Annex H

Biological survey

List of flora observed in the LRT trace from Malabe to Fort

Abbreviations Used:

E- Endemic, **N** - Native, **I** - Introduced, alien or Exotic, **IAS** - Alien invasive species, N**CS** - National Conservation Status, **EN**- Endangered, **VU**- Vulnerable, **NE** - Not Evaluated, **NT** - Near Threatened, **DD** - Data Deficient, **LC** - Least Concern

Family	Scientific Name	Common name	NCS	Origin
Acanthaceae	*Asystasia gangetica*	Puruk	LC	N
Acanthaceae	*Dipteracanthus prostratus*	Nil Puruk	LC	N
Acanthaceae	*Hygrophila auriculata*	Katu Ikiriya	LC	N
Amaranthaceae	*Achyranthes aspera*	Gas Karaal Heba	LC	N
Amaranthaceae	*Aerva lanata*	Pol pala	LC	N
Amaranthaceae	*Alternanthera sessilis*	Mukunuwenna	LC	N
Amaranthaceae	*Amaranthus viridis*	Kura Thampala	LC	N
Amaranthaceae	*Celosia argentea*	Kiri Henda	LC	N
Amaranthaceae	*Gomphrena celosioides*		NE	I
Anacardiaceae	*Lannea coromandelica*	Hik	LC	N
Anacardiaceae	*Mangifera indica*	Amba	NE	I
Anacardiaceae	*Spondias dulcis*	Amberella	NE	I
Annonaceae	*Annona glabra*	Wel Atha	NE	IAS
Annonaceae	*Annona muricata*	Katu Atha	NE	I
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N
Apocynaceae	*Alstonia macrophylla*	Havari Nuga	NE	IAS
Apocynaceae	*Alstonia scholaris*	Ruk-Attana	LC	N
Apocynaceae	*Cerbera odollam*	Gon Kaduru	LC	N
Apocynaceae	*Plumeria obusta*	Araliya	NE	I
Apocynaceae	*Tabernaemontana dichotoma*	Divi Kaduru	LC	N
Araceae	*Colocasia esculenta*	Gahala	LC	N
Araceae	***Lagenandra praetermissa***	Ketala	LC	E
Araceae	*Lasia spinosa*	Kohila	LC	N
Araceae	*Pistia stratiotes*	Diya Paradel	LC	N
Araceae	*Pothos scandens*	Pota Wel	LC	N
Arecaceae	*Areca catechu*	Puwak	NE	I
Arecaceae	*Areca triandra*		NE	I
Arecaceae	*Caryota urens*	Kithul	LC	N
Arecaceae	*Cocos nucifera*	Pol	NE	I
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I
Boraginaceae	*Heliotropium indicum*	Eth Honda	LC	N
Calophyllaceae	*Mesua ferrea*	Na	LC	N
Cannabaceae	*Trema orientalis*	Gedumba	LC	N
Casuarinaceae	*Casuarina equisetifolia*	Kasa	NE	I

Family	Scientific Name	Common name	NCS	Origin
Cleomaceae	*Cleome rutidosperma*		NE	I
Cleomaceae	*Cleome viscosa*	Wal Aba	LC	N
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N
Combretaceae	*Terminalia bellirica*	Bulu	LC	N
Combretaceae	*Terminalia catappa*	Kottamba	NE	I
Commelinaceae	*Commelina benghalensis*	Diya meneriya	LC	N
Commelinaceae	*Commelina diffusa*	Gira Pala	LC	N
Compositae	*Ageratum conyzoides*	Hulanthala	NE	I
Compositae	*Chromolaena odorata*	Podi Sinnamaran	NE	I
Compositae	*Cyanthillium cinereum*	Kumburuwenna	LC	N
Compositae	*Eclipta prostrata*	Kikirindi	LC	N
Compositae	*Emilia sonchifolia*	Kadu Pahara	LC	N
Compositae	*Mikania cordata*	Gam Palu	NE	I
Compositae	*Sphagneticola trilobata*	Udaya Kumari	NE	IAS
Compositae	*Struchium sparganophorum*		NE	I
Compositae	*Synedrella nodiflora*		NE	I
Compositae	*Tridax procumbens*	Wasu Sudu	NE	I
Compositae	*Xanthium strumarium*	Wal Rambutan	LC	N
Convolvulaceae	*Cuscuta campestris*		DD	N
Convolvulaceae	*Evolvulus nummularius*	Sudu Vishnukranthi	NE	I
Convolvulaceae	*Ipomoea aquatica*	Kankun	LC	N
Convolvulaceae	*Ipomoea cairica*		NE	I
Convolvulaceae	*Merremia tridentata*	Hawari Madu	LC	N
Cucurbitaceae	*Coccinia grandis*	Kowakka	LC	N
Cyperaceae	*Actinoscirpus grossus*		LC	N
Cyperaceae	*Cyperus iria*	Wel Hiri	LC	N
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	IAS
Dipterocarpaceae	***Dipterocarpus zeylanicus***	Hora	NT	E
Ebenaceae	*Diospyros ebenum*	Kaluwara	EN	N
Elaeocarpaceae	*Elaeocarpus serratus*	Weralu	LC	N
Euphorbiaceae	*Acalypha indica*	Kuppameniya	LC	N
Euphorbiaceae	*Croton aromaticus*	Wel Keppetiya	LC	N
Euphorbiaceae	*Croton hirtus*	Wal Thippili	NE	I
Euphorbiaceae	*Euphorbia heterophylla*	Kepumkiriya	NE	I
Euphorbiaceae	*Euphorbia hirta*	Kiri Thala	LC	N
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N
Euphorbiaceae	*Microstachys chamaelea*	Rath Pitawakka	LC	N
Euphorbiaceae	*Ricinus communis*	Endaru	NE	I
Lamiaceae	*Clerodendrum indicum*	Wal Kirithekku	NE	I
Lamiaceae	*Hyptis capitata*		NE	I

Family	Scientific Name	Common name	NCS	Origin
Lamiaceae	*Hyptis suaveolens*	Ali Thala	NE	I
Lamiaceae	*Leucas zeylanica*	Geta Thumba	LC	N
Lamiaceae	*Tectona grandis*	Thekka	NE	I
Lamiaceae	*Vitex negundo*	Nika	LC	N
Lauraceae	*Litsea glutinosa*	Bomi	LC	N
Lauraceae	*Persea americana*	Ali-pera	NE	I
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N
Lecythidaceae	*Barringtonia asiatica*	Diya midella	LC	N
Lecythidaceae	*Couroupita surinamensis*	Sal	NE	I
Leguminosae	*Acacia auriculiformis*		NE	I
Leguminosae	*Adenanthera pavonina*	Madatiya	LC	N
Leguminosae	*Aeschynomene americana*		NE	I
Leguminosae	*Albizia saman*	Pini Mara	NE	I
Leguminosae	*Alysicarpus vaginalis*	Aswenna	LC	N
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I
Leguminosae	*Cassia fistula*	Ehela	NE	I
Leguminosae	*Centrosema pubescens*		NE	I
Leguminosae	*Delonix regia*	Mei- Mara	NE	I
Leguminosae	*Desmodium triflorum*	Heen Undupiyaliya	LC	N
Leguminosae	*Erythrina sp*			N
Leguminosae	*Gliricidia sepium*	Wetamara	NE	I
Leguminosae	*Leucaena leucocephala*	Ipil Ipil	NE	IAS
Leguminosae	*Mimosa diplotricha*	Wel Nidikumba	NE	I
Leguminosae	*Mimosa pigra*	Yoda Nidikumba	NE	IAS
Leguminosae	*Mimosa pudica*	Nidikumba	NE	I
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I
Leguminosae	*Pericopsis mooniana*	Nadun	VU	N
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I
Leguminosae	*Pongamia pinnata*	Magul-Karanda	LC	N
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I
Leguminosae	*Pueraria phaseoloides*		NE	I
Leguminosae	*Senna alata*	Bu Thora	NE	I
Leguminosae	*Senna occidentalis*	Peni Thora	LC	N
Leguminosae	*Senna tora*	Pethi Thora	LC	N
Leguminosae	*Sesbania grandiflora*	Kathuru Murunga	NE	I
Leguminosae	*Tamarindus indica*	Siyambala	NE	I
Linderniaceae	*Lindernia anagallis*	Hadapath Wila	LC	N
Linderniaceae	*Lindernia ciliata*		NT	N
Linderniaceae	*Lindernia crustacea*		LC	N
Linderniaceae	*Lindernia rotundifolia*		LC	N

Family	Scientific Name	Common name	NCS	Origin
Loranthaceae	*Dendrophthoe falcata*	Pilila	LC	N
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N
Meliaceae	*Azadirachta indica*	Kohomba	NE	I
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I
Malvaceae	*Abutilon indicum*	Anodha	LC	N
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N
Malvaceae	*Ceiba pentandra*	Kotta Pulun	LC	N
Malvaceae	*Grewia nervosa*	Kohu Kirilla	LC	N
Malvaceae	*Hibiscus tilliaceus*	Beli Patta	LC	N
Malvaceae	*Melochia corchorifolia*	Gas Kura	LC	N
Malvaceae	*Microcos paniculata*	Kohu Kirilla	LC	N
Malvaceae	*Sida rhombifolia*	Heen Bebila	LC	N
Malvaceae	*Sterculia foetida*	Telabu	LC	N
Malvaceae	*Triumfetta pentandra*	Epala	LC	N
Malvaceae	*Urena lobata*	Patta Epala	LC	N
Malvaceae	*Urena sinuata*	Heen Epala	LC	N
Moraceae	*Artocarpus incisus*	Rata-Del	NE	I
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I
Moraceae	*Ficus callosa*	Gonna	LC	N
Moraceae	*Ficus elastica*		NE	I
Moraceae	*Ficus exasperata*	Bu Deliya	LC	N
Moraceae	*Ficus hispida*	Kota Dimbula	LC	N
Moraceae	*Ficus racemosa*	Attikka	LC	N
Moraceae	*Ficus religiosa*	Bo	NE	I
Moringaceae	*Moringa oleifera*	Murunga	NE	I
Muntingiaceae	*Muntingia calabura*	Jam	NE	I
Musaceae	*Musa x paradisiaca*	Kesel	NE	I
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I
Myrtaceae	*Psidium guajava*	Pera	NE	I
Myrtaceae	*Syzygium aromaticum*	Karambu	NE	I
Myrtaceae	*Syzygium caryophyllatum*	Dan	LC	N
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N
Nymphaeaceae	*Nymphaea rubra*		NE	N
Onagraceae	*Ludwigia decurrens*		NE	I
Onagraceae	*Ludwigia hyssopifolia*		LC	N
Onagraceae	*Ludwigia peruviana*	Wel karabu	NE	I
Oxalidaceae	*Oxalis barrelieri*		NE	I
Pandanaceae	*Pandanus kaida*	Wetakeyya	LC	N

Family	Scientific Name	Common name	NCS	Origin
Passifloraceae	*Passiflora foetida*	Pada Gedi	NE	I
Phyllanthaceae	*Antidesma ghaesembilla*	Bu Embilla	LC	N
Phyllanthaceae	*Aporosa cardiosperma*	Mapath Kebella	LC	N
Phyllanthaceae	*Breynia retusa*	Wal Murunga	LC	N
Phyllanthaceae	*Bridelia retusa*	Keta kela	LC	N
Phyllanthaceae	*Flueggea leucopyrus*	Katu Pila	LC	N
Phyllanthaceae	*Glochidion zeylanicum*	Hunukirilla	LC	N
Phyllanthaceae	*Phyllanthus acidus*	Rata nelli	NE	I
Phyllanthaceae	*Phyllanthus amarus*	Pitawakka	LC	N
Phyllanthaceae	*Phyllanthus reticulatus*	Wel kaila	LC	N
Pinaceae	*Pinus sp.*		NE	I
Plantaginaceae	*Bacopa monnieri*	Lunuwila	LC	N
Plantaginaceae	*Scoparia dulcis*	Wal Koththamalli	NE	I
Plantaginaceae	*Stemodia verticillata*		NE	I
Poaceae	*Axonopus compressus*	Pothu Thana	NE	I
Poaceae	*Bambusa vulgaris*	Kaha Una	NE	I
Poaceae	*Chrysopogon aciculatus*	Thuththiri	LC	N
Poaceae	*Eleusine indica*	Bela Thana	LC	N
Poaceae	*Panicum maximum*	Gini Thana	NE	IAS
Poaceae	*Setaria barbata*		NE	I
Polygonaceae	*Persicaria barbata*	Rathu Kimbulwenna	LC	N
Pontederiaceae	*Eichhornia crassipes*	Japan Jabara	NE	IAS
Pontederiaceae	*Monochoria vaginalis*	Diya Habarala	LC	N
Rhizophoraceae	*Carallia brachiata*	Dawata	NT	N
Rubiaceae	*Mitracarpus hirtus*		NE	I
Rubiaceae	*Morinda citrifolia*	Ahu	LC	N
Rubiaceae	*Nauclea orientalis*	Bak Me	LC	N
Rubiaceae	***Oldenlandia auricularia***	Geta Kola	VU	E
Rubiaceae	*Oldenlandia corymbosa*	Wal Pathpadagam	LC	N
Rubiaceae	*Richardia brasiliensis*		NE	I
Rubiaceae	*Spermacoce alata*		NE	I
Rubiaceae	*Spermacoce exilis*		NE	I
Rubiaceae	*Spermacoce ocymifolia*		NE	I
Rubiaceae	*Spermacoce remota*		NE	I
Rubiaceae	*Spermacoce verticillata*		NE	I
Rutaceae	*Aegle marmelos*	Beli	NE	I
Rutaceae	*Glycosmis pentaphylla*	Dodam Pana	LC	N
Rutaceae	*Limonia acidissima*	Divul	LC	N
Sapindaceae	*Cardiospermum halicacabum*	Penela	LC	N
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N

