
iii. tree height (if available)
iv. all trees / single-stem palms are to be uniquely numbered. The numbering should be consistent with architectural plans (if applicable) throughout the project.

b. All existing trees / palms indicated on the survey plan are to be reflected in Tree Survey Information Form.

c. Clear photographs of trees / palms proposed for conservation are to be attached. The photograph should show entire height of tree(s)/ palm(s).

d. The trees / palms in the photographs are to be numbered according to the numbering shown on plan.

Note:
Qualified Person / Surveyor is to obtain permission from the neighbouring owner(s) to gather the requisite tree information within the neighbouring lot(s).
Method of measuring girth of a tree:
Generally, the girth of a tree is to be measured at 0.5m from ground level, except for multi-leader and low branching trees, as delineated below.

I. For a simple single trunk tree and buttressed tree (Figure 1) - measure the girth at 0.5 metres height above the ground.

Figure 1
II. For a multi-leader tree where the leaders sprout from the collar - 
measure the girth of each individual stem at 0.5m height above 
the ground, and treat each stem as a separate tree [Figure (II)].
III. For a low branching tree with the lowest branching below 0.5m height from the ground – measure the girth at the point just below the lowest branching [Figure (III)].
4.3.4 Information on Roadside Trees / Palms / Shrubs

a. The site and survey plans should show roadside trees / palms / shrubs abutting the development boundary and up to 10m on both sides of the boundary with the following information provided:
   i. species
   ii. girth - (for tree / single stem palm) measured 1.0m from the ground
   iii. height (if available) and number of cluster palm / shrub
   iv. The numbering should be consistent with architectural plans (if applicable) and throughout the project.

b. All existing trees / palms / shrubs indicated on the site plan are to be indicated in Tree Survey Information Form.

4.3.5 The colour code for existing trees / palms shrubs is as follows:

<table>
<thead>
<tr>
<th>Status of existing trees / palms</th>
<th>Outline in colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>To be retained</td>
<td>Green</td>
</tr>
<tr>
<td>To be removed</td>
<td>Yellow</td>
</tr>
<tr>
<td>Removed without written approval</td>
<td>Red</td>
</tr>
<tr>
<td>Removed with written approval</td>
<td>*Yellow (indicate the approved date in the tree schedule)</td>
</tr>
<tr>
<td>Non-existence after investigation</td>
<td>Indicate a 'cross' on tree symbol</td>
</tr>
</tbody>
</table>

Advisory Note:
For a development site that does not fall within a Tree Conservation Area or Vacant Land, NParks' written approval for removal of trees within the development site is not required. However, the developer is advised to minimize the number of trees to be felled and to take all necessary precautions to protect non-affected trees.

The developer is also advised to engage a Certified Arborist to assess and monitor the condition and safety of all trees to be conserved/retained.
Greenery Provisions within Premises

- Requirements on Greenery Provisions within a Premises
- Objective-based Guidelines
- Plan Submission Requirements
- Car Park Lodgement
Greenery Provisions within Premises

Purpose

Singapore has long established itself as a Garden City. The success comes about from collective and continuous efforts of many individuals and organizations from both private and public sectors.

Tree planting within the green buffers and along the streets complement each other, forming the backbone of our city’s greenery with distinctively lush tree-lined streetscape for all to enjoy.

The peripheral tree planting provides pleasant greenery between neighbouring lots’ boundaries, and enhances the overall greenery of the city.

While we move forward to create a City in the Garden, green buffers and peripheral plantings verges shall continue to be an integral part in sustaining and improving the quality of our environment with excellent greenery.
5.1 Requirements on Greenery Provisions within a Premises

5.1.1 Peripheral Tree Planting Verge

A 2.0m (minimum) wide peripheral tree planting verge is to be provided along all sides of a development site's boundaries except where it fronts a public road. In such situations, a green buffer that corresponds to the road category shall be provided. (Refer to Figure 5.1.1.)

The exceptions to the provision of peripheral planting verge are:
- a) Industrial and warehouse developments;
- b) Landed housing developments; or
- c) Areas with urban design controls.

5.1.2 Green Buffer

For the sides of the development boundaries that front a public road, the width of the green buffer, which is a segment within the road buffer, shall be provided in accordance with the category of road. The classification of the road category is obtainable from LTA through the purchase of the Road Interpretation Plan (RIP). (Refer to Figure 5.1.2 on Green Buffer Requirements Along Roads.)

The exceptions to the provision of the green buffer are:
1. When there are urban design requirements allowing the buildings to abut the road reserve line or site boundaries such as for developments in the Central Area; (For urban design requirements, please refer to URA's handbook on Urban Design Guidelines in Central Area)
2. The boundary of a landed housing development that fronts a category 5 road.

Generally, green buffers should be flat (gradient 1:40). Any proposed slope should not be steeper than 1:2.5.
5.1.3 **Development bordering Drainage Reserve**

For development bordering drainage reserve, the peripheral tree planting verge or green buffer shall be provided after the drainage reserve line.

Where a drainage reserve line is not required to be vested to the State, the peripheral tree planting verge or green buffer may provide above the drainage reserve, subjected to a provision of minimum 2m soil depth.

*Figure 5.1.1 Diagrammatic Plan view*

Green Buffers & 2m Peripheral Tree Planting Verges Requirements within a Premises
### Greenery Provisions within Premises

<table>
<thead>
<tr>
<th>Proposed Use/ Development</th>
<th>Green Buffer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 1</strong></td>
<td></td>
</tr>
<tr>
<td>Residential/ Educational</td>
<td>5m</td>
</tr>
<tr>
<td>Commercial/ Industrial / Institutional / Multi-storey carpark (MSCP) / Place of worship</td>
<td>5m</td>
</tr>
<tr>
<td><strong>Category 2</strong></td>
<td></td>
</tr>
<tr>
<td>Residential/ Educational</td>
<td>5m</td>
</tr>
<tr>
<td>Commercial/ Industrial / Institutional / Multi-storey carpark (MSCP) / Place of worship</td>
<td>3m</td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td></td>
</tr>
<tr>
<td>Residential/ Educational</td>
<td>3m</td>
</tr>
<tr>
<td>Commercial/ Industrial / Institutional/ Place of worship</td>
<td>3m</td>
</tr>
<tr>
<td>MSCP</td>
<td></td>
</tr>
<tr>
<td><strong>Category 4 - 5 &amp; Slip Roads</strong></td>
<td></td>
</tr>
<tr>
<td>Residential/ Educational</td>
<td>3m</td>
</tr>
<tr>
<td>Commercial/ Industrial / Institutional/ Place of worship</td>
<td>3m</td>
</tr>
<tr>
<td>MSCP</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.1.2**
Green Buffer Requirements for Development Boundaries abutting Roads

**Note:**
The classification of the road category is obtainable from LTA through the purchase of the Road Interpretation Plan (RIP). Green buffer is a segment within the road buffer.
5.1.3 Retaining / Boundary Wall along Green Buffers and Peripheral Planting Verges

a. The width of green buffers and 2m wide peripheral tree planting verges should exclude boundary/retaining wall. (Refer to Figure 6.1.3.)

b. Footing of the wall should be recessed at least 2.0m below the proposed planting level if it encroaches more than 0.5m into a planting verge.

Figure 5.1. 3 Diagrammatic Sectional Views:
Retaining / Boundary Wall abutting Green Buffer and Peripheral Tree Planting Verges

A. Boundary Wall abutting Green Buffer
5.1.4 Submerged Basement Structure Within Green Buffer and Peripheral Tree Planting Verges

The submerged basement structures which encroach into green buffers / peripheral tree planting verges should be at least 2m or more below the ground level. Please refer to Figure 5.1.4 - Submerged Basement Structure Within Green Buffers / Peripheral Tree Planting Verges.
5.1.5 **Allowable Minor Ancillary Structures Within Green Buffers and Peripheral Tree Planting Verges (Prescriptive Guidelines)**

a. In general, green buffers and peripheral tree planting verges should be free from any encroachment, except for allowable minor ancillary structures as listed in Figures 5.1.5a on Minor Ancillary Structures allowed in green buffers & peripheral tree planting verges.

b. Minor Ancillary Structures not allowed in green buffers & peripheral planting verges are listed in (Figure 5.1.5b.)

c. The total width of the structures allowable within the green buffers must not exceed 3.0m or 25% of the available road frontage, whichever is greater. (Refer to Figure 5.1.5c.)

