Why Green Roofs?

Green roofs are quickly gaining popularity in highly urbanised Singapore. The use of such areas in land scarce Singapore is changing our cityscape and the way we see and experience the landscape. From high rise housing to commercial buildings, green roofs are increasingly becoming a permanent part of the urban Singapore experience. Urbanization takes away much of our greenery, and the use of green roofs is a great way to replace this lost footprint.

Many of us have seen or walked across a green roof garden before, but most of us are probably not aware of the complexity, types or the benefits which green roofs provide.

Green roofs are divided broadly into 2 categories:

- Intensive green roofs are elaborate as they cater for human uses, e.g. recreational and leisure. These areas have deeper growing substrates, a large variety of plant species and are designed to take heavier loads.
- Extensive green roofs on the other hand are lightweight and not designed for human access. The substrate for plant growth is thinner and the selected plants used require minimal maintenance.

Green roofs provide a range of benefits ranging from environmental to economic. Besides helping to green the urban areas and improve aesthetics, they help reduce urban heat island effect and assist in storm water management. By reducing urban heat island effect, buildings and their surroundings are kept cool, reducing the energy required to cool the surrounding environment. Green roofs help to soak up the sudden deluge of rainwater. It helps mitigate the occurrence of flash floods and reduces the speed of run-off water into the storm water drainage system. These features of green roofs are relevant in tropical Singapore, where high temperatures and heavy rainfall are typical throughout the year.

Fig 1.1 50 Scotts Road Roof Garden

Fig 1.2 Starhub Green Roof Garden at Ubi Avenue 1

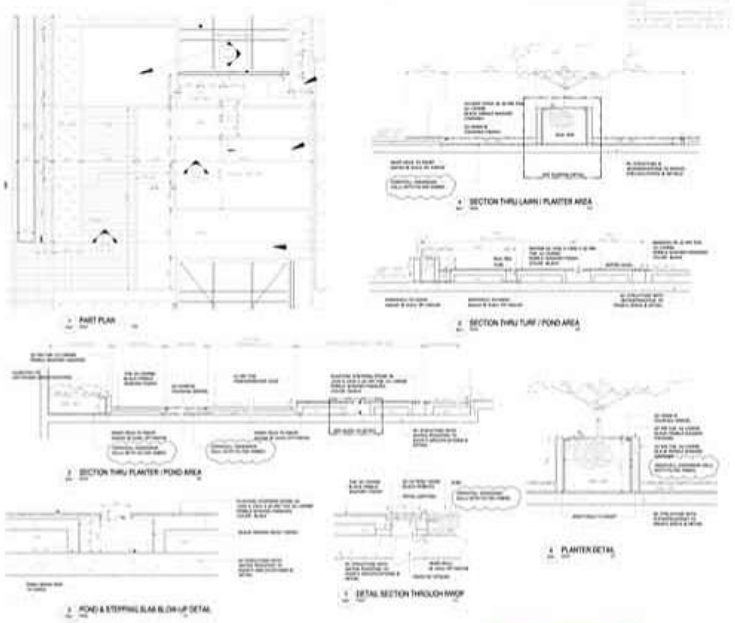


Fig 1.3 Planter details for a green roof

The Roof Garden is an outcome of the green roof effort, and offers an effective way of greening our very harsh urban structures. At Earthscape, we have met the challenges of roof gardens head-on.

In order for roof gardens to be well integrated into buildings, the design of these high rise gardens have to be done early, working at the outset with the owner and architect. Considerations have to start with the location of the roof garden in relation to the building structure; issues of orientation to the sun, size and surrounding structures, and reflected heat which can be harsh to the plants and affects the plant choice. The civil engineering aspects of weight of the planting beds, drainage system, the watering needs of the plants are but a few of the points that must be detailed early. In roof gardens located on 10 storey structures and above, wind loads are added concerns. Root balls must be properly anchored and the correct choice of plants become crucial. With the wrong plant choice, plant death and replacement will be unwelcomed and costly. Maintenance issues of pest and perceived nuisance such as millipedes, garden shrews, ants and such creatures have to be addressed early and be included in the maintenance programme.

At Earthscape, we understand the requirements of roof gardens, and by working with the various consultants at an early stage, you will be assured of a roof garden that is effective and sustainable.

Reference: A selection of plants for green roofs in Singapore by Tan Puay Yok and Angelia Sia (2nd ed, 2011)

Fig 1.4 Standard Chartered Bank Roof Garden at Changi Business Park

Cocos nucifera, the coconut tree

The coconut is a tropical seacoast South Asian Palm Tree. They grow wild, need minimal care and are strong at resisting typhoons. It has trunks of 300-600mm in diameter, no branches and has a crown of leaves 3-6m long, 20-30m from the ground.