Family	Scientific Name	Common name	NCS	Origin
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I
Sapindaceae	*Pometia pinnata*	Bulumora	LC	N
Sapindaceae	*Schleichera oleosa*	Kon	LC	N
Sapotaceae	*Chrysophyllum cainito*	Kos-eta-lawalu	NE	I
Sapotaceae	*Madhuca longifolia*	Me	NT	N
Solanaceae	*Physalis angulata*		NE	I
Solanaceae	*Solanum americanum*	Kalu Kanheeriya	NE	I
Solanaceae	*Solanum torvum*	Thibbatu	LC	N
Typhaceae	*Typha angustifolia*	Hambu Pan	LC	N
Verbenaceae	*Lantana camara*	Gandapana	NE	IAS
Verbenaceae	*Stachytarpheta cayennensis*		NE	I
Verbenaceae	*Stachytarpheta urticifolia*		NE	I

Appendix . List of fauna observed in the LRT trace from Malabe to Slave Island

Abbreviations Used:

E- Endemic, **N** - Native, **I** - Introduced, alien or Exotic, **NCS** - National Conservation Status, **EN**- Endangered, **VU**- Vulnerable, **NE** - Not Evaluated, **NT** - Near Threatened, **DD** - Data Deficient, **LC** - Least Concern

Family	Scientific Name	Common English Name	NCS	Origin
BUTTERFLIES				
Pieridae	*Catopsilia scylla*	Orange Migrant	NE	I
Hesperiidae	*Cephrenes trichopepla*	Yellow Palm Dart	NE	I
Papilionidae	*Graphium agamemnon*	Tailed Jay	LC	N
Papilionidae	*Pachliopta aristolochiae*	Common Rose	LC	N
Papilionidae	*Pachliopta hector*	Crimson Rose	LC	N
Papilionidae	*Papilio clytia*	Mime	LC	N
Papilionidae	*Papilio demoleus*	Lime Butterfly	LC	N
Papilionidae	*Papilio polytes*	Common Mormon	LC	N
Pieridae	*Catopsilia pomona*	Lemon Emigrant	LC	N
Pieridae	*Catopsilia pyranthe*	Mottled Emigrant	LC	N
Pieridae	*Delias eucharis*	Jezebel	LC	N
Pieridae	*Eurema hecabe*	Common Grass Yellow	LC	N
Pieridae	*Leptosia nina*	Psyche	LC	N
Nymphalidae	*Acraea violae*	Tawny Coster	LC	N
Nymphalidae	*Danaus chrysippus*	Plain Tiger	LC	N
Nymphalidae	*Danaus genutia*	Common Tiger	LC	N
Nymphalidae	*Elymnias hypermnestra*	Common Palmfly	LC	N
Nymphalidae	*Euploea core*	Common Indian Crow	LC	N
Nymphalidae	*Euthalia aconthea*	Baron	LC	N
Nymphalidae	*Junonia almana*	Peacock Pansy	LC	N
Nymphalidae	*Junonia atlites*	Grey Pansy	LC	N
Nymphalidae	*Junonia iphita*	Chocolate Soldier	LC	N
Nymphalidae	*Melanitis leda*	Common Evening Brown	LC	N
Nymphalidae	*Mycalesis perseus*	Common Bushbrown	LC	N
Nymphalidae	*Neptis hylas*	Common Sailor	LC	N
Nymphalidae	*Orsotriaena medus*	Medus Brown	LC	N
Nymphalidae	*Parantica aglea*	Glassy Tiger	LC	N
Nymphalidae	*Phalanta phalantha*	Leopard	LC	N
Nymphalidae	*Tirumala limniace*	Blue Tiger	LC	N
Nymphalidae	*Ypthima ceylonica*	White Four-ring	LC	N
Lycaenidae	*Arhopala amantes*	Large Oakblue	LC	N
Lycaenidae	*Castalius rosimon*	Common Pierrot	LC	N
Lycaenidae	*Chilades lajus*	Lime Blue	LC	N
Lycaenidae	*Chilades pandava*	Plains Cupid	LC	N

Family	Scientific Name	Common English Name	NCS	Origin
Lycaenidae	*Everes lacturnus*	Indian Cupid	LC	N
Lycaenidae	*Jamides bochus*	Dark Cerulean	LC	N
Lycaenidae	*Jamides celeno*	Common Cerulean	LC	N
Lycaenidae	*Prosotas nora*	Common Lineblue	LC	N
Lycaenidae	*Rathinda amor*	Monkey-puzzle	LC	N
Lycaenidae	*Spalgis epeus*	Apefly	LC	N
Lycaenidae	*Tajuria cippus*	Peacock Royal	LC	N
Lycaenidae	*Zizina otis*	Lesser Grass Blue	LC	N
Lycaenidae	*Zizula hylax*	Tiny Grass Blue	LC	N
Hesperiidae	*Ampittia dioscorides*	Bush Hopper	LC	N
Hesperiidae	*Borbo cinnara*	Wallace's Swift	LC	N
Hesperiidae	*Iambrix salsala*	Chestnut Bob	LC	N
Hesperiidae	*Potanthus confuscius*	Tropic Dart	LC	N
Hesperiidae	*Suastus gremius*	Indian Palm Bob	LC	N
Hesperiidae	*Taractrocera maevius*	Common Grass Dart	LC	N
Hesperiidae	*Parnara bada*	Smallest Swift	NT	N
Nymphalidae	*Ideopsis similis*	Blue Glassy Tiger	VU	N
Hesperiidae	*Telicota bambusae*	Dark Palmdart	VU	N
DRAGONFLIES				
Coenagrionidae	*Ischnura senegalensis*	Common Bluetail, Marsh Bluetail	LC	N
Coenagrionidae	*Ceriagrion coromandelianum*	Yellow Waxtail	LC	N
Coenagrionidae	*Pseudagrion microcephalum*	Blue Sprite	LC	N
Platycnemididae	*Copera marginipes*	Yellow Featherleg	LC	N
Gomphidae	*Ictinogomphus rapax*	Rapacious Flangetail	LC	N
Libellulidae	*Orthetrum sabina*	Green Skimmer	LC	N
Libellulidae	*Acisoma panorpoides*	Asian Pintail	LC	N
Libellulidae	*Brachythemis contaminata*	Asian Groundling	LC	N
Libellulidae	*Crocothemis servilia*	Oriental Scarlet	LC	N
Libellulidae	*Diplacodes trivialis*	Blue Percher	LC	N
Libellulidae	*Neurothemis tullia*	Pied Parasol	LC	N
Libellulidae	*Rhyothemis variegata*	Variegate Flutterer	LC	N
Libellulidae	*Pantala flavescens*	Wandering Glider	LC	N
Libellulidae	*Urothemis signata*	Scarlet Basker	LC	N
Libellulidae	*Orthetrum luzonicum*	Marsh Skimmer	NT	N
Libellulidae	*Orthetrum pruinosum*	Pink Skimmer	NT	N
Libellulidae	*Neurothemis intermedia*	Paddyfield Parasol	NT	N
Libellulidae	*Rhodothemis rufa*	Spine-legged Redbolt	NT	N
Coenagrionidae	*Onychargia atrocyana*	Marsh Dancer	VU	N
FRESH WATER FISH				
Aplocheilidae	*Aplocheilus dayi*	Day's killifish	E	EN

Family	Scientific Name	Common English Name	NCS	Origin
Belontiidae	*Trichogaster pectoralis*	Snake skin gourami	I	NE
Cichlidae	*Oreochromis niloticus*	Tilapia	I	NE
Cichlidae	*Oreochromis mossambicus*	Tilapia	I	NE
Cyprinidae	*Dawkinsia singhala*	Filamented barb	E	LC
Cyprinidae	*Puntius bimaculatus*	Redside barb	N	LC
Cyprinidae	*Rasbora dandia*	Striped rasbora / Common rasbora	N	LC
Cyprinidae	*Rasbora microcephalus*	Thin line Rasbora	N	LC
AMPHIBIANS				
Bufonidae	*Duttaphrynus melanostictus*	Common house toad	N	LC
Dicroglossidae	*Euphlyctis hexadactylus*	Sixtoe green frog	N	LC
Dicroglossidae	*Fejervarya syhadrensis*	Common paddy field frog	N	LC
REPTILES				
Bataguridae	*Melanochelys trijuga*	Black turtle	LC	N
Agamidae	*Calotes calotes*	Green garden lizard	LC	N
Agamidae	*Calotes versicolor*	Common garden lizard	LC	N
Gekkonidae	*Gehyra mutilata*	Four-claw gecko	LC	N
Gekkonidae	*Hemidactylus frenatus*	Common house-gecko	LC	N
Gekkonidae	*Hemidactylus parvimaculatus*	Spotted housegecko	LC	N
Scincidae	*Eutropis macularia*	Bronzegreen little skink	LC	N
Varanidae	*Varanus bengalensis*	Land monitor	LC	N
Varanidae	*Varanus salvator*	Water monitor	LC	N
Natricidae	*Amphiesma stolatum*	Buff striped keelback	LC	N
Natricidae	*Xenochrophis piscator*	Checkered Keelback	LC	N
Colubridae	*Dendrelaphis schokari*	Schokari's bronze back	LC	E
Colubridae	*Ptyas mucosa*	Rat snake	LC	N
BIRDS				
Accipitridae	*Haliastur indus*	Brahminy Kite	LC	N
Alcedinidae	*Halcyon smyrnensis*	White-throated Kingfisher	LC	N
Alcedinidae	*Alcedo atthis*	Common Kingfisher	LC	N
Anatidae	*Dendrocygna javanica*	Lesser Whistling-duck	LC	N
Apodidae	*Cypsiurus balasiensis*	Asian Palm-swift	LC	N
Ardeidae	*Ardea cinerea*	Grey Heron	LC	N
Ardeidae	*Ardea purpurea*	Purple Heron	LC	N
Ardeidae	*Ardeola grayii*	Indian Pond-heron	LC	N
Ardeidae	*Bubulcus ibis*	Cattle Egret	LC	N
Ardeidae	*Casmerodius albus*	Great Egret	LC	N
Charadriidae	*Vanellus indicus*	Red-wattled Lapwing	LC	N
Cisticolidae	*Cisticola juncidis*	Zitting Cisticola	LC	N
Cisticolidae	*Prinia inornata*	Plain Prinia	LC	N
Columbidae	*Ducula aenea*	Green Imperial-Pigeon	LC	N

Family	Scientific Name	Common English Name	NCS	Origin
Columbidae	*Stigmatopelia chinensis*	Spotted Dove	LC	N
Corvidae	*Corvus splendens*	House Crow	LC	N
Cuculidae	*Centropus sinensis*	Greater Coucal	LC	N
Cuculidae	*Eudynamys scolopaceus*	Asian Koel	LC	N
Dicruidae	*Dicrurus caerulescens*	White-bellied Drongo	LC	N
Nectariniidae	*Nectarinia lotenia*	Long-billed Sunbird	LC	N
Nectariniidae	*Nectarinia zeylonica*	Purple-rumped Sunbird	LC	N
Oriolidae	*Oriolus xanthornus*	Black-hooded Oriole	LC	N
Phalacrocoracidae	*Phalacrocorax niger*	Little Cormorant	LC	N
Phalacrocoracidae	*Phalacrocorax fuscicollis*	Indian Cormorant	LC	N
Psittacidae	*Psittacula krameri*	Rose-ringed Parakeet	LC	N
Pycnonotidae	*Pycnonotus cafer*	Red-vented Bulbul	LC	N
Rallidae	*Amaurornis phoenicurus*	White-breasted Waterhen	LC	N
Rallidae	*Porphyrio porphyrio*	Purple Swamphen	LC	N
Ramphastidae	*Megalaima zeylanica*	Brown-headed Barbet	LC	N
Sturnidae	*Acridotheres tristis*	Common Myna	LC	N
Sylviidae	*Orthotomus sutorius*	Common Tailorbird	LC	N
Threskiornithidae	*Threskiornis melanocephalus*	Black-headed Ibis	LC	N
Timalidae	*Turdoides affinis*	Yellow-billed Babbler	LC	N
MAMMALS				
Cercopithecidae	*Semnopithecus vetulus*	Sri Lanka Purple-faced langur	EN	E
Felidae	*Prionailurus viverrinus*	Fishing cat	EN	N
Hystricidae	*Hystrix indica*	Porcupine	LC	N
Scuiridae	*Funambulus palmarum*	Palm squirrel	LC	N

Appendix xx. Potential list of trees that will be affected by the LRT trace

Abbreviations Used:
E- Endemic, **N** - Native, **I** - Introduced, alien or Exotic, **IAS** - Invasive Alien Species,N**CS** - National Conservation Status, **EN**- Endangered, **VU**- Vulnerable, **NE** - Not Evaluated, **NT** - Near Threatened, **DD** - Data Deficient, **LC** - Least Concern

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Section 1: From LRT Depot to Malabe						
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	135	12
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	153	18
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	115	15
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	117	15
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	148	18
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	165	18
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	95	11
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	240	18
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	142	12
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	184	18
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	203	16
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	90	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	99	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	172	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	132	8
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	84	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	185	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	95	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	130	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	61	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	130	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	72	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	58	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	122	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	46	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	60	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	98	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	141	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	142	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	180	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	48	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	220	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	80	14

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	70	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	66	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	152	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	147	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	135	14
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	87	12
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	86	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	130	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	72	15
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	79	14
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	80	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	103	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	86	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	125	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	81	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	95	60
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	65	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	108	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	76	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	91	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	40	6
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	115	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	79	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	94	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	78	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	40	5
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	57	5
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	59	5
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	132	8
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	78	8
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	67	6
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	110	12
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	110	11
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	71	5
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	78	10
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	38	10
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	122	8
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	99	10
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	90	8
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	73	9