**Note:**
Applicant can choose to either apply the perspective guidelines or the objective base guidelines. For objective base guidelines, please refer to URL address.
**Greenery Provisions within Premises**

**Figure 5.1.5a**
Minor Ancillary Structures allowed within Green Buffer & Peripheral Tree Planting Verges (Prescriptive)

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Structures</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flag poles</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lamp posts and landscape light fittings</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Guard house &amp; Bin centre</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>OG Boxes</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Inspection chamber &amp; minor sewer lines</td>
<td>Minor sewer lines must be laid at least 2.0m below planting level</td>
</tr>
<tr>
<td>6</td>
<td>Water bulk meter</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Industrial water pipes</td>
<td>Water pipes must be laid at least 2.0m below planting level</td>
</tr>
<tr>
<td>8</td>
<td>Fire hydrant</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Entrance gate/post</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Metering compartment</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Vehicular impact guardrails</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.1.5b**
Minor Ancillary Structures not allowed within Green Buffer & Peripheral Tree Planting Verges

<table>
<thead>
<tr>
<th>S/No.</th>
<th>Structures</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fire engine hardstanding areas</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Drain and access covers</td>
<td>Except for crossings running perpendicular to planting verge</td>
</tr>
<tr>
<td>3</td>
<td>Sign boards</td>
<td></td>
</tr>
</tbody>
</table>
5.1.6 **Planting Verges beside Internal Driveways**

a. For public building development, in addition to green buffer and peripheral tree planting verges, a minimum 2.0m wide tree planting verge is to be provided on at least one side of the proposed internal driveway if the driveway does not abut the green buffer or any of the peripheral tree planting verges.

b. This 2.0m wide tree planting verge should generally be flat (gradient not steeper than 1:40). Proposed slope, if any, should not be steeper than 1:2.5.

c. This 2.0m wide tree planting verge should be free from encroachment, above and below the planting level.

d. Basement structure below any planting verges must be recessed at least 2m below ground.
5.1.7 **Hedge Planting Around Proposed Bin Centres, Substations and Perimeter Fence of Schools and Public Buildings**

a. A minimum 1.0m wide planting verge is to be provided for planting of hedges around bin centres, substations of schools and public buildings as illustrated in Figure 5.1.7 – Hedge Planting Verge.

b. Hedges are required along the perimeter fence of schools.

![Figure 5.1.7: Hedge Planting Verge](image)
Greenery Provisions within Premises

5.1.8 Planting Verges For At-Grade Open Surface Vehicular Parking Area

a. A minimum 2.0m wide planting verge is to be provided along a row of parking lots, if the parking area does not abut the green buffer or any of the 2m wide peripheral tree planting verges. (Tree planting verge is not required for lorry/bus parking lots within car parking area for industrial developments.)

b. A minimum 4.0m wide planting verge (centre divider) is to be provided between two rows of parking lots as illustrated in Figure 5.1.8.

c. A minimum 4.0m wide planting verge (centre divider) is to be provided between a building and parking lots as illustrated in Figure 5.1.8. The exception are industrial developments, where a planting verge between a building and parking lots is not required for parking lots that are meant for loading /unloading purposes.

d. All planting verges should generally be flat (gradient not steeper than 1:40). Proposed slope, if any, should not be steeper than 1:2.5.

e. All planting verges should be free from encroachment, above and below the planting levee.

f. Basement structure below any planting verges must be recessed at least 2m below ground.

g. All car parking lots are to be fully laid with aeration slabs for tree aeration purpose. Each piece of slab should have 35% aeration area with all the void areas turfed.

h. For covered car parking lot, aeration slabs are not required if at least three-quarters of each parking lot's area is covered.
Figure 5.1.8
Tree Planting Provision for At-Grade Open Surface Parking Spaces
5.1.9 Tree Planting Requirements

a. All green buffers and planting verges are to be planted with trees. Other plants can be used to supplement, but is not to substitute for tree planting.

b. For government school and public building development projects, the size and condition of trees and palms to be planted should at least match the standards as specified below:

I. A Sapling Tree should have:
   i. total overall height of at least 2.5m with clear trunk height 1.5m (measured from soil level)
   ii. girth at least 0.1m
   iii. upright and in good form
   iv. terminal shoot

II. A Single Stem Palm should have:
   i. total overall height 2.0m (measured from soil level)
   ii. upright and in good form
   iii. spear must be intact

III. A Cluster Palm should have:
   i. total overall height 2.0m (measured from soil level)
   ii. upright and in good form
Greenery Provisions within Premises

IV. Specification of Hedge Planting:
Each stem of the hedge planting should have a height of 1m and be planted at 0.5m centre to centre.

V. Staking is to be provided for a sapling tree / single-stem palm as and when required. Stakes provided should be:

i. galvanized steel pipe or treated wood of 25mm diameter

ii. 1/3 buried underground and the stake to be slightly lower than the sapling

iii. positioned 200mm away from the collar of the tree

iv. provided with PVC tubed nylon string placed around the trunk and tied firmly to the stake.

VI. Tree collar protector should be provided for all proposed sapling tree / single stem palm. A protector should be made of a PVC tube of length 200mm, diameter 75mm and thickness 2mm with a slit cut along the full length of the tube.

An example of staking
5.2 Plan Submission Requirements

5.2.1 A registered architect / professional engineer is required to submit a completed NParks' application form, enclose the letter of authorization from the developer, and sign all layers of drawing digitally:

The plans should comprise:
- a. Key and location plans of the development site (scale 1:10000 or 1:5000) with access to the site from a street or road
- b. Site plan (scale 1:500, 1:200 or 1:100)
- c. Address Lot and/or plot number of the development site and neighbouring lots
- d. 1st storey plan (scale 1:500, 1:200 or 1:100)
- e. Basement plan (scale 1:500, 1:200 or 1:100)
- f. Survey plan (survey done less than 2 years at the point of application and endorsed by a qualified surveyor). Not applicable for Alteration & Additions proposal.

5.2.2 General Site Information for greenery provision within premises should be provided as follows:

<table>
<thead>
<tr>
<th></th>
<th>Site Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Development boundary verge in red</td>
<td>Indicate</td>
</tr>
<tr>
<td>(b)</td>
<td>Proposed development layout</td>
<td>Indicate</td>
</tr>
<tr>
<td>(c)</td>
<td>Existing and proposed road reserve line verge in red</td>
<td>Indicate</td>
</tr>
<tr>
<td>(d)</td>
<td>Width of proposed road</td>
<td>Indicate</td>
</tr>
<tr>
<td>(e)</td>
<td>Category of existing and proposed roads</td>
<td>Indicate</td>
</tr>
<tr>
<td>(f)</td>
<td>Existing and proposed road surface</td>
<td>Indicate</td>
</tr>
<tr>
<td>(g)</td>
<td>Existing and proposed levels of the development site</td>
<td>Indicate</td>
</tr>
<tr>
<td>(h)</td>
<td>Basement line highlighted in brown dotted line</td>
<td>Indicate</td>
</tr>
<tr>
<td>(i)</td>
<td>Boundary / retaining wall to be highlighted in orange</td>
<td>Indicate</td>
</tr>
<tr>
<td>(j)</td>
<td>Fire engine access and fire hardstanding areas</td>
<td>Indicate</td>
</tr>
<tr>
<td>(k)</td>
<td>Schematic engineering drawing with dimensions of retaining / boundary wall and foundation</td>
<td>-</td>
</tr>
<tr>
<td>(l)</td>
<td>Species, girth and heights of existing trees / single-stem palms within the site boundary and on the neighbouring lot up to 5m from the boundary (only applicable if the development is within the gazetted Tree Conservation Area or on vacant land) [refer to module on Conservation of Trees/Plants]</td>
<td>Indicate</td>
</tr>
</tbody>
</table>
5.2.3 **Planting Provision**

<table>
<thead>
<tr>
<th></th>
<th>Site Plan &amp; First Storey Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>All proposed green buffer/planting verges roadside planting verges (whenever applicable) are to be coloured green on the site plan and 1 storey plan.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(b)</td>
<td>Widths of all proposed planting provisions provided in (a) are to be indicated.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(c)</td>
<td>All slopes are to be shown on plan with standard symbols. The gradients of all proposed slopes are to be indicated.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(d)</td>
<td>Hedge planting (only applicable to public building and school developments) are to be indicated on plan with a wavy green line.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(e)</td>
<td>Drawing of the perforated slab and calculation of the aeration areas for car parking lots are to be shown on plan at Building Plan Stage.</td>
<td>Site plan</td>
</tr>
<tr>
<td>(f)</td>
<td>Ancillary Structures Within The Green Buffer and 2m Peripheral Planting Verges are to be reflected with the height and width indicated.</td>
<td>Indicate</td>
</tr>
</tbody>
</table>
5.2.4 Planting Scheme based on Prescriptive Guidelines

<table>
<thead>
<tr>
<th>Layout Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>(To be submitted at Building Plan Stage) Only applicable to:</td>
</tr>
<tr>
<td>• Public Buildings</td>
</tr>
<tr>
<td>• Government Schools;</td>
</tr>
<tr>
<td>• Good Class Bungalows within a Tree Conservation Area or vacant lands</td>
</tr>
<tr>
<td>• Apartments within a Tree Conservation Area or vacant lands</td>
</tr>
<tr>
<td>• Condominiums developments within a Tree Conservation Area or vacant lands</td>
</tr>
<tr>
<td>i. Location and species of proposed and existing trees/single stem palms are to be shown on plan,</td>
</tr>
<tr>
<td>ii. A legend for proposed trees is to be provided. (For tree symbols, please use colours other than green, red and yellow,)</td>
</tr>
<tr>
<td>Indicate</td>
</tr>
</tbody>
</table>