The coconut palm bears fruits (coconuts) from the 6th year and several clusters can hang from the leaf bases of one tree. Each palm can produce 40-200 coconuts a year. When they ripen and are ready for dispersal, they often fall into the sea and may drift for months before being washed onto shore again. A new tree will then sprout in 4-5 months.

(Reference: http://len7288.hubpages.com/hub/uses-of-coconut-trees)

http://www.emustore.com/

Uses of Coconut Trees

- Leaves: thatch,roofs,hats, baskets
- Young Leaf shoots: salads
- Rips of Leaves: spears, arrows, brooms
- Sweet sap (Toddy): alchoholic drinks, vinegar
- Trunk: canoes, posts, rafters, fences
- Milk: oils for ailments, hair and massage
- Meat: baking, cooking, cosmetics, lubricants
- Juice: alkaline drinks which are especialy good for people with kidney problems
- Fibre: mats, brushes, packaging materials
- Shells: fuels, décor ornaments

http://www.bijlmaker.com/fruits/coconut.htm

http://inhabitat.com/wp-content/blogs.dir/1/files/2010/11/Pacific-Green-Funiture-13.jpg

http://www.weddingguideasia.com/2011/08/selamat-hari-raya-aidilfitri/ketupat-3933543064_d18d9b023e/

Cooking with Coconut Milk

Sayur Lodeh- curried vegetables is a traditional Malay dish consisting of cabbage, long beans and tofu cubes. The vegetables used in the curry take well to long periods of cooking and soak up the aromatic gravy. Ladle a generous portion of the tasty gravy over steamed white rice and you'll be going for second helpings!

Serves 4-6

Ingredients:
1 small cabbage, cut into wedges
2 carrots, peeled and cut into chunks
2 pieces firm tofu cubes
150g long beans, cut into sections

750ml coconut milk (soak 500g freshly grated coconut in 750ml water, sqeeze out the coconut milk through a sieve)

Spice mixture to be blended:
4-6 red chillies
50g toasted shrimp paste (belacan)
4 red shallots, peeled
4 cloves garlic, peeled
100g dried shrimps, soaked
3 slices ginger
1 tablespoon vegetable curry powder

Oil for frying

Method:

1. Blend the spice mixture ingredients to a rough puree. A little texture is good as it gives the gravy some character.

2. Fry the spice mixture in enough oil to help it render. When the spice mixture smells good, turns a darker colour and the oil rises again, it is done. It takes some time to "tumis" the paste, but the slow stirring will make the gravy smell and taste fabulous.

3. Blend the coconut milk with the spice paste.

4. When the mixture comes to a boil, add in all your prepared vegetables, and the tofu cubes.

5. Simmer until vegetables are cooked and tender. Serve hot.

Reference: (http://food.insing.com/recipe/Sayur-lodeh-recipe/id-872a1c00?nav=20500)

Director's Note

Looking Back

In recent efforts to upgrade myself with new skills to meet the challenges of the landscape industry, I am reminded of the time when Singapore had within its ranks professionals, academics and garden directors who were walking dictionaries and renowned experts, with intimate knowledge of their plants and trade. As a horticulturist and a practicing landscaper, I appreciate the works of Dr Holttum, Director of the Botanic Gardens and his Book on Plants, and Amy and John Ede of Mandai Gardens fame, who established a garden of international acclaim, Dr Anne Johnson an authority on ferns, or other Botanists such as Dr Hsuan Keng, Dr Avadhani, Dr Rao and Dr Gloria Lim. The natural tropical environment was their playground.

Nothing beats hands-on field experience.Lily mixing soil with a mini excavator, 1985.

This immense diversity of flora species which prevails to this day offers a huge resource of plant types to create sustainable gardens and serve as laboratories for research; for instance, the Singapore Botanic Gardens has an original forest (that predates the founding of modern Singapore) in its midst, albeit, now somewhat retarded no doubt from human intrusion and urban pollution. I feel as always, we can do a much better job of preserving our natural heritage, or whatever little remnants we have of it. It is after all precious gems which link us to nature and our past, and is our country's soul. It is far more beneficial than any of the air-conditioned malls we have in Singapore.