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	80	12
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	95	9
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	70	11
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	41	5
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	57	8
Apocynaceae	*Alstonia macrophylla*	Havari Nuga	NE	I	32	8
Apocynaceae	*Alstonia macrophylla*	Havari Nuga	NE	I	70	15
Apocynaceae	*Alstonia macrophylla*	Havari Nuga	NE	I	52	13
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	90	15
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	50	5
Malvaceae	*Microcos paniculata*	Kohu Kirilla	LC	N	32	15
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	72	10
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	55	14
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	40	9
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	51	11
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	40	9
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	60	8
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	119	20
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	65	8
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	67	8
Anacardiaceae	*Lannea coromandelica*	Hik	LC	N	41	4
Anacardiaceae	*Lannea coromandelica*	Hik	LC	N	86	11
Rubiaceae	*Nauclea orientalis*	Bak Me	LC	N	65	5
Annonaceae	*Annona glabra*	Wel Atha	NE	I	32	6
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	103	15
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	50	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	82	10
Annonaceae	*Annona muricata*	Katu Atha	NE	I	56	4
Myrtaceae	*Psidium guajava*	Pera	NE	I	25	10
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	70	12
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	83	7
Leguminosae	*Gliricidia sepium*	Wetamara	NE	I	47	3
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I	28	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	54	8
Malvaceae	*Ceiba pentandra*	Kotta Pulun	LC	N	144	9
Cannabaceae	*Trema orientalis*	Gedumba	LC	N	155	4
Leguminosae	*Leucaena leucocephala*	Ipil Ipil	NE	I	70	10
Section 2: From Malabe to Koswatta						
Anacardiaceae	*Mangifera indica*	Amba	NE	I	30	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	130	9

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Anacardiaceae	*Mangifera indica*	Amba	NE	I	102	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	83	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	72	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	73	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	142	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	109	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	115	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	76	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	63	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	89	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	91	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	82	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	69	4
Anacardiaceae	*Mangifera indica*	Amba	NE	I	223	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	82	7
Anacardiaceae	*Mangifera indica*	Amba	NE	I	71	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	62	7
Anacardiaceae	*Mangifera indica*	Amba	NE	I	63	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	51	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	120	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	73	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	61	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	69	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	94	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	40	5
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	82	7
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	79	6
Moringaceae	*Moringa oleifera*	Murunga	NE	I	78	6
Leguminosae	*Sesbania grandiflora*	Kathuru Murunga	NE	I	30	6
Leguminosae	*Sesbania grandiflora*	Kathuru Murunga	NE	I	33	7
Arecaceae	*Cocos nucifera*	Pol	NE	I	91	11
Arecaceae	*Cocos nucifera*	Pol	NE	I	90	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	85	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	73	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	92	12
Arecaceae	*Cocos nucifera*	Pol	NE	I	80	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	74	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	81	9
Arecaceae	*Cocos nucifera*	Pol	NE	I	52	7
Arecaceae	*Cocos nucifera*	Pol	NE	I	60	5

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Arecaceae	*Cocos nucifera*	Pol	NE	I	71	6
Arecaceae	*Cocos nucifera*	Pol	NE	I	69	6
Arecaceae	*Cocos nucifera*	Pol	NE	I	83	7
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	110	11
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	86	8
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	71	7
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I	62	5
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I	90	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	92	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	49	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	62	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	69	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	82	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	52	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	50	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	61	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	84	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	32	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	41	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	52	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	41	3
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	84	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	71	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	108	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	83	7
Moraceae	*Ficus callosa*	Gonna	LC	N	40	6
Moraceae	*Ficus callosa*	Gonna	LC	N	80	11
Cannabaceae	*Trema orientalis*	Gedumba	LC	N	42	8
Ebenaceae	*Diospyros ebenum*	Kaluwara	EN	N	102	12
Calophyllaceae	*Mesua ferrea*	Na	LC	N	41	6
Calophyllaceae	*Mesua ferrea*	Na	LC	N	43	6
Calophyllaceae	*Mesua ferrea*	Na	LC	N	32	5
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	32	6
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	31	6
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	64	7
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	49	5
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	63	6
Sapotaceae	*Madhuca longifolia*	Me	NT	N	81	9

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Sapotaceae	*Madhuca longifolia*	Me	NT	N	52	13
Sapotaceae	*Madhuca longifolia*	Me	NT	N	64	8
Sapotaceae	*Madhuca longifolia*	Me	NT	N	71	10
Sapotaceae	*Madhuca longifolia*	Me	NT	N	93	8
Sapotaceae	*Madhuca longifolia*	Me	NT	N	107	10
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	131	11
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	62	7
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	51	7
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	63	8
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	49	7
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	42	5
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	51	5
Fabaceae	*Cassia fistula*	Ehela	NE	I	31	4
Fabaceae	*Cassia fistula*	Ehela	NE	I	38	3
Fabaceae	*Cassia fistula*	Ehela	NE	I	31	6
Fabaceae	*Cassia fistula*	Ehela	NE	I	29	5
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	55	4
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	62	5
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	45	4
Arecaceae	*Palm sp.*				62	5
Leguminosae	*Pericopsis mooniana*	Nadun	VU	N	63	7
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N	102	11
Moraceae	*Ficus religiosa*	Bo	NE	I	507	10
Combretaceae	*Terminalia bellirica*	Bulu	LC	N	64	9
Lecythidaceae	*Couroupita surinamensis*	Sal	NE	I	62	7
Pinaceae	*Pinus sp.*		NE	I	83	15
Phyllanthaceae	*Bridelia retusa*	Keta kela	LC	N	112	10
Leguminosae	*Tamarindus indica*	Siyambala	NE	I	41	8
Leguminosae	*Tamarindus indica*	Siyambala	NE	I	50	7
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	10
Dipterocarpaceae	*Dipterocarpus zeylanicus*	Hora	NT	E	168	32
Myrtaceae	*Syzygium aromaticum*	Karambu	NE	I	41	8
Leguminosae	*Acacia auriculiformis*		NE	I	103	11
Lamiaceae	*Tectona grandis*	Thekka	NE	I	112	10
Lamiaceae	*Tectona grandis*	Thekka	NE	I	82	6
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	84	6
Arecaceae	*Areca catechu*	Puwak	NE	I	42	10
Rubiaceae	*Morinda citrifolia*	Ahu	LC	N	42	4
Anacardiaceae	*Lannea coromandelica*	Hik	LC	N	84	7
Anacardiaceae	*Spondias dulcis*	Amberella	NE	I	72	7

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Anacardiaceae	*Spondias dulcis*	Amberella	NE	I	63	5
Apocynaceae	*Cerbera odollam*	Gon Kaduru	LC	N	42	3
Apocynaceae	*Cerbera odollam*	Gon Kaduru	LC	N	33	4
Moraceae	*Ficus exasperata*	Bu Deliya	LC	N	42	4
Moraceae	*Artocarpus incisus*	Rata-Del	NE	I	63	5
Malvaceae	*Ceiba pentandra*	Kotta Pulun	LC	N	83	8
Section 3: From Koswatta to Battaramulla						
Apocynaceae	*Alstonia scholaris*	Ruk-Attana	LC	N	82	11
Leguminosae	*Tamarindus indica*	Siyambala	NE	I	41	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	62	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	91	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	62	5
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	70	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	122	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	51	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	132	12
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	81	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	80	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	122	14
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	133	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	62	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	148	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	124	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	40	6
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	124	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	122	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	133	15
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	98	13
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	110	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	112	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	124	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	67	4
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	59	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	73	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	154	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	120	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	144	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	72	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	72	7

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	133	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	125	7
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	94	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	110	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	121	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	112	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	79	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	125	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	99	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	81	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	123	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	139	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	101	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	121	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	123	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	83	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	91	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	121	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	103	5
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	81	4
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	89	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	106	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	91	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	114	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	110	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	103	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	100	10
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	72	8
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	41	7
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	52	4
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	41	3
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	94	7
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	82	6
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	53	6
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	71	6
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	84	6
Cannabaceae	*Trema orientalis*	Gedumba	LC	N	40	6

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Cannabaceae	*Trema orientalis*	Gedumba	LC		51	5
Cannabaceae	*Trema orientalis*	Gedumba	LC		32	7
Cannabaceae	*Trema orientalis*	Gedumba	LC		54	6
Cannabaceae	*Trema orientalis*	Gedumba	LC		53	7
Leguminosae	*Delonix regia*	Mei- Mara	NE	I	73	8
Annonaceae	*Annona glabra*	Wel Atha	NE	I	53	4
Annonaceae	*Annona glabra*	Wel Atha	NE	I	41	3
Rhizophoraceae	*Carallia brachiata*	Dawata	NT	N	84	15
Malvaceae	*Sterculia foetida*	Telabu	LC	N	132	14
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	82	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	10
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	42	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	70	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	44	3
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	65	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	74	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	91	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	84	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	64	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	41	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	57	6
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	76	5
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	72	5
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	92	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	84	11
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	91	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	84	11
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	90	8
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	81	6
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	94	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	90	11
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	82	11
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	84	8
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	71	7
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	49	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	93	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	69	5

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	81	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	54	6
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	96	8
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	91	13
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	72	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	84	9
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	85	5
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	107	12
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	83	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	101	10
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	82	6
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	113	11
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	32	3
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	41	4
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	34	3
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	41	3
Phyllanthaceae	*Glochidion zeylanicum*	Hunukirilla	LC	N	33	3
Phyllanthaceae	*Glochidion zeylanicum*	Hunukirilla	LC	N	71	10
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	I	21	3
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	I	22	3
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	I	25	3
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	I	25	4
Myrtaceae	*Syzygium caryophyllatum*	Dan	LC	N	43	3
Rubiaceae	*Nauclea orientalis*	Bak Me	LC	N	62	6
Lauraceae	*Litsea glutinosa*	Bomi	LC	N	62	4
Lauraceae	*Litsea glutinosa*	Bomi	LC	N	73	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	82	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	51	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	90	12
Anacardiaceae	*Mangifera indica*	Amba	NE	I	54	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	83	11
Anacardiaceae	*Mangifera indica*	Amba	NE	I	54	8
Rutaceae	*Aegle marmelos*	Beli	NE	I	62	6
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	82	6
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	81	8
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	62	4
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	64	7
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	55	6
Phyllanthaceae	*Bridelia retusa*	Keta kela	LC	N	72	5
Arecaceae	*Cocos nucifera*	Pol	NE	I	82	9

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Arecaceae	*Cocos nucifera*	Pol	NE	I	69	9
Phyllanthaceae	*Phyllanthus acidus*	Rata nelli	NE	I	42	4
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N	45	6
Casuarinaceae	*Casuarina equisetifolia*	Kasa	NE	I	81	12
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	82	8
Elaeocarpaceae	*Elaeocarpus serratus*	Weralu	LC	N	41	8
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I	73	7
Meliaceae	*Azadirachta indica*	Kohomba	NE	I	82	6
Section 4: From Battaramulla to Borella Junction						
Arecaceae	*Cocos nucifera*	Pol	NE	I	81	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	86	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	72	7
Arecaceae	*Cocos nucifera*	Pol	NE	I	81	7
Arecaceae	*Cocos nucifera*	Pol	NE	I	84	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	52	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	71	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	62	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	61	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	73	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	64	4
Anacardiaceae	*Mangifera indica*	Amba	NE	I	51	4
Anacardiaceae	*Mangifera indica*	Amba	NE	I	84	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	81	7
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	62	6
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	84	7
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	93	6
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I	68	4
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	51	6
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	92	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	72	5
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	31	4
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	42	4
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	53	5
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	85	7
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	31	5
Sapotaceae	*Madhuca longifolia*	Me	NT	N	84	6
Fabaceae	*Cassia fistula*	Ehela	NE	I	44	4
Fabaceae	*Cassia fistula*	Ehela	NE	I	32	4
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	32	3
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	31	3

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	35	5
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	44	6
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	32	4
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	31	4
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	43	3
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N	52	7
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	73	6
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	102	10
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	94	6
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	108	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	93	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	92	10
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	79	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	51	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	88	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	9
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	88	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	74	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	61	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	75	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	91	10
Moraceae	*Ficus religiosa*	Bo	NE	I	208	12
Moraceae	*Ficus religiosa*	Bo	NE	I	84	5
Moraceae	*Ficus religiosa*	Bo	NE	I	95	10
Moraceae	*Ficus religiosa*	Bo	NE	I	81	8
Moraceae	*Ficus religiosa*	Bo	NE	I	72	8
Moraceae	*Ficus religiosa*	Bo	NE	I	51	6
Moraceae	*Ficus religiosa*	Bo	NE	I	84	7
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	41	6
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	44	5
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	75	5
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	81	9
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	62	4
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	86	10
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	73	6
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	77	6
Leguminosae	*Albizia saman*	Pini Mara	NE	I	144	9

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	52	8
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	104	9
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	110	11
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	177	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	60	6
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	66	6
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	65	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	52	4
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	54	4
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	51	3
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	44	3
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	80	9
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	107	11
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	81	9
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	72	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	76	7
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	82	12
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	71	7
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	90	7
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	104	10
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	94	8
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	92	8
Calophyllaceae	*Mesua ferrea*	Na	LC	N	72	6
Calophyllaceae	*Mesua ferrea*	Na	LC	N	39	3
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	72	5
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	107	8
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	103	9
Leguminosae	*Erythrina sp*				84	5
Arecaceae	*Caryota urens*	Kithul	LC	N	62	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	66	7
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	73	6
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	91	7
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	66	3
Combretaceae	*Terminalia bellirica*	Bulu	LC	N	97	10
Meliaceae	*Azadirachta indica*	Kohomba	NE	I	94	12
Rutaceae	*Limonia acidissima*	Divul	LC	N	54	5
Leguminosae	*Delonix regia*	Mei- Mara	NE	I	112	10
Leguminosae	*Delonix regia*	Mei- Mara	NE	I	91	6
Leguminosae	*Delonix regia*	Mei- Mara	NE	I	88	6
Anacardiaceae	*Spondias dulcis*	Amberella	NE	I	76	5