5.2.5 Planting Scheme based on Objective-based Guidelines

<table>
<thead>
<tr>
<th>Layout Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Property annotated Landscape Plan and the justifications in line with the objectives are submitted.</td>
</tr>
<tr>
<td>Indicate</td>
</tr>
<tr>
<td>(b) Landscape Plan to include all the information as stated in the objective-based guidelines.</td>
</tr>
<tr>
<td>Indicate</td>
</tr>
</tbody>
</table>
5.2.6 Lodgement for Tree Planting Provision and Aeration Requirement for At Grade Open Surface Parking Spaces

a. Lodgement is applicable only for proposal complies with the tree planting provision and aeration requirements of at grade car parks within the development boundary. Please refer to the requirements for Tree Planting Provision And Aeration Requirement For At Grade Open Surface Parking Spaces.

b. Lodgement does not apply to proposals with waiver item.

c. A set of site plan showing the planting verges, parking spaces, drawing of the perforated slab and calculation of the aeration area of a slab must be submitted. Dimensions such as planting verge width, gradients of planting verges, size of a parking lot and width of driveways should be clearly indicated on plans. The proposal must be similar to that approved by Competent Authority.

d. The lodgement must be made on Form NPARKS-0-BPS08 after obtaining approval from the Competent Authority for the proposed development. All items of the form must be duly completed and endorsed where applicable by a qualified person. The qualified person must endorse if there are amendments made on the lodgement form and plans.

e. Upon completion of the development, please use Form NPARKS-0-CSC08 to apply for CSC clearance to the authority.
Greenery Provisions for Roadside

- Requirements for Roadside Greenery Provisions
- Planting Requirements for Pedestrian Overhead Bridge
- Irrigation System for Pedestrian Overhead Bridges
Importance of Roadside Planting/Greenery

Roadside trees are planted for shade, aesthetic and screening purposes and they constitute the backbone of our garden city.
6.1 Requirements for Roadside Greenery Provisions

6.1.1 Planting verges (tree planting and service verge) are to be provided in accordance with LTA standard road codes. (When there is no requirement from the road authority to provide standard road reserve for the road, the width of roadside verge should then match with existing conditions.)

6.1.2 The length of a planting island should be at least 6.0m long.

6.1.3 Roadside planting verge should generally be flat. The finished soil level of the verge is to be 25mm below the footpath.

6.1.4 Planting verges of less than 0.5m wide or less than 1m² should be paved to match with the adjacent footpath.

6.1.5 No underground services are allowed to be laid within the roadside tree planting verges. Services that are required to transverse through a planting verge into a building plot are to be laid at least 2.0m away from the centre of a tree / palm. Dependent on the root spread, especially for trees with girth of more than 2.0m, a wider clearance may be required as determined on a case-by-case basis.
6.1.6 Fire engine hardstandings are not to encroach into the roadside verges.

6.1.7 Proposed tree planting verges are to be excavated to 1m deep, backfilled with 3 part of loamy soil and 1 part of organic matter (processed woodchips or compost) and close turfed with 50mm thick Axonopus compressus (cow grass).

6.1.8 Disturbed verges are to be reinstated with 50mm thick Axonopus compressus (cow grass) in close turfing with provision of 100mm depth planting mixture. The planting mixture should be made up of 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).

6.2 Requirements for Roadside Trees / Palms / Shrubs

6.2.1 Species of proposed roadside trees / palms / shrubs will be specified/approved by NParks. (Tables 6.2.1a to 6.1.2d - Lists of Trees are for references.)

6.2.2 Vehicular impact guardrails are to be camouflaged with shrubs.

6.2.3 Shrub planting beds should be provided beneath the staircases of the pedestrian overhead bridges.
Greenery Provisions for Roadside

6.2.4a Proposed trees / palms should be planted at the midpoint of a roadside tree planting verge as shown in the Table below.

<table>
<thead>
<tr>
<th>Width of roadside tree planting verge</th>
<th>Midpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2m</td>
<td>0.6m</td>
</tr>
<tr>
<td>1.5m</td>
<td>0.75m</td>
</tr>
<tr>
<td>2.0m</td>
<td>1.0m</td>
</tr>
</tbody>
</table>

**Figure 6.2.4a**
- Tree planting verge ≥1.2m wide

6.2.4b For tree planting verges that are less than 1.2m wide, trees / palms are to be planted at the midpoint of the verge as shown in Figure 6.2.4b.

**Figure 6.2.4b**
- Tree planting verge <1.2m wide
6.2.5 If there are existing trees / palms planted on an existing footpath which is equal or greater than 1.2m wide, proposed trees / palms are to be planted to match existing with aeration provision. The aeration provision should comprise of a minimum area of unpaved area, and loose paved PC slabs around the tree base that is match with existing, or in accordance with the details as shown in Figure 6.2.5.

![Figure 6.2.5](image)

Unsealed aeration area (1 x 1)m² to be closed turfed with Anopopus Compressus (Cow Grass)

Existing / proposed tree

Drain

Footpath

Loose paved PC slab

Carriageway
### 6.2.6 Position of Roadside Element

The clearance from a proposed road element to the centre of a proposed tree / palm should be as stipulated in the Table below:

<table>
<thead>
<tr>
<th>Clause</th>
<th>Proposed roadside elements</th>
<th>Required minimum clearance of proposed roadside elements from proposed:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Palm</td>
<td>Small to medium size tree</td>
</tr>
<tr>
<td>1</td>
<td>Splay corner of: Entrance culvert, Bin centre driveway, Substation driveway, MDF room driveway Fire Engine Access</td>
<td>1.0m</td>
</tr>
<tr>
<td>2</td>
<td>Scupper pipe / drain</td>
<td>1.0m</td>
</tr>
<tr>
<td>3</td>
<td>Lamp post</td>
<td>2.0m</td>
</tr>
<tr>
<td>4</td>
<td>OG box</td>
<td>2.0m</td>
</tr>
<tr>
<td></td>
<td>TAS manhole</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sewer line and manhole</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical post</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fire hydrant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCV box</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lighting control box</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traffic control box</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Traffic light</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cement Crossing (e.g. pushcart ramp for bin centre)</td>
<td>1.5m</td>
</tr>
</tbody>
</table>
Greenery Provisions for Roadside

Legend

- **cl**: Clause
- **Tree**
- **SCV**: SCV Box (and other service boxes)
- **Lamp Post**
- **Fire Hydrant**
- **Traffic Light**

![Diagram of greenery provisions for roadside]
6.3 Aeration Requirements For Planting On Plaza

If a tree is to be planted on plaza, at least \((2 \times 2)\) m² unsealed soil area with a total surrounding aeration area of 16 m² is to be provided around the tree.

The Figure below illustrates various possible shapes of planting plaza and soil area for tree planting.

![Tree planting on plaza](image)

**Figure:** Tree planting on plaza

If a palm is to be planted on plaza, at least \((1.5 \times 1.5)\) m² unsealed soil area with a total surrounding aeration area of 16m² is to be provided around the palm.

The Figure below illustrates various possible shapes of planting plaza and soil area for palms planting.

![Palm planting on plaza](image)

**Figure:** Palm planting on plaza
6.4 Planting Requirements for Pedestrian Overhead Bridge

6.4.1 Continuous planting troughs are to be provided along the span on both sides of the bridge.

6.4.2 The troughs should have internal minimum width of 650mm and depth of 750mm. They are to be backfilled with 1 part of expanded clay, 1 part of organic matter (processed woodchips or compost) and 2 parts of loamy topsoil.

6.4.3 The troughs must be waterproofed.

6.4.4 Shrubs are to be planted within the troughs and beneath the staircases of the pedestrian overhead bridges.
6.5 Irrigation System for Pedestrian Overhead Bridges

6.5.1 For pedestrian overhead bridges less than 25m long, a 25mm stainless steel sprinkler pipe (with 5mm diameter holes are provided at 200mm c/c along the bottom of the pipe) should be fixed to the inner wall of the trough that abuts the platform and above the soil level.

6.5.2 For pedestrian overhead bridges between 25m to 50m long, a 25mm stainless steel sprinkler pipe (with 3mm diameter holes are provided at 400mm c/c along the bottom of the pipe) should be fixed to the inner wall of the trough that abuts the platform and above the soil level.

6.5.3 For pedestrian overhead bridge exceeding 50m long, multiple pipe system with robust switch valve to channel water to different pipes are to be used. A 25mm stainless steel sprinkler pipe (with 3mm diameter holes are provided at 400mm c/c along the bottom of the pipe) should be fixed to the inner wall of the trough that abuts the platform and above the soil level.