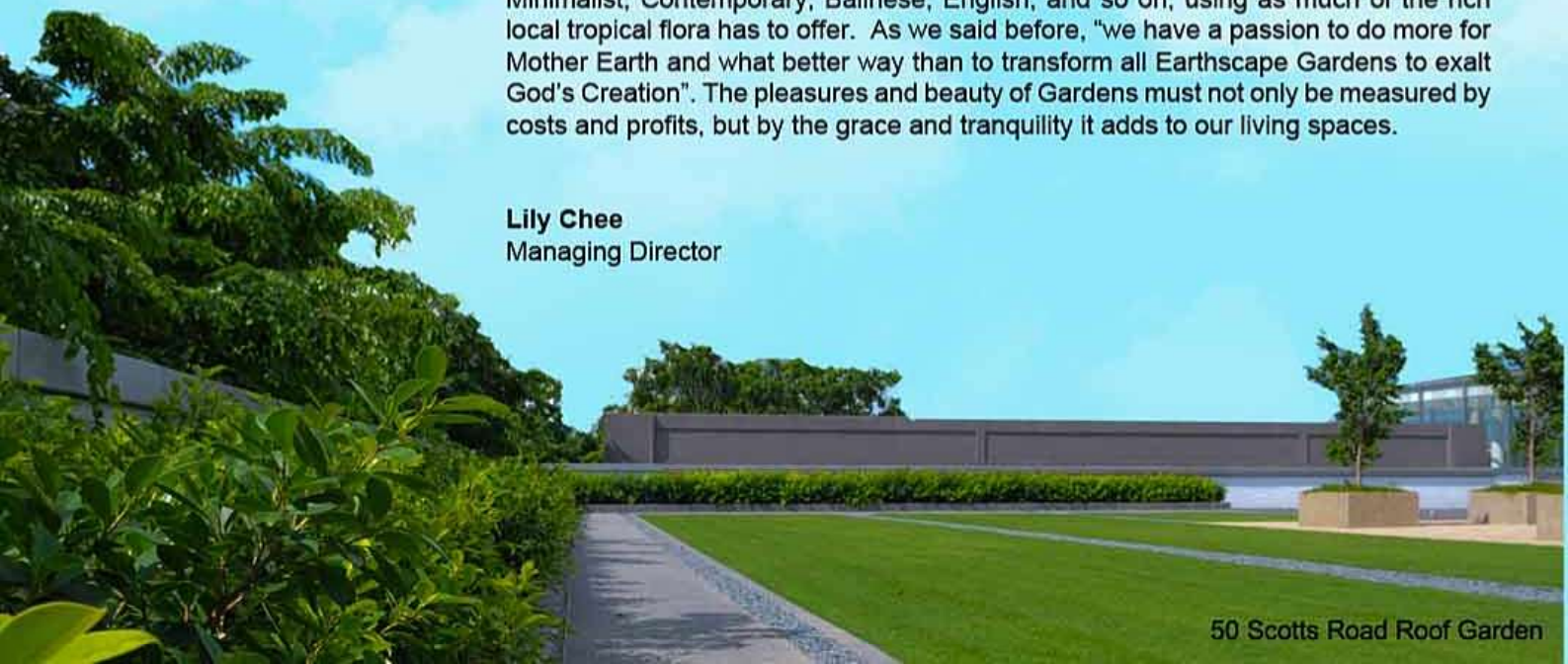
We have created an impressive "Gardens by the Bay" which will no doubt earn international acclaim, but I wonder at what cost? Could we have done better at remaining true to the theme a City in a Garden? Could we have integrated our natural heritage into the "Gardens by the Bay" better with less the reliance on imported flora?

I miss the time when we had Singapore's professional botanists, and gardeners teach us while maintaining their research interest in the plants.

These days, we are left to rely on foreign experts whose special skills are gained from the work they do in a different climate, to help us understand our rich tropical environment better. What happened? How did we reach this sad state? The need to drive economic growth may have diminished the way we treat nature and its flora. We need champions to regain this important aspect of our natural heritage. We have more plant species in Singapore than all of England, and it is certainly worthwhile to protect and retain this precious heritage.

But what I do know is that at Earthscape Concepts, we must remain true to our cause, that is, to use tropical and practical solutions to create garden spaces to treasure always. We use our skills to create sustainable gardens of varied themes, be they be Minimalist, Contemporary, Balinese, English, and so on, using as much of the rich local tropical flora has to offer. As we said before, "we have a passion to do more for Mother Earth and what better way than to transform all Earthscape Gardens to exalt God's Creation". The pleasures and beauty of Gardens must not only be measured by costs and profits, but by the grace and tranquility it adds to our living spaces.

Lily Chee
Managing Director



50 Scotts Road Roof Garden