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	82	7
Lauraceae	*Persea americana*	Ali-pera	NE	I	66	4
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	85	6
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	80	5
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	92	4
Sapindaceae	*Schleichera oleosa*	Kon	LC	N	87	6
Section 5: From Borella Junction to Fort						
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	107	8
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	155	9
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	202	10
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	150	8
Moraceae	*Ficus religiosa*	Bo	NE	I	42	5
Moraceae	*Ficus religiosa*	Bo	NE	I	108	7
Moraceae	*Ficus religiosa*	Bo	NE	I	102	6
Moraceae	*Ficus religiosa*	Bo	NE	I	88	7
Moraceae	*Ficus religiosa*	Bo	NE	I	80	7
Moraceae	*Ficus religiosa*	Bo	NE	I	84	10
Moraceae	*Ficus religiosa*	Bo	NE	I	113	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	82	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	88	7
Anacardiaceae	*Mangifera indica*	Amba	NE	I	91	11
Anacardiaceae	*Mangifera indica*	Amba	NE	I	94	4
Anacardiaceae	*Mangifera indica*	Amba	NE	I	90	8
Anacardiaceae	*Mangifera indica*	Amba	NE	I	59	4
Anacardiaceae	*Mangifera indica*	Amba	NE	I	82	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	80	9
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	71	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	55	4
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	62	5
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	41	3
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	72	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	71	5
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	72	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	68	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	72	9
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	74	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	81	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	88	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	85	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	84	8

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	86	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	91	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	84	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	84	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	79	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	77	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	84	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	81	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	80	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	80	7
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	83	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	88	9
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	74	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	91	8
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	72	7
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	91	10
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	88	10
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	70	6
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	82	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	103	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	82	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	85	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	104	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	102	10
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	86	7
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	83	6
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	94	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	91	8
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	80	7
Lamiaceae	*Tectona grandis*	Thekka	NE	I	92	10
Lamiaceae	*Tectona grandis*	Thekka	NE	I	94	10
Lamiaceae	*Tectona grandis*	Thekka	NE	I	82	9
Lamiaceae	*Tectona grandis*	Thekka	NE	I	107	11
Lamiaceae	*Tectona grandis*	Thekka	NE	I	86	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	84	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	82	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	79	8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	87	7
Lamiaceae	*Tectona grandis*	Thekka	NE	I	82	8
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	86	8

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Sapotaceae	*Madhuca longifolia*	Me	NT	N	72	8
Sapotaceae	*Madhuca longifolia*	Me	NT	N	76	7
Sapotaceae	*Madhuca longifolia*	Me	NT	N	82	6
Sapotaceae	*Madhuca longifolia*	Me	NT	N	80	9
Sapotaceae	*Madhuca longifolia*	Me	NT	N	83	8
Sapotaceae	*Madhuca longifolia*	Me	NT	N	95	9
Sapotaceae	*Madhuca longifolia*	Me	NT	N	84	11
Sapotaceae	*Madhuca longifolia*	Me	NT	N	98	10
Sapotaceae	*Madhuca longifolia*	Me	NT	N	91	9
Sapotaceae	*Madhuca longifolia*	Me	NT	N	84	7
Sapotaceae	*Madhuca longifolia*	Me	NT	N	115	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	92	10
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	87	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	92	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	95	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	93	8
Meliaceae	*Azadirachta indica*	Kohomba	NE	I	86	8
Fabaceae	*Cassia fistula*	Ehela	NE	I	76	5
Fabaceae	*Cassia fistula*	Ehela	NE	I	72	5
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	85	8
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	83	9
Apocynaceae	*Alstonia scholaris*	Ruk-Attana	LC	N	84	6
Apocynaceae	*Alstonia scholaris*	Ruk-Attana	LC	N	91	8
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	124	8
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	108	6
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N	75	8
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N	70	7
Combretaceae	*Terminalia bellirica*	Bulu	LC	N	86	9
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	74	6
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	70	6
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	41	5
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	86	8
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	92	9
Leguminosae	*Albizia saman*	Pini Mara	NE	I	106	10
Leguminosae	*Albizia saman*	Pini Mara	NE	I	93	8
Leguminosae	*Albizia saman*	Pini Mara	NE	I	80	7
Leguminosae	*Albizia saman*	Pini Mara	NE	I	108	9
Sapotaceae	*Chrysophyllum cainito*	Kos-eta-lawalu	NE	I	74	6
Sapindaceae	*Pometia pinnata*	Bulumora	LC	N	85	5
Ebenaceae	*Diospyros ebenum*	Kaluwara	EN	N	63	4

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	62	6
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	57	3
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	55	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	54	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	59	5
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	51	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	49	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	57	5
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	55	6
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	51	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	50	4
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	55	5
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	58	6
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	54	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	91	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	94	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	75	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	67	4
Moraceae	*Ficus racemosa*	Attikka	LC	N	44	3
Moraceae	*Ficus racemosa*	Attikka	LC	N	83	9
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	112	11
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	119	11
Section 6: From Fort to Slave island						
Leguminosae	*Albizia saman*	Pini Mara	NE	I	122	11
Leguminosae	*Albizia saman*	Pini Mara	NE	I	130	13
Leguminosae	*Albizia saman*	Pini Mara	NE	I	127	11
Leguminosae	*Albizia saman*	Pini Mara	NE	I	98	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	79	6
Arecaceae	*Cocos nucifera*	Pol	NE	I	81	6
Arecaceae	*Cocos nucifera*	Pol	NE	I	88	7
Arecaceae	*Cocos nucifera*	Pol	NE	I	83	6
Arecaceae	*Cocos nucifera*	Pol	NE	I	70	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	84	9
Arecaceae	*Cocos nucifera*	Pol	NE	I	81	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	85	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	84	10
Arecaceae	*Cocos nucifera*	Pol	NE	I	83	11
Arecaceae	*Cocos nucifera*	Pol	NE	I	69	8
Arecaceae	*Cocos nucifera*	Pol	NE	I	74	8

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	607	11
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	402	8
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	359	9
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	351	9
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N	413	11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	50	4
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	72	5
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	74	5
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	70	5
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	84	9
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I	92	10
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I	82	6
Moraceae	*Ficus racemosa*	Attikka	LC	N	84	7
Moraceae	*Ficus racemosa*	Attikka	LC	N	80	8
Moraceae	*Ficus racemosa*	Attikka	LC	N	76	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	64	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	81	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	73	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	77	6
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	65	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	69	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	49	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	55	5
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	51	4
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	80	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	85	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	72	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	78	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	70	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	84	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	90	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	88	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	94	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	89	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	96	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	95	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	95	7
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	91	8
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	82	11
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	94	11

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	86	6
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	82	12
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	110	13
Lamiaceae	*Tectona grandis*	Thekka	NE	I	84	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	72	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	88	6
Anacardiaceae	*Mangifera indica*	Amba	NE	I	69	5
Anacardiaceae	*Mangifera indica*	Amba	NE	I	91	11
Anacardiaceae	*Mangifera indica*	Amba	NE	I	91	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	88	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	96	10
Anacardiaceae	*Mangifera indica*	Amba	NE	I	45	3
Anacardiaceae	*Mangifera indica*	Amba	NE	I	84	7
Anacardiaceae	*Mangifera indica*	Amba	NE	I	105	9
Anacardiaceae	*Mangifera indica*	Amba	NE	I	112	9
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	92	10
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	85	6
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	80	5
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	92	9
Arecaceae	*Palm sp.*				72	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	52	8
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N	74	8
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	80	4
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	76	6
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	50	5
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	77	5
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	92	6
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	94	6
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	81	9
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	112	10
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	108	10
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	102	10
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	90	8
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	94	8
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	72	5
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	69	5
Moraceae	*Ficus elastica*		NE	I	104	8
Rubiaceae	*Nauclea orientalis*	Bak Me	LC	N	62	8
Lecythidaceae	*Barringtonia asiatica*	Diya midella	LC	N	82	6
Lecythidaceae	*Barringtonia asiatica*	Diya midella	LC	N	92	6

Family	Scientific Name	Common name	NCS	Origin	GBH (cm)	Height (m)
Lecythidaceae	*Barringtonia asiatica*	Diya midella	LC	N	92	10
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	94	11
Meliaceae	*Azadirachta indica*	Kohomba	NE	I	106	13
Sapotaceae	*Madhuca longifolia*	Me	NT	N	90	8
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	82	6
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I	84	6
Moraceae	*Ficus religiosa*	Bo	NE	I	84	8
Moraceae	*Ficus religiosa*	Bo	NE	I	108	9
Moraceae	*Ficus religiosa*	Bo	NE	I	107	9
Moraceae	*Ficus religiosa*	Bo	NE	I	96	7
Moraceae	*Ficus religiosa*	Bo	NE	I	112	7
Moraceae	*Ficus religiosa*	Bo	NE	I	107	6
Moraceae	*Ficus religiosa*	Bo	NE	I	110	8
Moraceae	*Ficus religiosa*	Bo	NE	I	114	7
Moraceae	*Ficus religiosa*	Bo	NE	I	118	8
Moraceae	*Ficus religiosa*	Bo	NE	I	115	8
Moraceae	*Ficus religiosa*	Bo	NE	I	162	10

Appendix XX. Number of plants that are potentially impacted by the proposed LRT by the six sections

Abbreviations Used:
E- Endemic, **N** - Native, **I** - Introduced, alien or Exotic, **IAS** - Invasive Alien Species, **NCS** - National Conservation Status, **EN**- Endangered, **VU**- Vulnerable, **NE** - Not Evaluated, **NT** - Near Threatened, **DD** - Data Deficient, **LC** - Least Concern, **1** - Section from LRT Depot to Malabe, **2** - Section from Malabe to Koswatta, **3** - Section from Koswatta to Battaramulla, **4** - Section from Battaramulla to Borella Junction, **5** - Section from Borella Junction to Fort, **6** - Section from Fort to Slave Island

Family	Scientific Name	Common name	NCS	Origin	Value	1	2	3	4	5	6	TOTAL
Anacardiaceae	*Mangifera indica*	Amba	NE	I	Fruit	1	27	6	9	7	11	61
Anacardiaceae	*Spondias dulcis*	Amberella	NE	I	Fruit		2		1			3
Anacardiaceae	*Lannea coromandelica*	Hik	LC	N	Timber	2	1					3
Annonaceae	*Annona muricata*	Katu Atha	NE	I	Fruit	1						1
Annonaceae	*Annona glabra*	Wel Atha	NE	IAS		1		2				3
Annonaceae	*Polyalthia longifolia*	Devadaru	LC	N			1		12	28	2	43
Apocynaceae	*Cerbera odollam*	Gon Kaduru	LC	N			2					2
Apocynaceae	*Alstonia macrophylla*	Havari Nuga	NE	IAS	Timber	3						3
Apocynaceae	*Alstonia scholaris*	Ruk-Attana	LC	N	Timber			1		2		3
Apocynaceae	*Plumeria obusta*	Araliya	NE	I	Ornamental		3			3	2	8
Arecaceae	*Areca catechu*	Puwak	NE	I	Multiple		1					1
Arecaceae	*Caryota urens*	Kithul	LC	N	Timber				1			1
Arecaceae	*Palm sp.*			I	Ornamental		1				1	2
Arecaceae	*Cocos nucifera*	Pol	NE	I	Multiple		13	2	5	1	12	33
Bignoniaceae	*Tabebuia rosea*	Rosa Tabobia	NE	I	Ornamental		1	1	4	1	8	15
Calophyllaceae	*Mesua ferrea*	Na	LC	N	Timber		3		2			5
Cannabaceae	*Trema orientalis*	Gedumba	LC	N	Timber	1	1	5				7
Casuarinaceae	*Casuarina equisetifolia*	Kasa	NE	I				1				1
Combretaceae	*Terminalia bellirica*	Bulu	LC	N	Medicine		1		1	1		3
Combretaceae	*Terminalia arjuna*	Kumbuk	LC	N	Timber	17		25	3			45
Combretaceae	*Terminalia catappa*	Kottamba	NE	I	Fruit	2	19	15	14	10	26	86
Dilleniaceae	*Dillenia suffruticosa*	Para	NE	IAS				4				4

Family	Scientific Name	Common name	NCS	Origin	Value	1	2	3	4	5	6	TOTAL
Dipterocarpaceae	*Dipterocarpus zeylanicus*	Hora	NT	E	Timber		1					1
Ebenaceae	*Diospyros ebenum*	Kaluwara	EN	N	Timber		1			1		2
Elaeocarpaceae	*Elaeocarpus serratus*	Weralu	LC	N	Fruit			1				1
Euphorbiaceae	*Macaranga peltata*	Kenda	LC	N	Timber	9	2	8				19
Fabaceae	*Cassia fistula*	Ehela	NE	I	Ornamental		4		2	2		8
Lamiaceae	*Tectona grandis*	Thekka	NE	I	Timber	1	2		1	10	1	15
Lauraceae	*Persea americana*	Ali-pera	NE	I	Fruit				1			1
Lauraceae	*Litsea glutinosa*	Bomi	LC	N				2				2
Lecythidaceae	*Couroupita surinamensis*	Sal	NE	I	Ornamental		1					1
Lecythidaceae	*Barringtonia asiatica*	Diya midella	LC	N							3	3
Lecythidaceae	*Barringtonia acutangula*	Ela midella	LC	N					8			8
Leguminosae	*Leucaena leucocephala*	Ipil Ipil	NE	IAS	Fodder	1						1
Leguminosae	*Acacia auriculiformis*		NE	I	Fodder		1					1
Leguminosae	*Gliricidia sepium*	Wetamara	NE	I	Timber	1						1
Leguminosae	*Pericopsis mooniana*	Nadun	VU	N	Timber		1					1
Leguminosae	*Erythrina sp*			N					1			1
Leguminosae	*Sesbania grandiflora*	Kathuru Murunga	NE	I	Vegetable		2					2
Leguminosae	*Tamarindus indica*	Siyambala	NE	I	Multiple		2	1				3
Leguminosae	*Delonix regia*	Mei- Mara	NE	I	Timber			1	3			4
Leguminosae	*Pithecellobium dulce*	Pinikaral	NE	I				2	3	2	1	8
Leguminosae	*Albizia saman*	Pini Mara	NE	I	Timber				1	4	4	9
Leguminosae	*Bauhinia purpurea*	Rath koboleela	NE	I	Ornamental					11		11
Leguminosae	*Peltophorum pterocarpum*	Ayawaka	NE	I		44			3	11	6	64
Leguminosae	*Pterocarpus indicus*	Wal Ehela	NE	I		2	1	62	1	2	2	70
Lythraceae	*Lagerstroemia speciosa*	Murutha	NT	N	Timber	17						17
Malvaceae	*Sterculia foetida*	Telabu	LC	N	Timber			1				1
Malvaceae	*Berrya coridifolia*	Halmilla	LC	N	Timber		1	1		2		4
Malvaceae	*Microcos paniculata*	Kohu Kirilla	LC	N	Timber	1						1
Malvaceae	*Ceiba pentandra*	Kotta Pulun	LC	N	Multiple	1	1					2