6.5.4 The watering system pipes are to be terminated 1m above the ground level with 37.5mm diameter male adapter and there should be one coupling point that is easily and safely accessible to water tanker.
6.5.4 Typical Cross Sectional Drawing on Watering and Drainage Systems, and Planting Troughs of a Pedestrian Overhead Bridge

- 25 mm Ø S.S sprinkler pipe with 5mm Ø perforation at 150mm C/C with sealed end at mid span point.
- Rating should allow accessibility to the trough for regular maintenance, e.g., tending, manuring or replacement of plants. The top of the trough is to be leveled with the overhead bridge platform.
- 100mm Ø UPVC pipe with 5mm Ø perforation at 100mm C/C in all directions.
- 100mm wide x 50mm deep trench with UPVC strainer.
- 50mm Ø UPVC water down pipe.
- 20mm Ø stainless steel water supply pipe.
- 100mm wide half rounded UPVC pipe with end cap and 5mm Ø perforation at 150mm C/C on concrete support discharging to the nearest roadside drain.

Vehicular impact guardrail to comply with LAA requirement.

Footings of the column

Roadside drain
6.5.6 **Standard Design of Pedestrian Overhead Bridge (POB) with Roof Cover**

The roof should be extended not more than 50% over the width of the planting surface of the trough laterally from the edge of the bridge deck.
6.5.6 Water Tanker Lay-by

<table>
<thead>
<tr>
<th></th>
<th>Layout Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>A lay-by of 23m long and 3m wide is to be provided for water tanker, unless there is a paved shoulder. (A letter from the authority indicating no objection to the use of paved area is attached)</td>
</tr>
<tr>
<td>(b)</td>
<td>Location of the water tanker lay-by has to be within a radius of 8m from the coupling point (at the column of the bridge or housed in a pit) to the mid-point of the lay-by.</td>
</tr>
<tr>
<td>(c)</td>
<td>Dimension of Water Tanker Lay-by</td>
</tr>
</tbody>
</table>

**Figure:** Dimension of Water Tanker Lay By
6.6 Specification of Trees / Palms / Shrubs

6.6.1 A sapling tree should have:
   i. total overall height 2.5m with clear trunk height 1.5m
      (measured from soil level)
   ii. girth at least 0.1m
   iii. upright and in good form

6.6.2 A single stem palm should have:
   i. total overall height 2.0m (measured from soil level)
   ii. upright and in good form
   iii. terminal shoot

6.6.3 A cluster palm should have:
   i. total overall height 2.0m (measured from soil level)
   ii. upright and in good form
   iii. minimum 4 suckers

6.6.4 A planting hole for a sapling tree/palm/cluster should be 1m × 1m × 1m, and be backfilled with 3 parts of loamy soil and 1 part of organic matter (processed woodchip and compost).

6.6.5 Sapling trees/ single-stem palms are to be staked as and when required. Stake provided should be:
   i. galvanized steel pipe, or treated wood of 25mm diameter
   ii. slightly lower than the sapling and 1/3 buried underground
   iii. positioned 200mm away from the collar of the tree
   iv. provided with PVC tubed nylon string placed round the trunk and tied firmly to the stake
Figure 6.6.5:
Staking for a sapling tree/single-stem palm
6.6.6 Tree collar protectors are to be provided for all proposed sapling trees / single stem palms. A protector is to be made of a PVC tube of length 200mm, diameter 75mm and thickness 2mm with a slit cut along the full length of the tube.

6.6.7 An instant tree should have:
   i. girth of at least 0.3m
   ii. clear trunk height 2.0m (measured from the soil level)
   iii. upright and good form
   iv. minimum 3 primary branches of 500mm long

6.6.8 A planting hole for an instant tree should be 1.5m × 1.5m × 1m, and be backfilled with 3 parts of loamy soil and 1 part of organic matter (processed woodchip and compost).

6.6.9 Aeration Trough
Proposed trees/palms or existing trees of girth less than < 0.5m will require aeration troughs to be provided if the planting verge is less than 3.0m wide. (Details of aeration trough to be in accordance with the specification shown on the drawing number: LTA/RD/SD99/PNR/2 & 3)

6.6.10 Shrubs planting

   i. For single shrub planting, each shrub should be at least 0.5m tall. A shrub hole should be 0.6m × 0.6m × 0.6m, and be backfilled with 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).

   ii. For shrub bed planting, depending on the species, each shrub should have a height of 0.3 to 0.5m and planted at 0.3 to 0.5m centre to centre. A shrub bed should have a soil depth of 0.6m, and be backfilled with 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).
# Greenery Provisions for Roadside

**Table 6.2.1a**

Large sized trees are generally recommended for planting along major roads and expressways with planting verge greater than 3 metres in width.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>APPROXIMATE HEIGHT WHEN MATURE (m)</th>
<th>RECOMMENDED SPACING (m)</th>
<th>ROADSIDE</th>
<th>OPEN SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Ailanthus pedunculata (Pulai)</td>
<td>25</td>
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<tr>
<td>2  Azadirachta excelsa (Sentang)</td>
<td>20</td>
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<td>18</td>
</tr>
<tr>
<td>3  Caesalpinia ferrea (Brazilian Ironwood)</td>
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<td></td>
<td>12</td>
<td>18</td>
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<tr>
<td>4  Casuarina nobilis (Sumatran Rhu)</td>
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<td>12</td>
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<tr>
<td>5  Couroupita guianensis (Cannon Ball Tree)</td>
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<td>18</td>
</tr>
<tr>
<td>6  Dalbergia latifolia</td>
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<td>7  Dalbergia oliveri (Tamalan)</td>
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<td>8  Dyera costulata (Jelutong)</td>
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<td>9  Erythrina variegata (Variegated Coral Tree)</td>
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<tr>
<td>10 Erythrophleum guineense (Ordeal Tree)</td>
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<td>11 Eucalyptus camaldulensis</td>
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<td>12 Eugenia grandis (Jambu Laut)</td>
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<td>13 Fagraea crenulata</td>
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<td>14 Fagraea fragrans (Tembusu)</td>
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<td>15 Ficus decipiens (Fem Tree)</td>
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<td>16 Hopea odorata</td>
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<td>17 Khaya grandifolia</td>
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<td>18 Khaya senegalensis (Senegal Khaya)</td>
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<td>19 Mesua ferrea (Ceylon Ironwood)</td>
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<td>20 Michelia alba (White Champaka)</td>
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<td>21 Miletia atropurpurea (Purple Miletia)</td>
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<td>22 Pterocarpus indicus (Angsana)</td>
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<tr>
<td>23 Pterocarpus indicus (Angsana)</td>
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<td>24 Samanea samara (Rain Tree)</td>
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<td>25 Swietenia macrophylla (Broad leaf Mahogany)</td>
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<td>26 Tabeula rosea (Pink Poul)</td>
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<td>27 Tectona grandis (Teak)</td>
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<td>28 Terminalia catappa (Ketapang)</td>
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### Table 6.2.1b
Medium sized trees are generally recommended for planting at major roads and some minor roads with planting verges between 1.5 to 3.0 metres

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>APPROXIMATE HEIGHT WHEN MATURE (m)</th>
<th>RECOMMENDED SPACING (m)</th>
<th>ROADSIDE</th>
<th>OPEN SPACE</th>
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<tr>
<td>1</td>
<td>Acacia mangium</td>
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<td>Arctostaphylos uva-ursi</td>
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<td>4</td>
<td>Bauhinia blakeana (Hong Kong Bauhinia)</td>
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<tr>
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<td>Caranrea odorata (Kenanga)</td>
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<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Cassia fistula (Golden Showers)</td>
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<td>Cinnamomum iners (Wild Cinnamomum)</td>
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<td>8</td>
<td>Citharexylum quadrangulare (Fiddlewood)</td>
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<tr>
<td>9</td>
<td>Cochlospermum religiosum (Buttercup Tree)</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Eucalyptus botryoides (Gum Tree)</td>
<td>15</td>
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</tr>
<tr>
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<td>Eucalyptus viminalis (Rom Tree)</td>
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<td>8</td>
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</tr>
<tr>
<td>12</td>
<td>Eugenia cuminum (Jambolan)</td>
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<td>13</td>
<td>Eugenia jambos (Rose Apple)</td>
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</tr>
<tr>
<td>14</td>
<td>Eugenia polyantha (Bush Salam)</td>
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</tr>
<tr>
<td>15</td>
<td>Gnetum gnemon (Menjia)</td>
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<tr>
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<td>Gustavia sp</td>
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<td>6</td>
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<td>17</td>
<td>Lagerstroemia speciosa (Rose of India)</td>
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<tr>
<td>18</td>
<td>Magnolia browniodes (Hardkirsch Tree)</td>
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<td>19</td>
<td>Melaleuca leucadendron (Gelam)</td>
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<tr>
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<td>Melia indica (Kam Tree)</td>
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<tr>
<td>21</td>
<td>Mimosa tropica (Bunga Tanjung)</td>
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<td>12</td>
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<tr>
<td>22</td>
<td>Plumeria spp (Rangoon)</td>
<td>8</td>
<td>8</td>
<td>10</td>
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<tr>
<td>23</td>
<td>Podocarpus rumphi</td>
<td>15</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>24</td>
<td>Pongamia pinnata (Mempari)</td>
<td>15</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>25</td>
<td>Podocarpus polystachyus (Sea teak)</td>
<td>15</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>26</td>
<td>Saraca indica (Sorrowless Tree)</td>
<td>8</td>
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</tr>
<tr>
<td>27</td>
<td>Saraca thalipensis (Yellow Saraca)</td>
<td>12</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>28</td>
<td>Tamarindus indica (Tamarind /Asam)</td>
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</tr>
<tr>
<td>29</td>
<td>Xanthostemon chrysanthus</td>
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<tr>
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<td>Eugenia oleina</td>
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<td>31</td>
<td>Eugenia spicata</td>
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<tr>
<td>32</td>
<td>Eugenia longifolia</td>
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</tbody>
</table>
Greenery Provisions for Roadside

