ANNEXURE - 2

Email : registrar@uasbangalore.edu.in

Ph. & Fax : + 91 080 - 23330984
Extn.: 080-23330153(205), Mobile: 9449866901

UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE
Registrar's Office, GKVK, Bengaluru - 560065

No: UASB/Expert Com/BMRCL/2020-21 Date: 08-07-2020

Sub: Constitution of Expert Committee to expedite and submit detailed report on considering the alignment of the project of underground Metro Rail being implemented by BMRCL upon Order of the Hon'ble High Court of Karnataka vide W.P. 17841/2018(PIL) -reg.

Ref: 1) Order of the Hon'ble High Court of Karnataka dated 02-07-2020.
2) Letter of the Bangalore Metro Rail Corporation Ltd dated 07-07-2020.
3) Letter of the Chief Conservator of Forests Bengaluru(Territorial), Bengaluru dated 08-07-2020.
3) Recommendations of the Director of Research, UAS, Bangalore dated 08-07-2020.
4) Approval of the Vice-Chancellor, UAS, Bangalore dated 08-07-2020.

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PREAMBLE :

The Hon'ble High Court of Karnataka vide Order dated 02-07-2020 in Writ Petition-17841/2018(PIL) has directed to appoint the Dept. of Forestry, GKVK, UAS, Bangalore as an Expert agency to look in to the aspects as detailed in its Order cited at ref.(1) above and to form a Committee of its own and to submit detailed report to the Court considering the alignment of the project of underground Metro Rail being implemented by the BMRCL and hence, the notification,

NOTIFICATION

Under the circumstance explained in the preamble, the University of Agricultural Sciences, Bangalore has constituted the following Expert Committee to expedite and submit detailed report considering the alignment of the project of underground Metro Rail being implemented by the BMRCL:-

1.	**Dr C. Nagarajaiah** Professor & Head, Dept. of Forestry & Environmental Science, CoA, GKVK, UAS, Bangalore	Chairman
2.	**Dr K.T. Prasanna** Professor & Univ. Head, Dept. of Forestry & Environmental Science, CoA, GKVK, UAS, Bangalore	Member
3.	**Dr A.S. Devakumar** Professor, Dept. of Forestry & Environmental Science, CoA, GKVK, UAS, Bangalore	Member
4.	**Dr M. Mahadeva Murhty** Professor, Dept. of Forestry & Environmental Science, CoA, GKVK, UAS, Bangalore	Member
5.	**Dr Nataraja Karaba** Professor, Dept. of Crop Physiology, CoA, GKVK, UAS, Bangalore	Member
6.	**Dr R. Krishnamurthy** Associate Professor, Dept. of Forestry & Environmental Science, CoA, GKVK, UAS, Bangalore	Member-Convener

The Expert Committee is to submit the detailed report to Hon'ble High Court through Govt. of Karnataka, before the next date of hearing which is fixed on 27-07-2020.

By Order

REGISTRAR

REGISTRAR
UNIVERSITY OF AGRICULTURAL SCIENCES
GKVK, CAMPUS BENGALURU - 560 065

Copy to :

1. The Chairman and all Members of the Expert Committee, UAS, Bangalore. *(by Muddam)*

P.T.O. 13

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CWC submitted to :

1. The Additional Chief Secretary to Government, Dept. of Forest, Environment & Ecology, Govt. of Karnataka, Gate No.2, 4th Floor, M.S. Building, Bengaluru-560001.
2. The Additional Chief Secretary to Government, Dept. of Agriculture, M.S. Building, Bangalore–for kind information.
3. The Managing Director, Bangalore Metro Rail Corporation Ltd, BMTC Complex, 3rd Floor, KH Road, Shanthinagar, Bangalore -560027.
4. The Executive Director(Civil-1), Bangalore Metro Rail Corporation Ltd, BMTC Complex, 3rd Floor, KH Road, Shanthinagar, Bangalore -560027.
5. The Chairman, Tree Authority of Bangalore Urban district and the Chief Conservator of Forests, Bengaluru (Territorial), Bengaluru – for kind information.
6. The Tree Officer and DCF, BBMP, Bengaluru – for kind information.
7. The Director of Research, UAS, GKVK campus, Bangalore -560065.
8. The Secretary to Vice-Chancellor, UAS, GKVK, Bangalore for kind information.

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ANNEXURE - 3

Guidelines for tree transplanting

Transplanting is the term used to describe the digging and replanting of trees from one location to a new location. Due to the wide extent and morphology of tree root system, transplanting of trees usually involves substantial removal of roots. The whole transplanting process in particular for large trees is an engineering feat and requires substantial involvement of resources and time.

A decision to transplant a tree should be based on a balancing consideration of its conditions, size, species, conservation status, amenity value, suitability for transplanting, environmental and cultural factors, functional and engineering considerations and cost effectiveness.

Species:

Trees having particular significance and high conservation value would be recommendable for transplanting in case they cannot be preserved on site. Identified trees should be healthy and structurally sound, and invasive exotic tree species should not be considered for transplanting.

Age, height and girth:

Conditions of the trees to be transplanted including health, form and structure will affect the success of the proposed transplanting.

The lifespan and health of the trees after transplanting have to be considered before transplanting to assess the cost effectiveness of the operation.

Trees with poor form/architecture, health or structure should not be considered for transplanting. If the tree has poor health, the rates of survival and recovery will be low. Trees suffer substantial stress and shock during construction and transplanting. A transplanted tree should be able to re-establish sufficient roots to sustain itself.