Family	Scientific Name	Common name	NCS	Origin	Value	1	2	3	4	5	6	TOTAL
Meliaceae	*Azadirachta indica*	Kohomba	NE	I	Timber			1	1	1	1	4
Meliaceae	*Swietenia macrophylla*	Mahogani	NE	I	Timber				6	1	1	8
Moraceae	*Artocarpus incisus*	Rata-Del	NE	I	Fruit		1					1
Moraceae	*Ficus exasperata*	Bu Deliya	LC	N	Timber		1					1
Moraceae	*Ficus elastica*		NE	I							1	1
Moraceae	*Ficus callosa*	Gonna	LC	N			2					2
Moraceae	*Ficus racemosa*	Attikka	LC	N						2	3	5
Moraceae	*Ficus benjamina*	Walu Nuga	NE	I			5		4			9
Moraceae	*Ficus benghalensis*	Maha Nuga	LC	N					4	4	5	13
Moraceae	*Artocarpus heterophyllus*	Kos	NE	I	Vegetable	2	3	1	3	4	4	17
Moraceae	*Ficus religiosa*	Bo	NE	I	Religeous		1		7	7	11	26
Moringaceae	*Moringa oleifera*	Murunga	NE	I	Vegetable		1					1
Muntingiaceae	*Muntingia calabura*	Jam	NE	I	Fruit			4			2	6
Myrtaceae	*Psidium guajava*	Pera	NE	I	Fruit	1						1
Myrtaceae	*Syzygium caryophyllatum*	Dan	LC	N	Fruit			1				1
Myrtaceae	*Syzygium aromaticum*	Karambu	NE	I	Spice		1					1
Myrtaceae	*Syzygium cumini*	Ma-Dan	LC	N	Fruit				2	1	2	5
Myrtaceae	*Eucalyptus* sp.	Eucalyptus	NE	I	Timber				8			8
Phyllanthaceae	*Phyllanthus acidus*	Rata nelli	NE	I	Fruit			1				1
Phyllanthaceae	*Bridelia retusa*	Keta kela	LC	N	Timber		1	1				2
Phyllanthaceae	*Glochidion zeylanicum*	Hunukirilla	LC	N	Timber			2				2
Pinaceae	*Pinus sp.*		NE	I	Timber		1					1
Rhizophoraceae	*Carallia brachiata*	Dawata	NT	N	Timber			1				1
Rubiaceae	*Morinda citrifolia*	Ahu	LC	N	Timber		1					1
Rubiaceae	*Nauclea orientalis*	Bak Me	LC	N	Timber	1		1			1	3
Rutaceae	*Aegle marmelos*	Beli	NE	I	Fruit			1				1
Rutaceae	*Limonia acidissima*	Divul	LC	N	Fruit				1			1
Sapindaceae	*Schleichera oleosa*	Kon	LC	N	Timber				1			1
Sapindaceae	*Pometia pinnata*	Bulumora	LC	N						1		1

Family	Scientific Name	Common name	NCS	Origin	Value	1	2	3	4	5	6	TOTAL
Sapindaceae	*Nephelium lappaceum*	Rambutan	NE	I	Fruit	1	2	1				4
Sapindaceae	*Filicium decipiens*	Pihimbiya	LC	N	Ornamental		6	5	3	5	2	21
Sapotaceae	*Chrysophyllum cainito*	Kos-eta-lawalu	NE	I						1		1
Sapotaceae	*Madhuca longifolia*	Me	NT	N	Timber		6		1	11	1	19
					TOTAL	110	128	161	117	136	113	765

Appendix 4. List of fauna observed in the LRT trace from Malabe to Kollupitiya

Abbreviations Used:
E- Endemic, **N** - Native, **I** - Introduced, alien or Exotic, **M** - Migrant or Winter visitor
N**CS** - National Conservation Status, **GCS** - Global Conservation Status, **CR**- Critically Endangered, **EN**- Endangered, **VU**- Vulnerable, **NT**- Near Threatened, **NE** - Not Evaluated, **DD** - Data Deficient, **LC** - Least Concern

Family	Scientific Name	Common English Name	NCS	Origin
BUTTERFLIES				
Papilionidae	*Graphium agamemnon*	Tailed Jay	LC	N
Papilionidae	*Pachliopta aristolochiae*	Common Rose	LC	N
Papilionidae	*Pachliopta hector*	Crimson Rose	LC	N
Papilionidae	*Papilio clytia*	Mime	LC	N
Papilionidae	*Papilio demoleus*	Lime Butterfly	LC	N
Papilionidae	*Papilio polytes*	Common Mormon	LC	N
Pieridae	*Catopsilia pomona*	Lemon Emigrant	LC	N
Pieridae	*Catopsilia pyranthe*	Mottled Emigrant	LC	N
Pieridae	*Catopsilia scylla*	Orange Migrant	NE	I
Pieridae	*Delias eucharis*	Jezebel	LC	N
Pieridae	*Eurema hecabe*	Common Grass Yellow	LC	N
Pieridae	*Leptosia nina*	Psyche	LC	N
Nymphalidae	*Acraea violae*	Tawny Coster	LC	N
Nymphalidae	*Danaus chrysippus*	Plain Tiger	LC	N
Nymphalidae	*Danaus genutia*	Common Tiger	LC	N
Nymphalidae	*Elymnias hypermnestra*	Common Palmfly	LC	N
Nymphalidae	*Euploea core*	Common Indian Crow	LC	N
Nymphalidae	*Euthalia aconthea*	Baron	LC	N
Nymphalidae	*Ideopsis similis*	Blue Glassy Tiger	VU	N
Nymphalidae	*Junonia almana*	Peacock Pansy	LC	N
Nymphalidae	*Junonia atlites*	Grey Pansy	LC	N
Nymphalidae	*Junonia iphita*	Chocolate Soldier	LC	N
Nymphalidae	*Melanitis leda*	Common Evening Brown	LC	N
Nymphalidae	*Mycalesis perseus*	Common Bushbrown	LC	N
Nymphalidae	*Neptis hylas*	Common Sailor	LC	N
Nymphalidae	*Orsotriaena medus*	Medus Brown	LC	N
Nymphalidae	*Parantica aglea*	Glassy Tiger	LC	N
Nymphalidae	*Phalanta phalantha*	Leopard	LC	N
Nymphalidae	*Tirumala limniace*	Blue Tiger	LC	N
Nymphalidae	*Ypthima ceylonica*	White Four-ring	LC	N
Lycaenidae	*Arhopala amantes*	Large Oakblue	LC	N
Lycaenidae	*Castalius rosimon*	Common Pierrot	LC	N

Family	Scientific Name	Common English Name	NCS	Origin
Lycaenidae	*Chilades lajus*	Lime Blue	LC	N
Lycaenidae	*Chilades pandava*	Plains Cupid	LC	N
Lycaenidae	*Everes lacturnus*	Indian Cupid	LC	N
Lycaenidae	*Jamides bochus*	Dark Cerulean	LC	N
Lycaenidae	*Jamides celeno*	Common Cerulean	LC	N
Lycaenidae	*Prosotas nora*	Common Lineblue	LC	N
Lycaenidae	*Rathinda amor*	Monkey-puzzle	LC	N
Lycaenidae	*Spalgis epeus*	Apefly	LC	N
Lycaenidae	*Tajuria cippus*	Peacock Royal	LC	N
Lycaenidae	*Zizina otis*	Lesser Grass Blue	LC	N
Lycaenidae	*Zizula hylax*	Tiny Grass Blue	LC	N
Hesperiidae	*Ampittia dioscorides*	Bush Hopper	LC	N
Hesperiidae	*Borbo cinnara*	Wallace's Swift	LC	N
Hesperiidae	*Cephrenes trichopepla*	Yellow Palm Dart	NE	I
Hesperiidae	*Iambrix salsala*	Chestnut Bob	LC	N
Hesperiidae	*Parnara bada*	Smallest Swift	NT	N
Hesperiidae	*Potanthus confuscius*	Tropic Dart	LC	N
Hesperiidae	*Suastus gremius*	Indian Palm Bob	LC	N
Hesperiidae	*Taractrocera maevius*	Common Grass Dart	LC	N
Hesperiidae	*Telicota bambusae*	Dark Palmdart	VU	N
DRAGONFLIES				
Coenagrionidae	*Onychargia atrocyana*	Marsh Dancer	VU	N
Coenagrionidae	*Ischnura senegalensis*	Common Bluetail, Marsh Bluetail	LC	N
Coenagrionidae	*Ceriagrion coromandelianum*	Yellow Waxtail	LC	N
Coenagrionidae	*Pseudagrion microcephalum*	Blue Sprite	LC	N
Platycnemididae	*Copera marginipes*	Yellow Featherleg	LC	N
Gomphidae	*Ictinogomphus rapax*	Rapacious Flangetail	LC	N
Libellulidae	*Orthetrum luzonicum*	Marsh Skimmer	NT	N
Libellulidae	*Orthetrum pruinosum*	Pink Skimmer	NT	N
Libellulidae	*Orthetrum sabina*	Green Skimmer	LC	N
Libellulidae	*Acisoma panorpoides*	Asian Pintail	LC	N
Libellulidae	*Brachythemis contaminata*	Asian Groundling	LC	N
Libellulidae	*Crocothemis servilia*	Oriental Scarlet	LC	N
Libellulidae	*Diplacodes trivialis*	Blue Percher	LC	N
Libellulidae	*Neurothemis intermedia*	Paddyfield Parasol	NT	N
Libellulidae	*Neurothemis tullia*	Pied Parasol	LC	N
Libellulidae	*Rhodothemis rufa*	Spine-legged Redbolt	NT	N
Libellulidae	*Rhyothemis variegata*	Variegate Flutterer	LC	N
Libellulidae	*Pantala flavescens*	Wandering Glider	LC	N
Libellulidae	*Urothemis signata*	Scarlet Basker	LC	N

Family	Scientific Name	Common English Name	NCS	Origin
FRESH WATER FISH				
Aplocheilidae	*Aplocheilus dayi*	Day's killifish	E	EN
Belontiidae	*Trichogaster pectoralis*	Snake skin gourami	I	NE
Cichlidae	*Oreochromis niloticus*	Tilapia	I	NE
Cichlidae	*Oreochromis mossambicus*	Tilapia	I	NE
Cyprinidae	*Dawkinsia singhala*	Filamented barb	E	LC
Cyprinidae	*Puntius bimaculatus*	Redside barb	N	LC
Cyprinidae	*Rasbora dandia*	Striped rasbora	N	LC
Cyprinidae	*Rasbora microcephalus*	Thin line Rasbora	N	LC
AMPHIBIANS				
Bufonidae	*Duttaphrynus melanostictus*	Common house toad	N	LC
Dicroglossidae	*Euphlyctis hexadactylus*	Sixtoe green frog	N	LC
Dicroglossidae	*Fejervarya syhadrensis*	Common paddy field frog	N	LC
REPTILES				
Bataguridae	*Melanochelys trijuga*	Black turtle	LC	N
Agamidae	*Calotes calotes*	Green garden lizard	LC	N
Agamidae	*Calotes versicolor*	Common garden lizard	LC	N
Gekkonidae	*Gehyra mutilata*	Four-claw gecko	LC	N
Gekkonidae	*Hemidactylus frenatus*	Common house-gecko	LC	N
Gekkonidae	*Hemidactylus parvimaculatus*	Spotted housegecko	LC	N
Scincidae	*Eutropis macularia*	Bronzegreen little skink	LC	N
Varanidae	*Varanus bengalensis*	Land monitor	LC	N
Varanidae	*Varanus salvator*	Water monitor	LC	N
Natricidae	*Amphiesma stolatum*	Buff striped keelback	LC	N
Natricidae	*Xenochrophis piscator*	Checkered Keelback	LC	N
Colubridae	*Dendrelaphis schokari*	Schokari's bronze back	LC	E
Colubridae	*Ptyas mucosa*	Rat snake	LC	N
BIRDS				
Accipitridae	*Haliastur indus*	Brahminy Kite	LC	BrR
Alcedinidae	*Halcyon smyrnensis*	White-throated Kingfisher	LC	BrR
Alcedinidae	*Alcedo atthis*	Common Kingfisher	LC	BrR
Anatidae	*Dendrocygna javanica*	Lesser Whistling-duck	LC	BrR
Apodidae	*Cypsiurus balasiensis*	Asian Palm-swift	LC	BrR
Ardeidae	*Ardea cinerea*	Grey Heron	LC	BrR
Ardeidae	*Ardea purpurea*	Purple Heron	LC	BrR
Ardeidae	*Ardeola grayii*	Indian Pond-heron	LC	BrR
Ardeidae	*Bubulcus ibis*	Cattle Egret	LC	BrR
Ardeidae	*Casmerodius albus*	Great Egret	LC	BrR
Charadriidae	*Vanellus indicus*	Red-wattled Lapwing	LC	BrR
Cisticolidae	*Cisticola juncidis*	Zitting Cisticola	LC	BrR

Family	Scientific Name	Common English Name	NCS	Origin
Cisticolidae	*Prinia inornata*	Plain Prinia	LC	BrR
Columbidae	*Ducula aenea*	Green Imperial-Pigeon	LC	BrR
Columbidae	*Stigmatopelia chinensis*	Spotted Dove	LC	BrR
Corvidae	*Corvus splendens*	House Crow	LC	BrR
Cuculidae	*Centropus sinensis*	Greater Coucal	LC	BrR
Cuculidae	*Eudynamys scolopaceus*	Asian Koel	LC	BrR
Dicruidae	*Dicrurus caerulescens*	White-bellied Drongo	LC	BrR
Nectariniidae	*Nectarinia lotenia*	Long-billed Sunbird	LC	BrR
Nectariniidae	*Nectarinia zeylonica*	Purple-rumped Sunbird	LC	BrR
Oriolidae	*Oriolus xanthornus*	Black-hooded Oriole	LC	BrR
Phalacrocoracidae	*Phalacrocorax niger*	Little Cormorant	LC	BrR
Phalacrocoracidae	*Phalacrocorax fuscicollis*	Indian Cormorant	LC	BrR
Psittacidae	*Psittacula krameri*	Rose-ringed Parakeet	LC	BrR
Pycnonotidae	*Pycnonotus cafer*	Red-vented Bulbul	LC	BrR
Rallidae	*Amaurornis phoenicurus*	White-breasted Waterhen	LC	BrR
Rallidae	*Porphyrio porphyrio*	Purple Swamphen	LC	BrR
Ramphastidae	*Megalaima zeylanica*	Brown-headed Barbet	LC	BrR
Sturnidae	*Acridotheres tristis*	Common Myna	LC	BrR
Sylviidae	*Orthotomus sutorius*	Common Tailorbird	LC	BrR
Threskiornithidae	*Threskiornis melanocephalus*	Black-headed Ibis	LC	BrR
Timalidae	*Turdoides affinis*	Yellow-billed Babbler	LC	BrR
MAMMALS				
Cercopithecidae	*Semnopithecus vetulus*	Sri Lanka Purple-faced langur	EN	E
Felidae	*Prionailurus viverrinus*	Fishing cat	EN	N
Hystricidae	*Hystrix indica*	Porcupine	LC	N
Scuiridae	*Funambulus palmarum*	Palm squirrel	LC	N

Annex I

Cabinet Memorandum on the Adoption of LARC System for the LRT Project

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අමාත්‍ය මණ්ඩල කාර්යාලය
அமைச்சரவை அலுவலகம்
OFFICE OF THE CABINET OF MINISTERS

CABINET DECISION | අමාත්‍ය මණ්ඩල තීරණය | அமைச்சரவைத் தீர்மானம்

පිටපත් : ජනාධිපති ලේකම්.
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විගණකාධිපති.