**Table 6.2.1c**
Small sized trees are generally recommended for planting at minor roads with narrow/ restricted planting verge less than 1.6 metres in width.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>APPROXIMATE HEIGHT WHEN MATURE (m)</th>
<th>RECOMMENDED SPACING (m)</th>
<th>ROADSIDE</th>
<th>OPEN SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Brassia actinophylla</em> (Australian Ivy Palm)</td>
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<tr>
<td>2</td>
<td><em>Callistemon citrinus</em> (Bottle Brush Tree)</td>
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</tr>
<tr>
<td>3</td>
<td><em>Callistemon viminalis</em></td>
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<tr>
<td>4</td>
<td><em>Carailla brachista</em></td>
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</tr>
<tr>
<td>5</td>
<td><em>Cratoxylum formosum</em> (Pink Mempat)</td>
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<tr>
<td>6</td>
<td><em>Crotoxyon cochinchinense</em></td>
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<td>7</td>
<td><em>Erythrina glauca</em> (Coral Tree)</td>
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<td><em>Kopsia flavida</em> (Penang Sloe)</td>
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<td><em>Kopsia sinaporesis</em></td>
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<td>10</td>
<td><em>Melaleuca geminifolia cv Golden Gem</em></td>
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<tr>
<td>SPECIES</td>
<td>APPROXIMATE HEIGHT WHEN MATURE (m)</td>
<td>RECOMMENDED SPACING ROADSIDE</td>
<td>OPEN SPACE</td>
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<td>-----------------------------</td>
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<td></td>
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<tr>
<td>1</td>
<td>Archontophoenix alexandrae (Alexandra palm)</td>
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<td>Areca catechu (Betel nut palm)</td>
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<td>Bentinckia nicobarica</td>
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<td>Bismarckia nobilis (Bismarck palm)</td>
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<td>Carpentaria acuminata (Carpentaria palm)</td>
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<td>Caryota rumphiana (Solitary fishtail palm)</td>
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<td>Chrysalidocarpus lucbenensis</td>
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<td>Cyrtostachys lakka/ronds (Red sealing wax palm)</td>
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<td>Dypsis decaryi (Triangular palm)</td>
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<td>Hyphorbe verschoeffii (Spindle palm)</td>
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<td>Hyphorbe lagenicaulis (Botte palm)</td>
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<td>Latania lontaroides (Red Latan)</td>
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<td>Latania verschoeffii (Yellow Latan)</td>
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<td>Licuala grandis (Vanuatu fan palm)</td>
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<td>Licuala aurea (Mangrove fan palm)</td>
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<td>Livistona chinensis (Chinese fan palm)</td>
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<td>Livistona nudaifolia (Footstool palm)</td>
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<td>Pritchardia pacifica (Fiji fan palm)</td>
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<td>Pylchoraphis singaporensis</td>
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<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>22</td>
<td>Roystonea oleracea (Cabbage palm)</td>
<td>30</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>23</td>
<td>Roystonea regia (Royal palm)</td>
<td>25</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>24</td>
<td>Velchtia merrilli (Manila/Christmas palm)</td>
<td>15</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>25</td>
<td>Washingtonia robusta (Mexican fan palm)</td>
<td>25</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>26</td>
<td>Wodyetia bifurcata (Foxtail palm)</td>
<td>12</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
6.7 Plan Submission Requirements

6.7.1 A professional engineer is required to submit a completed NParks' application form, enclose the letter of authorization from the developer, and sign all layers of drawing digitally:

The plans should comprise:

a. Key and location plans of the development site (scale 1:10000 or 1:5000) with access to the site from a street or road
b. Site plan (scale 1:500, 1:200 or 1:100)
c. Cross section of road sidetables (scale at least 1:50).
d. Lot and/or plot number of the lots on both sides of the development site
e. Address of the development site (if applicable)
### 6.7.2 General Site Information should be provided as follows:

<table>
<thead>
<tr>
<th></th>
<th>Site Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Development boundary veraged in red</td>
<td>Indicate</td>
</tr>
<tr>
<td>(b)</td>
<td>Road reserve line/width of existing and proposed roads</td>
<td>Indicate</td>
</tr>
<tr>
<td>(c)</td>
<td>Locations and dimensions of carriageway, roadside drain, roadside planting verges (coloured green), service verges (coloured green) and footpath. Existing carriageway, roadside drain, roadside planting verge, service verge and footpath to be demolished are to be indicated in yellow broken line.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(d)</td>
<td>Existing and proposed road sidetable levels.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(e)</td>
<td>Location of existing and proposed lamp posts, OG boxes, SCV boxes, TAS manholes, sewer lines, electrical posts, fire hydrants, traffic lights, authorised signs and etc. (Please refer to Power Grid on the provision of OG box, if no new OG box is required, to attach a confirmation letter from Power Grid)</td>
<td>Indicate</td>
</tr>
<tr>
<td>(f)</td>
<td>Other proposed structures, for example, retaining walls, boundary walls, fire engine access and hardstanding areas.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(g)</td>
<td>Radius of spray centres of entrance culverts and driveways.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(h)</td>
<td>Existing roadside trees/palms/shrubbery abutting the development boundary and up to 10m on both sides of the boundary are to be indicated. (Please refer to module on Conservation of Trees/Plants for information requirement)</td>
<td>Indicate</td>
</tr>
<tr>
<td>(i)</td>
<td>For existing trees/palms on footpath, the existing unpaved areas and loose paved PC slabs around the trees/palms are to be shown.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(j)</td>
<td>The clearance from a road element to the centre of a tree/palm should be indicated on the site plan.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(k)</td>
<td>Species, girth and heights of existing trees/single-stem palms within the site boundary and on the neighbouring lot up to 5m from the boundary (only applicable if the development is within the gazetted Tree Conservation Area or on vacant land) (refer to module on Conservation of Trees/Palms).</td>
<td>Indicate</td>
</tr>
</tbody>
</table>
### Greenery Provisions for Roadside

Additional Information requirement for Pedestrian Overhead Bridges and/or Covered Linkways:

<table>
<thead>
<tr>
<th></th>
<th>Site Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>Alignment of proposed overhead bridge, the spans of the proposed planting troughs and schematic engineering drawing with dimensions of the pedestrian overhead bridge and foundation</td>
<td>Indicate</td>
</tr>
<tr>
<td>(b)</td>
<td>Alignment of proposed covered linkway and schematic engineering drawing with dimensions of the covered linkway</td>
<td>Indicate</td>
</tr>
<tr>
<td>(c)</td>
<td>Location of proposed water tanker lay-by</td>
<td>Indicate</td>
</tr>
<tr>
<td>(d)</td>
<td>Planting beds beneath pedestrian overhead bridge staircases. The beds are to be coloured on plan.</td>
<td>Indicate</td>
</tr>
<tr>
<td>(e)</td>
<td>Details of footings and the clearance from existing trees and roadside drain</td>
<td>-</td>
</tr>
<tr>
<td>(f)</td>
<td>Roof dimension and the clearance from existing trees</td>
<td>Indicate</td>
</tr>
<tr>
<td>(g)</td>
<td>Depth and types of existing/proposed underground services</td>
<td>Indicate</td>
</tr>
<tr>
<td>(h)</td>
<td>Planting scheme within the planting beds (To be provided at BP Stage)</td>
<td>Indicate</td>
</tr>
<tr>
<td>(i)</td>
<td>Shrubs within the troughs for Pedestrian Overhead Bridges (To be provided at BP Stage)</td>
<td>Indicate</td>
</tr>
<tr>
<td>(j)</td>
<td>Detailed drawings of irrigation/drainage systems (To be provided at BP Stage)</td>
<td>Indicate</td>
</tr>
</tbody>
</table>
6.8 Existing Trees / Palms / Shrubs

6.8.1 Annex 3 (existing roadside trees) is to be completed and submitted. Any changes on the status of the existing trees approved at DC / BP stage of Architect's plan are to be reflected.

6.8.2 For existing trees / palms on footpath, the existing unpaved areas and loose paved PC slabs around the trees / palms are to be shown.

6.8.3 The clearance from a road element to the centre of a tree / palm should be indicated on the site plan.

6.9 Planting Scheme

6.9.1 Location and species of proposed trees/palms are to be shown on plan and uniquely numbered with prefix 'P'.

6.9.2 Species and locations of proposed shrubs, if applicable, are to be shown on plan.

6.9.3 Please use colours other than green, red and yellow for proposed trees/palms/shrubs.

6.9.4 A legend for proposed trees/palms/shrubs is to be provided.

6.9.5 Specifications for turfings, proposed trees/palms/shrubs and the planting holes/planting beds are to be endorsed on plan.