Root system:

Larger trees need bigger root ball to encompass more roots to ensure adequate re-growth, as well as anchorage and stability. Transplanting may not be recommendable for situation where a reasonable root ball size cannot be achieved. International practices generally recommend a range of 8:1 to 10:1 for root ball diameter: trunk diameter. A larger root ball is recommendable for more mature trees to enhance better recovery after transplanting.

Root pruning is sometimes required before transplanting a tree. Sufficient time should be allowed between preparation and final lifting for development of new roots capable of sustaining and continuing the growth of the transplanted tree.

Soil type:

Trees growing on slopes, retaining walls or areas where formation of a root ball of reasonable size is not practicable are considered not transplantable. Trees should not be transplanted to non-fertile soils like lateritic soil.

Distance to travel:

Access to existing and receptor locations, manoeuvering spaces and transportation to the receptor site (including availability of access to accommodate the tree, topography of proposed route, engineering limitation, etc.) and other site constraints should be considered.

Large transplanting machine may be needed. Accessibility of the site should be considered including the movement and set up of the transplanting equipment and the manoeuvrability of the operation machinery and vehicles.

Season of transplant:

Summer is not a common transplanting season as evapo-transpiration rate is high and the transplanted trees will be under stress when transplanting work is taken place during that time.

Pre and Post care:

a) **Pit size:** The height, breadth and depth of pits depends on tree girth size

Table.1: Pit size based on tree girth size

S.No	Pit size (m^3)	Girth class (m)	Size of the tree
1	2.0 X 2.0 X 2.0	0.1 to 0.5	Small
2.	2.5 X 2.5 X 2.5	0.5 to 1.0	Medium
3.	3.0 X 3.0 X 3.0	1.0 to 1.5	Large

b) **Digging:**

- **Stage 1:** Dig a trench on the outside of the marked circumference in only two opposing segments.
- **Stage 2:** After a period of not less than 1 month since the firstroot pruning, dig a trench on the outside of the marked circumference in the adjacent two opposing segments.
- **Stage 3:** After another period of not less than one month since the secondroot pruning, dig a trench on the outside of the marked circumference, in the remaining two opposing segments.
- **Stage 4:** After a further period of not less than 1 month since the third root pruning, prepare the root ball and cut the underside of the root ball, followed by uplifting and transplanting.

c) **Root trimming:** Cuts must be clean to avoid tearing or breaking the roots. All cut roots shall be trimmed cleanly back to the healthy tissues to reduce the split and torn roots. Sharp cut ends can promote a flush of new fibrous roots, helping the trees recover faster from injuries.

d) **Crown pruning and cleaning:** Pruning of tree crown during transplanting may not be necessarily beneficial to the trees as thinning the crown can reduce the tree's capability in making food and building up reserves. Excessive pruning can ruin the natural form of a tree and reduce photosynthesis.

Crown cleaning however can be carried out to remove unhealthy, damaged,

diseased, dead and crossed branches so as to minimise susceptibility to pests and diseases.

e) **Pre root treatment:** Tree roots should be treated with antitermite, antibacterial, antifungal and root hormones.

Table 2:Active ingredients of root treatment chemicals

S.No	Name	Chemical Name	Active ingredient	Quantity/tree (L)
1	Anti-termite	Chloropyriphos 20% EC	4 mL/3 L water	8
2	Anti - bacterial	Bactinash 200	17 g/3 L water	2
3	Anti - fungal	Corbondazim (Bavistin)	2 g/3 L water	15
4	Root hormone	IBA	2000 ppm	20

f) **Preparation of pit at receptor site:** Tree lifting operations shall be carefully timed so as to enable direct delivery to the receptor site. No transplanting operations should commence until either the receptor site or the holding nursery is fully prepared. Tree uplifted must be transplanted and watered the same day. Watering before lifting is recommended.

Before uplifting, the outer edge of the previously dug trenches at receptor site shall be loosened from the surrounding soil and add 15 -25 kg of vermicompost or well decomposed matured farmyard manure or any compost per pit and watered to maintain soil moisture for longer time and easy establishment of roots.

g) **Damp hessian (Gunny bag):** is placed on the sides and across the tip of the ball and pinned. The hessian should cover the full circumference of the root ball with bottom skirt hanging out. This skirt is pinned to the root ball later after the tree is taken out of the hole. The base of the root ball should also be properly wrapped. This hessian shall be kept moist throughout the time of uplifting until the uplifted tree is transplanted in its new location.

h) **Lifting and handling of trees:** Lifting should be done by direct lift, with padded protection for the tree, using a machine of appropriate capacity connected to the support around the root ball, not to any other part of the tree. Tree should not be lifted by the trunk as this can cause serious trunk injury but by its root ball which should be properly prepared and wrapped.

i) **Planting:** Tree should preferably be placed in the same orientation from which they originated. Any branches damaged in transit should be properly pruned back to the nearest branch bark ridge.

j) **After care/ post planting care:** Immediately following planting and where appropriate, a soil saucer can be formed on the soil surface around the edge of the root

ball circumference to permit rain or irrigation water to be retained and slowly infiltrate into the root ball perimeter to conserve soil moisture.

Mulch can be used to conserve soil moisture, to buffer soil temperature extremes, to control weeds and other competing vegetation, and to replenish organic matters and nutrients in the soil.

k) **Nutrient management:** Fertilisation may be unnecessary unless nutrient deficiency is confirmed. Moderate release of nutrients by decomposition of both mulch and organic matter added to backfill soil may be sufficient during the initial establishment period

Source: Greening, Landscape and Tree Management Section Development Bureau The Government of the Hong Kong Special Administrative Region, 2014)