මගේ අංකය: අමප/17/1654/724/064
2017 අගෝස්තු මස 09 දින.

ක්‍රියා කළ යුතු : ප්‍රවාහන හා සිවිල් ගුවන්සේවා අමාත්‍යාංශයේ ලේකම්.
මහානගර හා බස්නාහිර සංවර්ධන අමාත්‍යාංශයේ ලේකම්.
ඉඩම් සහ පාර්ලිමේන්තු ප්‍රතිසංස්කරණ අමාත්‍යාංශයේ ලේකම්.

සැහැල්ලු දුම්රිය සංක්‍රමණ ව්‍යාපෘතිය නිසා පීඩාවට පත් පාර්ශ්වයන් සඳහා වන්දි ගෙවීමට ඉඩම් අත්පත් කරගැනීමේ හා නැවත පදිංචි කිරීමේ කමිටු (LARC/SUPER LARC) ක්‍රමවේදයන් අදාළ කරගැනීම

(මහානගර හා බස්නාහිර සංවර්ධන ගරු ඇමතිතුමා ඉදිරිපත් කළ 2017-07-19 දිනැති සංදේශය)

2017 අගෝස්තු මස 01 දින පැවැත්වුණු අමාත්‍ය මණ්ඩල රැස්වීමේදී එළඹී තීරණයක් අවශ්‍ය කටයුතු සඳහා මේ සමඟ එවා ඇත.

ඩබ්ලිව්.එම්.ඩී.ජේ.ප්‍රනාන්දු
අතිරේක ලේකම්.

අ.කළේ/එස්.අබේසිංහ
අමාත්‍ය මණ්ඩලයේ ලේකම්.

(ආ) න්‍යාය පත්‍රයේ විෂයයන්:

(II) අමාත්‍ය මණ්ඩල පත්‍රිකා - ප්‍රසම්පාදනයට අදාළ කරුණු :

53. අමාත්‍ය මණ්ඩල පත්‍රිකා අංක 17/1654/724/064 වූ, **"සැහැල්ලු දුම්රිය සංක්‍රමණ ව්‍යාපෘතිය නිසා පීඩාවට පත් පාර්ශ්වයන් සඳහා වන්දි ගෙවීමට ඉඩම් අත්පත් කරගැනීමේ හා නැවත පදිංචි කිරීමේ කමිටු (LARC/SUPER LARC) ක්‍රමවේදයන් අදාළ කරගැනීම"** යන මැයෙන් මහානගර හා බස්නාහිර සංවර්ධන ඇමතිතුමා ඉදිරිපත් කළ 2017-07-19 දිනැති සංදේශය - (අමප අංක 16/1175/724/047 පිළිබඳව වූ 2016-06-28 දිනැති අමාත්‍ය මණ්ඩල තීරණයට අදාළව) ඉහත සඳහන් සංදේශය මුදල් හා ජනමාධ්‍ය ඇමතිතුමාගේ නිරීක්ෂණ සමඟ සලකා බලන ලදී. මේ පිළිබඳව සාකච්ඡා කිරීමෙන් අනතුරුව, සංදේශයේ 4.0 ඡේදයෙහි සඳහන් යෝජනාව සඳහා අනුමැතිය ලබා දීමට තීරණය කරන ලදී.

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ක්‍රියා කළ යුතු:	**ප්‍රවාහන හා සිවිල් ගුවන්සේවා අමාත්‍යාංශය** - සංදේශයේ පිටපතක් හා ඉහත නිරීක්ෂණ යා කොට ඇත. **මහානගර හා බස්නාඹිර සංවර්ධන අමාත්‍යාංශය** - ඉහත නිරීක්ෂණ යා කොට ඇත. **ඉඩම් සහ පාර්ලිමේන්තු ප්‍රතිසංස්කරණ අමාත්‍යාංශය** - සංදේශයේ පිටපතක් හා ඉහත නිරීක්ෂණ යා කොට ඇත.
පිටපත්:	**ජනාධිපති ලේකම්** - සංදේශයේ පිටපතක් හා ඉහත නිරීක්ෂණ යා කොට ඇත. **අග්‍රාමාත්‍ය ලේකම්** - සංදේශයේ පිටපතක් හා ඉහත නිරීක්ෂණ යා කොට ඇත. **ජාතික ප්‍රතිපත්ති හා ආර්ථික කටයුතු අමාත්‍යාංශය** - සංදේශයේ පිටපතක් හා ඉහත නිරීක්ෂණ යා කොට ඇත. **මුදල් හා ජනමාධ්‍ය අමාත්‍යාංශය**

(B) Agenda Items :

(II) Cabinet Papers - Procurement Related Matters

53. Cabinet Paper No.17/1654/724/064, a Memorandum dated 2017-07-19 by the Minister of Megapolis and Western Development on "**Adoption of Land Acquisition and Resettlement Committee (LARC/SUPER LARC) Systems for the affected parties of the Light Rail Transit (LRT) Project**" - (Cabinet decision dated 2016-06-28 on CP No.16/1175/724/047 refers) the above Memorandum was considered along with the observations of the Minister of Finance and Mass Media. After discussion, it was decided to grant approval to the proposal in paragraph 4.0 of the Memorandum.

Action by: **My/Transport and Civil Aviation** - copy of Memorandum and above observations annexed.
My/Megapolis and Western Development - above observations annexed.
My/Lands and Parliamentary Reforms - copy of Memorandum and above observations annexed.

Copied to: **Secretary to the President** - copy of Memorandum and above observations annexed.
Secretary to the Prime Minister - copy of Memorandum and above observations annexed.
My/National Policies and Economic Affairs - copy of Memorandum and above observations annexed.
My/Finance and Mass Media

Annex J

Summary of Stakeholder Meetings

1. Information Dissemination and Notification

Information dissemination and notification regarding the stakeholder engagement events vary depending on the type of engagement required. Awareness and consultation meetings for government offices have been coursed through official invitations released by MMWD to relevant offices. Public engagement meetings have been publicly announce through newspaper announcements, leaflets and posters at DS/GN offices in all three official languages – Sinhala, Tamil and English (see Photos below). For project affected persons like paddy land owners, tenant farmers and business owners, they were contacted individually and were invited to meetings. For the Thalangama EPA Meeting, identified organizations were also contacted directly and invited to MMWD for the meeting.

Public Engagement Meeting Posters in local languages posted at the DS/GN office in Kotte

Design of leaflets distributed to the public. Sinhalese and Tamil version are also available. Copies were also provided in the DS/GNs offices.


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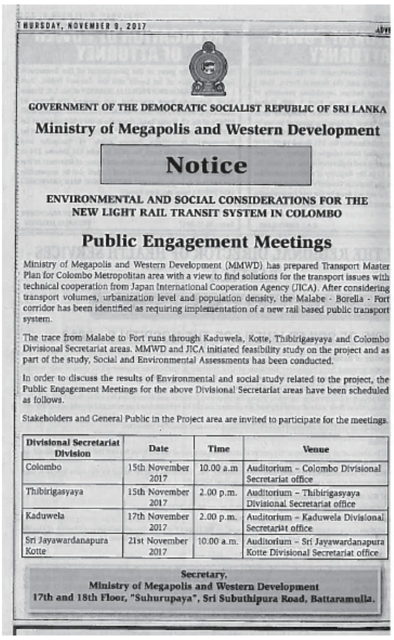
அறிவித்தல்

Newspaper announcements (Sinhala and Tamil versions) for the Public Engagement Meeting

(EIA Scoping)



THURSDAY, NOVEMBER 9, 2017

GOVERNMENT OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

Ministry of Megapolis and Western Development

Notice

ENVIRONMENTAL AND SOCIAL CONSIDERATIONS FOR THE NEW LIGHT RAIL TRANSIT SYSTEM IN COLOMBO

Public Engagement Meetings

Ministry of Megapolis and Western Development (MMWD) has prepared Transport Master Plan for Colombo Metropolitan area with a view to find solutions for the transport issues with technical cooperation from Japan International Cooperation Agency (JICA). After considering transport volumes, urbanization level and population density, the Malabe - Borella - Fort corridor has been identified as requiring implementation of a new rail based public transport system.

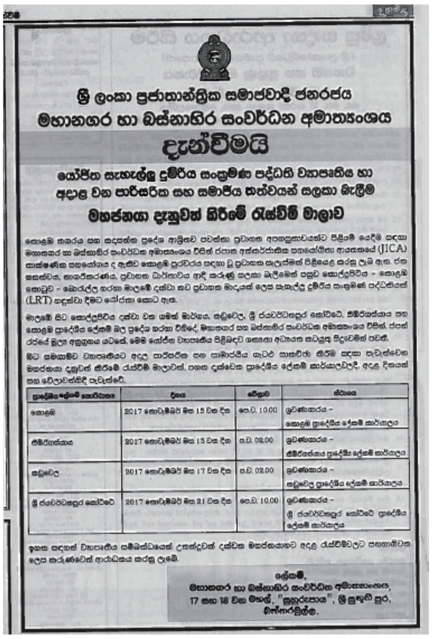
The trace from Malabe to Fort runs through Kaduwela, Kotte, Thibirigasyaya and Colombo Divisional Secretariat areas. MMWD and JICA initiated feasibility study on the project and as part of the study, Social and Environmental Assessments has been conducted.

In order to discuss the results of Environmental and social study related to the project, the Public Engagement Meetings for the above Divisional Secretariat areas have been scheduled as follows.

Stakeholders and General Public in the Project area are invited to participate for the meetings.

Divisional Secretariat Division	Date	Time	Venue
Colombo	15th November 2017	10.00 a.m	Auditorium – Colombo Divisional Secretariat office
Thibirigasyaya	15th November 2017	2.00 p.m.	Auditorium – Thibirigasyaya Divisional Secretariat office
Kaduwela	17th November 2017	2.00 p.m.	Auditorium – Kaduwela Divisional Secretariat office
Sri Jayawardanapura Kotte	21st November 2017	10.00 a.m.	Auditorium – Sri Jayawardanapura Kotte Divisional Secretariat office

Secretary,
Ministry of Megapolis and Western Development
17th and 18th Floor, "Suhurupaya", Sri Subuthipura Road, Battaramulla.



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යෝජිත සැහැල්ලු දුම්රිය සංක්‍රමණ පද්ධති ව්‍යාපෘතිය හා අදාළ වන පාරිසරික සහ සමාජීය තත්වයන් සලකා බැලීම

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Newspaper announcements (English and Sinhala versions) for the Public Engagement Meeting

(EIA Disclosure)

2. Stakeholder and Public Engagement Activities

Several stakeholders have been conducted by the PMU to ensure an open, inclusive and consultative engagement process. The approach employed takes into account dynamics across the horizontal and vertical spectrum of the government in order to gather support from relevant government agencies and local governments before reaching out to the public.

Thus, awareness meetings were separately conducted for relevant government agencies (including municipal councils), (Kaduwela) Agrarian Services Department, DS and GNs. Targeted awareness meetings were also held for the people who may be affected by the Project, such as paddy land owners, tenant farmers, property owners, and business owners. Also, four focus group discussions were held targeting specific groups that the Project may have an impact on. For the EIA process, 4 public engagement meetings were conducted per DS during for both the scoping phase and report disclosure. Besides these, a special stakeholder meeting was conducted to discuss Thalangama EPA. The summary of all engagement meetings conducted with the corresponding responses on how these have been considered in the Project, is shown in below.