6.10 Aeration for Plaza Planting

6.10.1 Detailed drawings of aeration provision for proposed trees/palms are to be shown on site plan, cross-sections and detail plan.
Open Space for Landed Housing Development

- Open Space Provision
- Location of the Open Space
- Accessibility of Open Space
- Terrain of Open Space
- Drainage Provision
- Playground / Fitness Space and Equipment Requirements
- Footpath
- Park Furniture
- Safety Railings
- Park Lighting and OG Box
- Soft Landscape and Tree Planting Requirements

NParks' Publication
7.1 Open Space Provision

The standard provision of open space required for a landed (land title) housing development is 4.05m² to every 56m² of gross floor area (GFA). [Area of open space = (G.F.A / 56m²) x 4.05m²]. This is subject to the following:

a) a minimum plot area for open space of 1000m²;

b) it should be of regular shape having a width of at least 30m;

c) it should not be fragmented by road, canal or other infrastructure;

d) it should be free from encumbrances above and below the ground level; and

e) The open space plot is to be vested in the State.
7.2 Location of the Open Space

7.2.1 The open space should be suitably located within the proposed development and be conveniently accessible to the community.

7.2.2 It should be located as such that at least 2 sides face the front of a house(s), and non face the rear of a house(s).

7.2.3 The walking distance from the furthest unit to the proposed open space, measured along the road centre, should not be more than 250m.

7.2.4 It should not abut a major road.

7.2.5 It should not abut an existing/proposed retaining wall.

7.2.6 If the proposed development is adjacent to a proposed or existing Park Connector, the open space is to abut the Park Connector provided:

   i) the Park Connector does not abut a major road, and
   ii) the walking distance specified in clause 8.2.2 above can be achieved;
7.3 Accessibility of Open Space

7.3.1 At least one of the boundaries of the open space is to abut an existing minor road or a new local access road.

7.3.2 Proposed entrance or access path to the open space should be at least 4.0m wide. Removable bollards with lock are to be installed to curb illegal entry/parking. However, the spacing of bollards should allow for wheelchair accessibility.

The open space accessibility, in general, should be designed in accordance with Building Control Authority's Design Guidelines for Parks & Open Space under Appendix H of The Code on Accessibility in the Built Environment 2007 code of accessibility.

7.4 Terrain of Open Space

7.4.1 The open space should generally be flat (gradient 1:40). Where slope is unavoidable, it should not be steeper than 1:2.5, and appropriate measures for slope stability should be carried out.

7.4.2 The level of open space should be the same as adjacent road and neighbouring lots.
7.5 Drainage Provision

7.5.1 The open space should be provided with suitable and sufficient drainage measures including sump pits, to channel away surface water, prevent flooding on hard surface as well as lawn area.

7.5.2 The open space should be properly graded to prevent water ponding and to efficiently channel storm water runoff to the proposed drains for discharge at the main outlet channel.

7.5.3 The types of drains to be provided where necessary are:
   a) Opened drains with hinged grating covers of similar material or scupper drains along footpath.
   b) Subsoil drains under open lawns.
   c) Subsoil drains under playground and fitness areas.

7.6 Playground / Fitness Space and Equipment Requirements

7.6.1 An area of at least 100m² shall be provided for proposed playground equipment within the open space. It may be substituted with fitness equipment in situation where there are existing or proposed playground equipment in another open space in the vicinity.

7.6.2 Playground/fitness equipment should be barrier-free and accessible by the physically challenged in accordance with Singapore Standards - SS 457 : 2007 Specification for Playground equipment for public use and SS 534 : 2007 Specification for Outdoor fitness equipment for public use respectively.

7.6.3 The design of the playground space should be sensitively designed to allow for participation by the physically challenged with the rest of the users without any spatial discrimination.
7.6.4 There shall be at least one barrier-free access route from the main circulation path system to the playground and fitness areas. The dimensions of the barrier free access route should be in accordance with the BCA 2007 Code of Accessibility Appendix H - Design Guidelines for Parks & Open Space.

7.6.5 The playground area should be designed with playground equipment catering for both age range of 2-5 and 5-12. The playground equipment could comprise of composite sets and stand alones, providing minimum 8 different playground activities. Each composite set of playground equipment shall have at least 5 different playground components.

7.6.6 Playground equipment should be stimulating and educational providing exercise not only to the body but also developing the intellectual and social skills.
7.6.7 For the fitness area, a set with minimum 6 stations shall be provided, with relevant instruction signboards.

7.6.8 At least 50% of the fitness equipment proposed should be suitable for use by the elderly.

7.6.9 Playground equipment should be designed and constructed or assembled in accordance with Singapore Standard SS 457:2007 Specification for Playground equipment for public use.

7.6.10 Fitness equipment should be designed and constructed or assembled in accordance with Singapore Standard SS 534:2007 Specification for Outdoor fitness equipment for public use.

7.6.11 The footings for playground and fitness equipment must be designed with structural safety endorsed by a QP (Structural Engineer).

7.6.12 All playground and/or fitness equipment are to be situated within acceptable protective surfacing materials complying with Singapore Standard SS 495:2001 – Specification for Impact Attenuation of Surface System under and around Playground Equipment.
Open Space for Landed Housing Development

7.6.13 Clearly defined edging between the playground area and adjacent surfaces should be provided. The playground area, adjacent ground and edging shall be flush with each other.

7.6.14 Playground and fitness equipment should be housed in separate areas.

7.6.15 Subsoil drainage shall be provided within sand pit or playground area. These subsoil pipes shall be linked to the nearest drain.

7.6.16 Relevant instructional signboards should be provided for all fitness equipment. It should be weather resistant and vandal proof, and complying with Singapore Standard Standards - SS 457 : 2007 Specification for Playground equipment for public use and SS 534 : 2007 Specification for Outdoor fitness equipment for public use respectively.

7.6.17 Relevant labelling signs should be provided for all playground and fitness equipment. They should be weather resistant and vandal proof, and complying with Singapore Standards - SS 457 : 2007 Specification for Playground equipment for public use and SS 534 : 2007 Specification for Outdoor fitness equipment for public use.

7.6.18 The playground and/or fitness area should be sufficiently shaded with instant trees. Please refer to the specification of an instant tree under Soft Landscape and Tree Planting Requirements Section.

7.6.19 Adequate seating should be provided around the playground and fitness area.

7.6.20 A 5 year warranty transferable to NParks is required from the supplier for the imported playground and fitness equipment. The validity of the warranty should not be less than 4 years at the time when the warranty is transferred to NParks. Please refer to sample of warranty in Figure 7.6.20a.
Figure 7.6.19a:
Sample of Playground/Fitness Equipment Warranty

Letter Head:

Supplier Company Name, Address, Telephone and Facsimile

Address to:
NATIONAL PARKS BOARD
HEADQUARTERS
Singapore Botanic Gardens
1 Cluny Road
Singapore 259569

Date:

5-YEARS WARRANTY FOR PLAYGROUND EQUIPMENT
AT

1 (Name of Supplier) provides a warranty to the customer against manufacturing defects on all (products module) products for a period of 5 years from the date of delivery of the playground equipment on the site (date of delivery). Any replacement parts required under this guarantee will be furnished absolutely free of charge.

2 “Customers” includes the National Parks Board or any other body responsible for the maintenance of the equipment installed at the site during the warranty period.

3 (Name of Supplier) must make all necessary repair or replace defective parts within 14 days upon receipt of customers’ written direction

4 Details on inspection and maintenance can be found in the attach appendix.

Director’s Name
Company stamp of the supplier

*The validity of the warranty should not be less than 4 years at the time when the warranty is transferred.*
7.7 Footpath

7.7.1 Design of a footpath should be in accordance with BCA 2007 Code of Accessibility Appendix H - Design Guidelines for Parks & Open Space.

7.7.2 Any footpaths leading to or away from the open space should be flushed upon intersection.

7.7.3 The material of footpath and any other pavement should ensure ease of movement by the physically challenged and be non-slip not only during dry, but also wet weather.

7.7.4 For wider footpath (min 3.0m) that is use also for vehicular access, engineering detail is required.

7.8 Park Furniture

7.8.1 A quality warranty transferable to NParks is required from the supplier of all park furniture.

7.8.2 Materials used should be durable and vandal proof.

7.8.3 Use of timber should be minimal. No timber is to be used for railings and litterbins.

7.8.4 All timber should be obtained from well managed, guaranteed sustainable wood source.
7.8.5 Signboard

a) Signboard should be installed at/near the entrance of an open space. More than one signboards may be required if there are multiple entrances located far apart.

b) The open space should be named after the nearest road. Where the nearest road is yet to be named, the name of the open space should be submitted to NParks as soon as the road name is approved by the Street Naming Committee.

c) A 128mm diameter NParks logo should be printed on the front of the signboard. It should be finished in 3M engineering grade outdoor reflective vinyl sticker (with 3 years warranty). For details of the graphic, please refer to Figure 8.8.5a – NParks Logo Details. The logo should be printed only at the time of handing over of the open space to NParks.

d) Size of the lettering for the name of the open space should not be less than 150mm tall.

e) Colour visuals and finished artwork of graphics (F.A.) and text are to be submitted for approval. Editable master copy of F.A. to be burnt into CD and handed over to NParks upon completion of project.

f) The design and construction of the footing should comply with the latest Building Control Act.

g) NParks Standard Signboard or other design approved by NParks may be used. Please refer to Specifications and Installation of Standard Signboard in Figure 8.8.5b.
Open Space for Landed Housing Development

Drawing 7.8.5a
NParks Logo Details
Open Space for Landed Housing Development

Figure 7.8.5b
- Size and Installation Details of Standard Signboard.

a) Colour visuals and finished artwork of graphics (F.A.) and text are to be submitted for approval. Editable master copy of F.A. to be burnt into CD and handed over to NParks upon completion of project.

b) Electrical works must be carried out by licensed electrical worker. Lighting and necessary cabling will be terminated at splashproof junction box, which is 300mm above ground surface. Junction box is to have a 6A DP MCB for the incoming cable.

c) All cabling and wiring are to be hidden or concealed within the structure.

d) All sharp corners are to be rounded off.
Open Space for Landed Housing Development

NParks Logo:
Finished in 3M engineering grade outdoor reflective vinyl stickers (with 3 years warranty).

Text
(30 Thk Box-up Text on one side):
Aluminium Sheet (2mm Thk for the Side and 3mm Thk for the Front) finished with Full Welding. Tighten with Screw and Washer to the Aluminium backing. Powder Coated to approved colour on all sides.

Weatherproof junction box c/w 6A DP MCB (with conduit and armoured cables). All cabling to the lighting fitting shall be hidden inside the aluminium structure. There shall be access for the incoming cable. Location of junction box subject to S.O approval.

FC Footing with 20mm Thk base plate, 6 nos of M16 stainless steel anchor bolts and full welded joints (To P.E.'s details and endorsement).
NOTE
The entire structure to be constructed with 3 mm Aluminium plate (except that curved or bend area to use 2 mm Aluminium plate), with full welded joints and hollow Aluminium section for internal framework finished with Powder Coating.

Powder Coating colour (for N/works internal reference)
RAL 7035 (Light Grey) for Unit or patio area
RAL 8005 (Blue Grey) for entrance or external area
RAL 8025 (Dark Green) for unit or other choice.

Total 7 nos of 34 inch Warm Fluorescent to be attached to the Aluminium structure (subject to S.O. approval).

3 mm Thick Aluminium door with Rubber Gasket at bottom. S.S. Lock.
Heavy Duty Piano Hinges. Silicone sealant (to S.O. approval).

Heavy Duty Piano Hinges (to S.O. approval).

1200 x 1200 x 5 mm Clear Polycarbonate pane.

W/1200 x H/1200 x 5.5 mm Cork Sheet to be attached to the Rubber Mat backing (subject to S.O. approval).

W/200 x H/1200 x 10 mm Rubber Mat to be attached to the Aluminium Door (subject to S.O. approval).

4 mm ventilation holes for air circulation (to S.O. approval).

FC Facing with 20mm Thick base plate, 6 nos of M16 stainless steel anchor bolts and full welded joints (to P.E.'s details and endorsement).
Open Space for Landed Housing Development

Total 1 no. of 24 inch Warm Fluorescent to be attached to the Aluminium structure (fixture to S.O. approval).

W1200 x H1200 x 15 Thk Cork Sheet to be attached to the Rubber Mat backing (Subject to S.O. approval).

W1200 x H1200 x 10 Thk Rubber Mat to be attached to the Aluminium Door (Subject to S.O. approval).

FC Footing with 20mm Thk base plate, 6 nos of M16 stainless steel anchor bolts and full welded joints (To P.E.'s details and endorsement).

SIDE ELEVATION
7.8.6 Benches

a) Should be connected to footpaths by means of a concrete platform with a minimum 0.5m apron all round;

b) The finished platform should have a level that matches with the footpath.

7.8.7 Litter Bins

a) NParks Standard Stainless Steel Litter Bin or other design approved by NParks may be used. Please refer to the Specifications and installation of NParks Standard Stainless Steel Litter Bin in Figures 8.8.7a to Figure 8.8.7j.

b) They should be secured firmly to the ground with stainless steel bolts and nuts.

c) They should be located 3m to 5m away from a bench.
Open Space for Landed Housing Development

Figure 7.8.7a
- Specifications and Installation of Litter Bin

1.5mm THK STAINLESS STEEL AISI 304
FULL LENGTH RECEPTACLE HINGE

ALL COMPONENTS ARE STAINLESS
STEEL HAIRLINE AISI 304
SLOT PROVIDED FOR ADVERTISING
MARKETING ACTIVITIES

20mm BULL NOSE PROJECTION &
COMPLETE WITH 1mm THK END
CAPPING ON BOTH SIDES

PLAN VIEW
NTS
Open Space for Landed Housing Development

Figure 7.8.7b
- Specifications and Installation of Litter Bin

F E N S T O R
F E N S T O R
S T A I N L E S S S T E E L
H A I R L I N E
F I N I S H E D

F R O N T E L E V A T I O N
N.T.S.
Open Space for Landed Housing Development

Figure 7.8.7c
- Specifications and Installation of Litter Bin

SIDE ELEVATION (LEFT & RIGHT)
Open Space for Landed Housing Development

Figure 7.8.7d
- Specifications and Installation of Litter Bin

REAR ELEVATION

N.S.
Figure 7.8.7e
- Specifications and Installation of Litter Bin
Figure 7.8.7f
- Specifications and Installation of Litter Bin

**ISOMETRIC VIEW**

N.T.S.
Figure 7.8.7g
- Specifications and Installation of Litter Bin

Isometric View of Stainless Steel Litter Bin
Figure 7.8.7h
- Specifications and Installation of Litter Bin

- 25mm (W) x 5mm THK. STAINLESS STEEL FRAME.

- 3 NOS. OF 40mm (H) x 30mm (L) x 25mm (W) STAINLESS STEEL HAIRLINE FINISHED WELDED TO 25mm (W) x 5mm THK. STAINLESS STEEL FRAME (DETAIL A).

DETAIL A
N.T.S.
Open Space for Landed Housing Development

Figure 7.8.71
- Specifications and Installation of Litter Bin

- 8 NOS. OF 20mm x 25mm x 3mm THK. BRACKET WELDED ONTO 5mm THK. FRAME
- 8 NOS. OF 25mm x 25mm x 3mm THK. BRACKET WELDED ONTO 25mm Ø VERTICAL TUBING

- MATERIAL PAINTED IN GREEN (25C PANTONE) IS 0.9mm THICK STAINLESS STEEL HAIRLINE AISI 304 STOVE-ENAMELED SHEET BAKED BETWEEN 150°C TO 180°C ON BOTH INTERNAL AND EXTERNAL WALLS
- 4 NOS. OF 25mm DIAMETER VERTICAL TUBING, GAUGE 12 FIXED ONTO 25mm x 3mm THK. FRAME ALL AROUND
Open Space for Landed Housing Development

Figure 7.8.7j
- Specifications and Installation of Litter Bin

DETAIL C
N.T.S.
7.8.8 **Shelter**

a) A shelter of not less than 20m² in area should be provided.

b) The proposed plan has to be endorsed by a QP (Structural Engineer) that the structural safety of the proposed shelter complies with the latest Building Control Act.

c) A shelter should be provided with lightning protection system in accordance with Singapore Standard CP 33: 1996 Code of Practice for Lightning Protection System;

d) QP of the development is advised to pre-consult NParks on the aesthetic design and materials to be used for a proposed shelter;

e) The minimum height of the roof overhang should not be less than 2.40m measures from the finished floor level to the underside of the roof members. The proposed roof overhang should not be less than 900mm measured from the side of the column or wall.

f) Shelter should be open sided to promote natural ventilation.

g) A perimeter drain with sump pit to be provided to discharge surface water from the shelter.

h) A 13A weatherproof type socket outlet is to be provided and installed in the shelter. It should be a multiple gang switches 13A weatherproof type socket outlet, plug top and metal screwed cover in GI conduit up to 3 x 15 ms run of 1.5 mm sq PVC cables.
7.9 Safety Railings

Where the edge of an open space and/or the main circulation paths border a slope, that is steeper than 1 : 2.5, safety railings complying with the following are to be provided:

7.9.1 a) 0.9m high (for pedestrians).

b) Durable materials used, such as stainless steel material grade 316 with hairline finishes for marine environment or hot dipped galvanised material with 5 years warranty period. Alternatively, proposed aluminium material with 6000 series and above will be acceptable.

c) Colour should match with the colour scheme of the open space.

7.9.2 For open drains more than 1.0m deep, safety railings should be installed within the drainage reserve, complying with the technical requirements of PUB Catchment and Waterways Department.
7.10 Park Lighting

This section of the guideline shall always be used in tandem with the latest FB checklist.