SUMMARY OF STAKEHOLDER ENGAGEMENT MEETINGS

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
1	May 16, 2017 10:00-13:00	Initial Stakeholder Consultation Meeting	MMWD Office	50	• RDA: Traffic during construction period (need for traffic management plan); Impact on existing roads (need for road widening); Combine LRT with proposed improvement of the Kelani-Valley railway line; Affordability (budget); Potential positive impacts; • UDA: Extension of the LRT to Kaduwela instead of stopping at Malabe; visual impact of elevated structure; facilities for maintenance and repairs at the end point; hydrological impacts of the LRT (proposed trace is on flood inundation area) • LECO: Possibility of underground construction; Impacts on power distribution lines along existing roads; Power requirements of the LRT • JICA Study Team: Issues regarding the construction of depot on paddy fields; Issues regarding crossing of Thalangama EPA • Department of Irrigation: Impact on paddy fields within the EPA (outside of our scope; consult CEA); Location of LRT Cotta Station may impact a proposed housing development in the area (land is owned by the department) • Sri Lanka Transport Board: inclusion of parking facilities (e.g. park and ride)	• Inclusion of traffic management plan development in the EMMP • Design of the elevated structure that would minimize impact on existing roads • Coordination with RDA in terms of road widening at Malabe area • Visual impact of elevated structure included in the Impact Assessment; Provision of mitigation/ management measures • Avoidance of the Thalangama EPA; Conduct of Stakeholder Meeting to discuss issues
2	May 24, 2017 10:30-12:00	Awareness Meeting for Colombo DS and GNs	Auditorium, Colombo DS	45	• GN-Grandpass: Impact on existing railway tracks; Impact on religious places • GN- Keththarama: Land acquisition in Colombo; Impact on existing buildings • Development Officer: Direction of tracks; Ticket price; Passenger capacity	• Avoidance of Gangaramaya Temple and road in front of Altair • Alter route alignment to minimize land acquisition as much as

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
						possible
3	May 26, 2017 11:30-13:00	Awareness Meeting for Thimbirigasyaya DS and GNs	Auditorium Thimbirigasyaya DS Office	31	• Development Officer: Extension of proposed LRT; Potential environmental and social impacts and assessment • GN- Wellawatta: Length of the proposed LRT; Structures (buildings) that may be affected; Passenger capacity; Ticket price	• Conduct of EIA process and development of RAP
4	May 31, 2017 10:15-12:00	Awareness Meeting for Kotte DS and GNs	Auditorium Kotte DS Office	35	• Divisional Secretary: Land acquisition in the Rajagiriya flyover area • Development Officer 1: Road developments around LRT stations; Traffic impact (from Pagoda Road to Nawala Road) and proposed solution • Deputy Director, Planning: Awarding of contract (Japanese company?) • Development Officer 2: Consideration of comments during Monorail Project consultation (extension of the route to Malabe); Parking facilities • Development Officer 3: Express trains; Ticket purchase mechanism; Technical training program for locals	• Propose a cantilever design that would fit within the ROW of the flyover so that no additional acquisition will be necessary • Operation of express and local trains are incorporated in the O&M Plan
5	June 14, 2017 10:20-11:40	Awareness Meeting for Kaduwela DS and GNs	Auditorium, Kaduwela DS Office	58	• GN-Pore: Ticket cost • GN- Muththettugoda: Maintenance of LRT engines • Development Officer 1: Traffic during construction period (traffic management); Employment during construction and operation; Frequency of trains (operation); Implementation issues (like Monorail) • Development Officer 2: Plan for train stations; End to end travel time	
6	June 7, 2017 11:00-12:30	Awareness Meeting for Kaduwela Agrarian Service	Kaduwela Agrarian Centre	30	• ARPA-Malabe West: Leakage of waste/wastewater to surface water (e.g. Kelani River); Impact of depot area on water holding capacity of the swamp (water catchment); Flood mitigation measures • ARPA-Taldiyawala: Compensation for tenant	• Provision of options for wastewater disposal. • Design of the wastewater treatment

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
					farmers and land owners (gap between government valuation and market value); • ARPA-Thunandahena: Hydrological impacts of the depot area (flood mitigation plan); Grievance redress mechanism of MMWD/PMU; Target users • ARPA- Ihala Bomiriya: Construction of structures over a wetland/swamp	plant that would be compliant with standards set by CEA for wastewater • Conduct of flood modelling in the EIA Report to know project impact on wetlands and catchment areas • Adoption of LARC System for compensation to project affected people
7	July 1, 2017 15:00-16:30	Awareness Meeting for Paddy Land Owners and Tenants	Auditorium, Sanasa Developmen t Bank	23	• Land Owner 1: Impact on existing roads • Land Owner 2: Station at Battaramula area; parking/park-and-ride facilities • Land Owner 3: JICA guidelines regarding compensation for land acquisition (Experienced inadequate compensation for a road widening project); Noise impacts in depot area • Tenant Farmer 1: Compensation for impact of geological survey for monorail (bore hole); Filling of paddy lands; Wastewater impact on surrounding paddy lands; Impact of depot elevated structure (light, stagnant water, agricultural activities); Alternative depot area • Tenant Farmer 2: Feasibility of agricultural activities under elevated structures; ROW along LRT route; Impact of construction of depot; environmental impact of wastes from the depot area (risks of leakage and contamination); Plan for sewerage	• Adoption of LARC system for compensation to project affected people
8	July 11, 2017 10:00-11:10	Public Engagement Meeting (Kotte)	Auditorium Kotte DS Office	14	• Operation (travel time, frequency of trips; operating hours) • Project schedule (start of operation)	

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
					• Training of staff (drivers) • Details of LRT structure • Other proposed LRT projects	
9	July 12, 2017 10:15-11:20	Public Engagement Meeting (Colombo)	Auditorium, Colombo DS	34	• Similarity with a tram • Cost; Financing mechanism (loan, grant) • Land acquisition in Colombo • Ticket payment methods • Connectivity with Maradana; Connectivity of stations • Ensure implementation	• Connectivity with Maradana through proposed Transport Station
10	July 12, 2017 13:30-15:00	Public Engagement Meeting (Thimbirigasyaya)	Auditorium Thimbirigasyaya DS Office	29	• Impact of LRT operation on other forms of transportation; Consultation with SLTB, private bus unions, railway department, 3-wheel drivers (alternative income generating program) • Training for LRT staff • Project schedule • Ticket price • Operation (availability of express trains, frequency of trips, emergency exits) • Project cost; Compensation cost • Land acquisition and compensation	• Inclusion of 3-wheel drivers in the focus group discussion; Consultation with the SLTB, National Transport Commission, Western Province Road Passenger Transport Authority at the Initial Stakeholder Meeting
11	July 18, 2017 10:30-12:00	Public Engagement Meeting (Kaduwela)	Auditorium, Kaduwela DS Office	69	• Operation (ticket price, insurance for train users) • Impact on Water Edge • Impact on traffic during construction period; • Opportunities for people of Kaduwela DS • Extension of the LRT Route to Katunayake • Project financing (interest rate for the loan) • Alternative power supply • Compensation for land acquisition and impact on businesses/employment • Impact on Thalangama EPA • Project schedule	• Development of RAP and adoption of LARC System for compensation to project affected people • Avoidance of the Thalangama EPA; Conduct of Stakeholder Meeting to discuss issues

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
					• Associated facilities (park-and-ride facility) • Impact of change in government to project implementation	
12	August 31, 2017 14:30-16:30	Awareness Meeting for Affected Business Owners	18th floor "Suhurupaya"	17	• P&S Manager, Noritake, Regal Theater, People's Bank, Peugot & Mazda: Extent of potential damage to our building; Potential impact to our operation; Compensation; Schedule of construction • CMC: Income restoration program for around 250 small businesses in Borella Supermarket; Extent of potential damage to our building	• Avoidance of Borella Supermarket
13	September 6, 2017 14:20-16:30	EPA Stakeholder Meeting	11th Floor, Sethsiripaya Stage II	3	• Farmers' Organization: Land fillings during construction stage; No considerable impact on the EPA; Demarcations to prevent encroachers; Impact on anicut; • Environmental Foundation Ltd.: Pillars within the EPA boundaries (number and location); Height of the LRT; LRT as a physical boundary (prevent encroachment in EPA); Communication with landowners who may be potentially be affected; Frequency of trips • Centre for Environmental Justice: Exact LRT route; land filling in the depot area; Hydrological impacts of the LRT (risks to flooding along the route and in the depot area); Power supply; Travel time; Maintenance and services	• Avoidance of Thalangama EPA and use of existing roads at Koswatta Junction • Hydrological modelling at the depot area
14	September 2017	FGD: Three wheeler drivers	Borella	7	• Better to introduce luxury trains for a comfortable ride • The system need to be double tracked • Implementation period need to be planned properly with minimal impacts to public	
15	September 2017	FGD: Parents and students of	Malabe	7	• LRT will reduce the travel time and traveling will be comfortable • Project will reduce traffic and land prices will	• Incorporation of barrier free concept in the LRT design

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
		Ananda Vidyalaya - Malabe			increase • There need to be equal opportunity for adults, children and differently abled people • Alternative routes needs to be proposed or the use during construction period • Wetlands need to be protected as those are essential to reduce floods.	• Consideration of traffic and hydrological (flooding) impacts during construction period
16	September 2017	FGD: Pedestrians	Town Hall	6	• The development is good as it will reduce the existing traffic situation. • LRT system needs to be efficient and productive better than existing rail system. • Already, the lands were acquired from the road side of Rajagiriya and Battaramulla areas, therefore, the land acquisition need to be minimal. • There need to be equal opportunity for adults, children and differently abled people to use the LRT • Security and proper maintenance is necessary at operational stage.	• Design of the LRT structure at Rajagiriya ensures that no additional land acquisition will be required in the area. • Incorporation of barrier free concept in the LRT design
17	September 2017	FGD: School van drivers	Maradana	6	• Railway development is essential for Sri Lanka. • The traffic congestion will be reduced and the travel time of commuters will be reduced. • Travel safety will be increased with the Project. • There will be temporary issues during implementation but the project will ultimately benefit the people. • Land prices will be increased. • There needs to be a special entrance for elders.	• Incorporation of barrier free concept in the LRT design
18	September	FGD: Bo Tree Devotees	Borella	5	• Avoid impact/damage on Bo trees • Trimming and cutting of branches is acceptable only if religious activities are properly performed	
19	November 11, 2017 10:35-12:00	Public Consultation Meeting: EIA	Auditorium, Colombo DS Office	35	• Concrete mitigation measures to reduce environmental impacts • Project timeline	• Development of EIA Report and RAP • Conduct of awareness

No.	Date & Time	Purpose (Target Audience)	Venue	No. of Pax	Concerns/Issues Raised	Consideration in the LRT Project
		Disclosure (Colombo)			• Impact on shops close to the proposed LRT route (Olcott Mawatha) • Informing the management of an impacted business enterprise	meetings to potentially affected persons/businesses
20	November 11, 2017 14:45-16:00	Public Consultation Meeting: EIA Disclosure (Thimbirigasyaya)	Auditorium, Thimbirigasyaya DS Office	19	• Route selection; Additional LRT route • Impact on Borella supermarket • Impact on transfer of business premises, land acquisition and resettlement • Compensation to project affected persons and businesses	• Avoidance of Borella Supermarket • Development of RAP and adoption of LARC System for compensation to project affected people
21	November 17, 2017 14:00-15:30	Public Consultation Meeting: EIA Disclosure (Kaduwela)	Auditorium, Kaduwela DS Office	60	• Extent of land acquisition for the proposed depot area • Project timeline (start of construction) • Proposed LRT route; additional route (extension to Kaduwela) • Similarity to the Monorail • Passenger capacity • Planned train station in Battaramulla	•
22	November 21, 2017 10:20-12:00	Public Consultation Meeting: EIA Disclosure (Kotte)	Auditorium, WP/ Jaya/ Sirihada Vidyalaya, Rajagiriya	12	• Plan for the Rajagiriya flyover area • Impact on marshlands caused by illegal constructions (apartments) in Rajagiriya • Need for behavioral change in people to solve traffic issue • Compensation for PAPs and need for political will • Construction impacts	• Propose a cantilever design that would fit within the ROW of the flyover so that no additional acquisition will be necessary • Development of RAP and adoption of LARC System for compensation to project affected people

Focus Group Discussions

1. Group Discussion with Three wheel drivers @ Boralla on LRT Project

It was revealed that the Three-Wheeler Drivers around Borella were extremely positive towards the Light Rail Transit (LRT) project. Their views and suggestions are listed below;

- Implementing stage of this project must be done diligently.
- A **double-track** railway must be designed as it involves running one track in each direction.
- Must include **Luxury trains** that are specifically designed to offer an elegant train ride with comfortable traveling options.
- Implementation stage could be planned with the minimal effects towards the public.
- As a suggestion, Borella Police Station must be taken off and let Light Rail move across that way.
- At the developing stage, if the Bo Tree lay as a barrier, cut it down and continue with the process.

2. Group Discussion with Parents of the students in "Malabe Ananda Vidyalaya"

It was revealed that the parents of the children in Ananda College, Malabe were extremely positive towards the Light Rail Transit (LRT) project. Their views and suggestions are as shown below;

- This project should be actualized effectively and productively.
- It encourages the community to reduce time on transportation and at meanwhile, they can have a comfortable ride.
- On the off chance, if the school children are influenced at the development phase of this project, particular moves must be made to avoid such impacts.
- Upturning the price of the lands would be another ideal reality through this undertaking.
- This project would help to diminish traffic clog around Colombo City.
- There should be alternative streets to be utilized during the construction stage of the LRT project keeping in mind the end goal to decrease traffic.
- Adults, Children as well as disabled persons must be given equal opportunity to use the light rail.
- There shouldn't be any harm towards the wetlands as this undertaking must be executed with zero harm towards the environment. Particularly it will affect possible flood situations inside Colombo District.

3. Group Discussion with devotees @ Boralla "BoTree"

Discussed with the devotees of the respected Boralla Bo Tree. The premises belongs to Colombo Municipal Council. People in surrounding area perform religious activities. The people is believing that the Bo Tree is very important for the Buddhist Community and the Bo Tree is having a miracle power. If it is removed it may come harm to the people who involved. Their thought is not to be any damage to the Bo Tree.

After the explanation of the project and the type of the impact to this Bo Tree they accepted the smooth trimming . But before the trimming It should be performed all religious activities should be properly performed.

The perception of these people regarding LRT is very positive. According to them proposed Light Rail will provide more comfortable travel mode to the commuters.

4. Group Discussion with pedestrians @ Town Hall

Discussions had with the pedestrians surrounding area of the Town Hall were happy with the proposed Light Rail Transit (LRT) project. They expressed their views very positive manner. Their views and suggestions are as follows

- This project should be designed effectually and productively.(To be avoid all bad things of Sri Lanka Railway)
- The end goal of the LRT should be to reduce the traffic jam.
- The land owners in either sides of the existing road (specially Rajagiriya,Batteramulla area) has already sacrificed their valuable property for the widening of the route. Therefore it should be taken necessary actions to avoid land acquisition as possible.
- The LRT will reassure the community to reduce time on transportation and at meanwhile, they can have a comfortable ride.
- Elderly people , Children as well as disabled persons must be given equal opportunity to use the light rail.
- Security and the proper maintenance is essential at the operational stages.