7.10.1 Lux Level Provisions

<table>
<thead>
<tr>
<th>Lux Level</th>
<th>Sub-Urban Areas (Open spaces within the housing estate, in general)</th>
<th>Urban Areas (Open spaces located in the main thoroughfare, or near bus stop/ MRT station.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Average Lighting Level</td>
<td>5 lux</td>
<td>10 - 20 lux</td>
</tr>
<tr>
<td>References</td>
<td>CIBSE fact file No.7 Nov, 1998 &amp; BS 5489 Part 9</td>
<td>URA DC/SL 225</td>
</tr>
</tbody>
</table>

i. The Architect and Lighting Consultant should do a site measurement of the existing lighting level before generating the proposal with computerized lux level calculation.

ii. The Architect/Lighting consultant shall determine the development’s classification areas. Additional task lighting for higher luminance shall be proposed for other activity areas namely carparks, shelter and etc.

iii. An estimated electrical bill is to be provided.
7.10.2 Lantern Design
i. Diamond and Cone shaped designs with diffusers are recommended if wider light coverage is needed.
ii. The proposed lantern design should be:
   • Vandal resistant
   • UV stabilised for the plastic components
   • Easily available locally
   • PSB batch tested to comply IP55

7.10.3 Bulb Type
Integrated Compact Fluorescent bulbs or other energy saving bulbs are recommended due to their performance. The type and technical specifications are as follows:
   GE bulbs (GE 60W CFL)
   • 220 – 240 V (50/60 Hz)
   • Lighting Output = 3400lm or higher
   • Colour Temperature = White 2700K or 6400K
7.10.4 Lamp Poles

Listed below are the recommended technical requirements.

i. Accessible door should be lockable with allen key. The door should be flushed with finishing and 500mm from ground level.

ii. Flange-mounted type preferred shall be mounted on exposed concrete foundation of at least 20mm.

iii. Pole height should be between 2.6m to 4m above ground.

iv. Pole should be installed at least 3.5m to 4m away from park chair, trees and hedges. Installation on sand, water logged and soft ground should be avoided.

v. Material thickness should be at least 2.5 mm and material should be:
   • Hot-dipped galvanized.

vii. Earthling terminal and earth rod completed with concrete inspection pit must be provided on the last pole of each circuit. The earth pit cover shall be removable made from heavy duty hot dipped galvanized iron.

viii. L-angle bracket for mounting the baseboard and cable gland to be provided at the internal surface of each pole.

ix. Cable entrance to be sealed to prevent insert ingress.

x. Labeling shall be 1.5m above ground level with the wording size of 6mm x 19mm x 34mm (Red 3-M sticker). The numbering should be continuous from first (No. 1) to the last number of poles.

xi. Pole door should be secured to the pole for the pole body using a stainless steel chain.

xii. Cable cut out unit come with HRC fuse should be provided.
7.11 Soft Landscape and Tree Planting Requirements

7.11.1 The proposed open space lawn is to be planted with 50mm thick *Axonopus compressus* (cow grass) in close turfing, with provision of 100mm depth planting mixture. The planting mixture should make up of 3 parts of loamy soil, and 1 part of organic matter (processed woodchips or compost).

7.11.2 Instant shade trees are to be planted around playground, fitness corner and sitting areas to provide shade soonest possible. The trees should have clear trunk height of 3.0m or more, over and above from the playground/fitness equipment.

7.11.3 Selection of trees should base on the following guidelines:
   a) Indigenous tree species is preferred;
   b) Shade provision take priority over aesthetics.

7.11.4 Shrubs can be proposed at focal points such as entrances.
7.11.6 Specifications of planting

a) An instant tree should have:
   i) girth at least 0.3m;
   ii) clear trunk height 2.0m (measured from soil level); [clear trunk height 3.0m (measured from soil level) for trees around playground/fitness area];
   iii) upright and good form;
   iv) minimum 3 primary branches of 500mm long.

b) A planting hole for an instant tree should be 1.5m x 1.5m x 1.0m deep, and be backfilled with loamy soil.

c) A sapling should have:
   i) girth at least 0.1m;
   ii) total overall height 2.5m with clear trunk height 1.5m (measured from soil level);
   iii) upright and good form.

d) A single stem palm should have:
   i) total overall height 2.0m (measured from soil level);
   ii) upright and good form;
   iii) with terminal shoot.

e) A cluster palm should have:
   i) total overall height 2.0m (measured from soil level);
   ii) upright and good form;
   iii) minimum 4 suckers.
f) Tree collar protectors are to be provided for all proposed sapling trees/single stem palms. A protector should be made of a PVC tube of length 200mm, diameter 75mm and thickness 2mm with a slit cut along the full length of the tube.

g) Sapling trees/single stem palms are to be staked as and when required. Stakes provided should be:
   i) galvanised steel pipe or treated wood of 25mm diameter;
   ii) 1/3 buried underground and the stake to be slightly lower than the sapling;
   iii) positioned 200mm away from the collar of the tree;

h) provided with PVC tubed nylon string placed round the trunk and tied firmly to the stake. A planting hole for a sapling tree / single stem palm / cluster palm should be 1m x 1m x 1m, and be backfilled with planting mixture made up of 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).

7.11.7 The size of shrubs to be planted and provision of planting hole/bed are as follows:

   a) For single shrub planting, each shrub should be at least 0.5m tall. A shrub hole should be 0.6m x 0.6m x 0.6m, and be backfilled with planting mixture made up of 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).

   b) For shrub bed planting, depending on the species, each shrub should have a height of 0.3 to 0.5m and planted at 0.3 to 0.5m c/c. A shrub bed should have a soil depth of 0.6m, and be backfilled with planting mixture made up of 3 parts of loamy soil and 1 part of organic matter (processed woodchips or compost).

Note

Architects are strongly encouraged to pre-consult NParks on the design and materials to be used for the proposed open space of the development.
7.12.1 **Plan Submission Requirements**

The plans should comprise:

a. Key and location plans of the development site (scale 1 : 10000 or 1 : 5000) with access to the site from a street or road;

b. Site plan (scale 1 : 500, 1 : 200 or 1 : 100);

c. Proposed landscaping plan of the open space of scale 1 : 200 or 1 : 100;

d. Details drawings and catalogues of proposed playground or fitness equipment;

e. De’ail drawings and/or catalogues of proposed park facilities, such as drainage, footpaths and benches;

f. Certificate of sustainable wood source (if any timber material is proposed).

7.12.2 **General site information should be provided as follows:**

<table>
<thead>
<tr>
<th>(a) Development boundary verged in red</th>
<th>Site Plan</th>
<th>Cross Sectional Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Proposed development layout</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(c) Existing and proposed road reserve line verged in red</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(d) Widths of proposed road reserve</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(e) Length of roadside planting verges</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(f) Proposed location of open space verged in red</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(g) Walking distance of the furthest house unit to the open space</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(h) Existing and proposed levels of the site including the open space</td>
<td>Indicate</td>
<td></td>
</tr>
<tr>
<td>(i) Area of open space</td>
<td>Indicate</td>
<td></td>
</tr>
</tbody>
</table>
7.12.3 Landscaping plan of the open space should provide the following:

(a) Existing and proposed levels of open space and the surrounding areas;

(b) Existing and proposed roads (with name indicated) and sidetables adjacent to the open space;

(c) Neighbouring lot's boundary wall highlighted in orange;

(d) Locations of proposed playground/fitness equipment;

(e) Locations of proposed park facilities such as litter bins, signboards, benches, footpaths, drains, railings, park lightings and shelters;

(f) Locations of existing park facilities (if applicable) and any other installations (if applicable);

(g) Location and species of existing and proposed trees/ palms/ shrubs, including roadside trees.
Submission Procedures
A registered architect / professional engineer is required submit a completed NParks' application form, the letter of authorization from the developer and digitally sign all relevant drawings. The applications to NParks are to be submitted through CORENET e-submission system.

8.1 Developments types which require NParks clearance for Planning, Building Plan Approvals and Certification of Statutory Completion

8.1.1 Planning Stage
- Private / Public building developments
- New landed housing developments with open space provision
- Pedestrian overhead bridges, Covered linkways
- Promenades, Pedestrian malls

8.1.2 Building Plan Stage
- Private / Public building developments
- New landed housing developments with open space provision
- Pedestrian overhead bridges, Covered linkways
- Entrance culverts, SWA section 18 roads, Promenades, Pedestrian malls
- Lodgement for at grade open surface parking spaces

8.1.3 Certificate of Statutory Completion Stage
- To obtain CSC clearance for those submissions as advised in the NParks' clearance letter for Building Plan Approval
- CSC Lodgement for at grade open surface parking spaces

8.2 Self-declaration scheme for projects abutting Category 5 roads at the Development Control (DC) and Building Plan (BP) stages
The self-declaration scheme is for DC submission within developments and BP submissions for external works.

Under this scheme, the Qualified Person (QP) is to attach the necessary plans and declare compliance with the criteria stated in the self-declaration forms (NPARKS-0-DCS10 & NPARKS-0-BPS10). It is compulsory for projects that comply with the criteria be submitted under the self-declaration scheme.