5. Group Discussion with school Van Drivers in Maradana area.

After the interview had with the school van drivers, it was revealed that they were extremely positive towards the Light Rail Transit (LRT) project. Few of their views and suggestions could be listed down as follows;

- Road development is one of the most essential fact for developing countries like Sri Lanka. Therefore, this project needs to be implemented actively and fruitfully.
- This would assist to reduce traffic congestion around Colombo City.
- It helps the travelers to reduce time on transportation thus, can have a cozy ride.
- There will be an impact towards the economic ailments at the implementation stage. However, people will have to bare this condition until the project is been done since, it is only them who will be ultimately benefited through this project.
- Community could travel safely.

- Increase the lands prices either sides of the road, in future would be another favorable fact through this project.
- There must be special entrance facilities for elderly people.

Meeting minutes of SHM

Ministry of Megapolis and Western Development (MMWD)

New Light Rail Transit System from Kollupitiya to Malabe

STAKEHOLDERS PARTICIPATION AND INFORMATION DISCLOSURE

Minutes of Initial Stakeholder Consultation Meeting

Date: 16th May 2017 from 10:00AM-13:00PM

Venue: Auditorium, 11th Floor, Sethsiripaya Stage II, Battaramaulla

Organized by: Ministry of Megapolis and Western Development

Participating Institutions:

1. *Secretary of the Ministry of Megapolis and Western Development*
2. *Representatives from JICA Study Team*
3. *Representatives from JICA Sri Lanka Office*
4. *Representative from DS office of Kaduwela & Sri Jayawardenapura – Kotte*
5. *Representatives from Municipal Councils of Colombo, Kaduwela & Sri Jayawardenapura – Kotte*
6. *Officials from Ministry of Higher Education and Highways*
7. *Officials from Ministry of Megapolis and Western Development*
8. *Ministry of Provincial Councils and Local Government*
9. *Ministry of Law and Order and Southern Development*
10. *Representatives from Urban Development Authority*
11. *Road Development Authority*
12. *Ceylon Electricity Board*
13. *Lanka Electricity Company (Pvt) Ltd*
14. *National Water Supply and Drainage Board*
15. *Sri Lanka Telecom, Department of Motor Traffic*
16. *Sri Lanka Transport Board, National Transport Commission*
17. *Western Province Road Passenger Transport Authority*
18. *Department of Railways*
19. *National Physical Planning Department*
20. *Department of Irrigation*
21. *Department of National Planning*

(List of Participants given in Attachment- A)

Speeches & Presentations

- Eng. Chaminda Ariyadasa (Project Director – Light Rail Transit Project) welcomed all participants for the Initial stakeholder meeting.
- Project Director then made the Opening Remarks regarding information disclosure followed by a presentation on the LRT.
- After the tea break all participants were invited to state their views on the project and ask for clarifications.

Details of Discussions

Table 01: *Comments and Questions by Participants of Initial Stakeholder Meeting-16th May 2017*

Raised by	Comments and/ or Questions	Answered by	Answer
Mr. T.L.M. Fernando (Project Director, Port Access Elevated Highway, Road Development Authority)	- Need to mitigate traffic jams during the construction period. - Since some main roads will get affected, roads may have to be widened to reduce the impacts. - There should be a proper traffic management plan.	Ms. Kalyani Dias (Environmental Specialist-WRMPP) Dr. Dimantha de Silva (Transport Specialist-WRMPP)	- Existing roads will be widened to reduce the impact of traffic congestion after discussion with RDA. - Alternative roads will be identified and developed to reduce the traffic congestion during the construction period.
Mr. K.D.L. Chandradasa (Deputy Director-Planning) Urban Development Authority	- Why it is not extended up to Kaduwela instead of Malabe? - Kaduwela is fast developing as a residential area and this will help to cater to existing development as well as encourage new developments. - Kaduwela is also a gateway to Colombo from Badulla/Rathnapura/Awissawella (A04) and Biyagama, Pugoda areas.	Mr. Chaminda Ariyadasa (Director - LRT project)	- There will be provision to continue up to Kaduwela in the future. - But at this stage it will be only up to Malabe due to financial constraints.
Mr. K.D.L. Chandradasa (Deputy Director-Planning)- (UDA)	- Will it be a visual barrier due to the elevated structure?	Ms. Kalyani Dias and Dr. Dimantha de Silva	- In Sri Lankan Context, Different sizes of buildings have different colours. - However, the LRT will be designed aesthetically to blend with the landscape.
Dr. Narendra Silva (Electrical Engineer) Lanka Electricity Company (Pvt) Ltd (LECO)	- Has the option for underground construction been explored?	Dr. Dimantha de Silva	- Lot of countries select underground as an option but the cost would be very high. - In the construction area the water table is high and need to use special construction techniques, therefore construction cost would be high. - Going underground can be considered generally cost is the factor.
Mr. K.D.L.Chandradasa (Deputy Director-Planning)- (UDA)	- Are there facilities for maintenance/ repairs at the end point?	Maintenance Engineer, JICA Study Team	- LRT system includes a depot which provides operations such as daily cleaning of interior and exterior, regular services and maintenance.

Mr. Yohei Suzuki, JICA Study Team	- The proposed depot area near Chandrika Kumarathunga Mawatha consists of paddy fields and all those are private lands. Will it be a problem?	Mr. K.D.L. Chandradasa (Deputy Director-Planning)- (UDA)	- Paddy lands are not being cultivated currently in most of the Malabe area and other urban areas. - People's living patterns have changed and farming is an occupation practiced by only a few.
Mr. Yohei Suzuki, JICA Study Team	- The proposed main route runs across the Talangama Environmental Protection Area (EPA). Will it be a problem?	Dr. Dimantha de Silva, Ms. Kalyani Dias, Ms. Ramani Ellepola	- We are still in the process of finalizing the trace. - Since this particular area is declared as an environmental protection area of Talangama tank, there are certain activities which are not permitted. Need to consult with Central Environment Authority and see what permissions are required. - If they don't allow we can go for the alternative options which runs across Koswatta junction or along the boundary of EPA.
Mr. T.L.M. Fernando (Project Director, Port Access Elevated Highway, RDA)	- There is a proposal to improve the Kelani Valley railway line as a double line. Is it possible to combine this LRT line with the Kelani Valley railway line?	Dr. Dimantha de Silva	- Kelani valley line and LRT have different routes. - When developing the Transport Master plan whole network has been considered based on network analysis and traffic demand. If station locations are away from business/ commercial centers or residential areas then people will not be attracted to LRT. If we consider coastal railway line main problem is some parts of the line going away from residential areas and commercial/ business centers. Therefore people need to get support from other transport modes. Therefore the route has been selected which closer it to main roads and commercial centers.
	- Is LRT affordable?	Dr. Dimantha de Silva	- LRT is an alternative new transport mode. Due to the usage of three-wheelers and motor cycles and due to the discomfort of existing public transport modes, usage of the public transport have decreased. This LRT project is proposed to attract people back to public transport. - Ex- The share of the public transport was 65%. It decreased to 50% during last few years. The balance of 15% shifted to three-wheelers and motor cycles. People pay Rs. 40.00 per 1 km for three wheels and

			cost for 1 km for motor bike is around Rs. 12.00. The cost of using LRT will be much cheaper, convenient, more comfortable and safer.
	- Positive impacts of proposed LRT system	D.D Pathmasiri (Representative from Kaduwela Divisional Secretariat)	- The proposed LRT will attract more people to the public transport system. It will reduce existing traffic congestion, emissions and will have many positive impacts. However, government should enforce new laws to prohibit entrance to the tracks.
Dr. Narendra Silva (Electrical Engineer)-LECO	- 11kv or 33kV power distribution lines run along the side of the road. Maintenance of these lines will be a problem during the construction period of LRT structures and also during the operations. Therefore going underground is ideal. - Or, otherwise can we hang the power distribution lines along LRT structures? - And also what is the power requirement for LRT?	Mr. Chaminda Ariyadasa	- We need to have detailed discussions with CEB about the power supply for LRT after the route is finalized. We should have some backup in addition to the existing power supply.
		Dr. Dimantha de Siiva	- Undergrounding of LRT can be considered generally the high cost is the factor, Undergrounding of electricity cables will be the best option. - Hanging utilities and street lights along LRT structures is possible. - We planned to go for third rail option not the overhead supply connectivity. - Now, Third rail option for providing power is common in the world and aesthetically it is not ugly since we don't have overhead cables. - As power requirement is same for LRT and monorail, we can get more details from the study done for monorail.
Mr. G.K Pathmakeerthi Director (Colombo Region), Department of Irrigation	- We are in charge of Talangama tank. The proposed route is outside our command area. You need to contact CEA and Agrarian services department, since there are some paddy fields across the proposed route.	Mr. Chaminda Ariyadasa (Director-LRT project)	- Yes, we need to have discussions with CEA and Agrarian Services department, regarding the Talangama EPA issue. (There were no representatives from CEA, Agrarian Services department, SLLRDC at the meeting).

Mr. T.L.M. Fernando (Project Director, Port Access Elevated Highway, RDA)	- It will be better if you can use pre-cast constructions as much as possible for the structures. Then we can speed up the construction and impact to the traffic will be lower.	Mr. Chaminda Ariyadasa (Director-LRT project)	- Thank you very much for your idea. Anyway, Construction methodology should be such that we have to finish the construction within the least possible time with minimum disturbance to the public.
Mr. P.D.Balasooriya Chief Executive Officer, Sri Lanka Transport Board	- Do you have any parking facilities near stations and any park and ride arrangements?	Dr. Dimantha de Silva	- Park and ride facilities will be provided for all stations outside the city (beyond Battaramulla). And we should focus on cyclists, motorcyclists and three-wheelers. Also need to create new bus routes and shuttle services to connect stations to main towns such as Kaduwela.
		Mr. Chaminda Ariyadasa (Director-LRT project)	- We will make provisions to create new bus routes from Kaduwela, since a large crowd commuting from Avissawella, Hatton, Ratnapura, Balangoda areas will get benefits. We will arrange Park and Ride facilities in all stations where we can acquire lands at reasonable cost.
G.K Pathmakeerthi Director (Colombo Region), Department of Irrigation	- Where is the exact location of cotta road LRT station? There is a land belonging to Department of Irrigation near the proposed station. We have planned a new housing development there and we need to know whether it will get affected or not?	Mr. Chaminda Ariyadasa (Director-LRT project)	- No, the proposed route is along the other side of the road. So, your lands will not get affected. - The proposed cotta road station should be integrated with the railway station, because there will be passengers transferring from railway to LRT. Exact location is not finalized. - After the feasibility study affected land owners will be consulted.
Mr. K.D.L.Chandradasa (Deputy Director-Planning)- (UDA)	- The proposed trace is almost along a flood inundation area. Did you consider this when selecting the trace or have you done any hydrology study?	Mr. Chaminda Ariyadasa (Director - LRT project)	- There will be new pumping station in Ambatale to pump excess flood water to Kelani River under the Metro Colombo Urban Development Project. Now, that project is under tender stage and flood impacts will be reduced after the project is implemented.
		Ms. Kalyani Dias	- Hydrological study need to be covered during the Environmental Impact Assessment (EIA) process.

		Mr. D.A.J.Ranwala- Team Leader- Environmental Impact Assessment Team	- According to the previous investigations, only the depot area is susceptible to flood impacts. Chandrika Kumarathunga Mawatha flooded up to 6 feet during the 2016 floods. Therefore the depot should be elevated and should be higher than that level. - However, we will do a detailed hydrological study and after that we can say whether there is an impact or not. There will be impacts mainly during the construction period not in the operational stage. - By discussing with Irrigation Department and Sri Lanka Land Reclamation and Development Corporation (SLLRDC), we can estimate the major flood possibilities of the Kelani River.
Ms. Aloka Karunarathne (National Transport Council)	- Now, there are some bus routes with over-supply in Colombo especially during the daytime. After the proposed LRT project, impact will increase and it will adversely affect to private bus owners.	Dr. Dimantha de Silva	- Bus rescheduling and rerouting will be planned as a part of the Transport master plan. Bus routes which has oversupply will be rearranged and new bus routes will be created from LRT stations to main towns.
		D.D Matharaarchchi, Senior Programme (Director, Ministry of Higher Education and Highways)	- We should give priority for proposed LRT to improve our public transport system. Then all other issues in other public transport modes (buses, three wheelers) will be automatically resolved.
		Mr. Chaminda Ariyadasa	- New bus routes such as Kaduwela-Pittugala, Biyagama-Malabe, Hanwella - Pittugala will be identified through the project itself and existing buses will be rerouted.
Mr. Yohei Suzuki, JICA study team	- The proposed trace is along the Perahara mawatha. Will it disturb the cultural events of Gangarama temple?	Mr. Chaminda Ariyadasa and Dr.Dimantha de Silva	- If we have columns along the center line of road, it will be a disturbance to the perahara event. Still, we are in the feasibility stage and we need to have discussions with the chief priest of Gangarama temple and come to a conclusion. If it is not possible we can divert the route over the Beira Lake.
Mr. K.D.L. Chandradasa (Deputy Director-Planning)- (UDA)	- Will the Port city development project will get benefits from proposed LRT project?	Mr. Chaminda Ariyadasa	- We had a discussion with officials of the Port city development project last week. We will make a provision for a dedicated line from Port city.

Questions raised and answers given during the discussion was summarized on a white board by officials of WRMPP and JICA study team. Extract of that table is given below.

Environmental	Social	Technical	Other
1. Visual barrier by elevated structure.	1. Integrated development around Malabe area?	1. Improvement of roads. (Discussion with RDA) (Alternative routes)	1.Why is it not extended to Kaduwela instead of Malabe?
2. Functions at the depot. (The Malabe end cleaning maintenance etc.)	2. Park and ride facilities.	2. Intersection with KV line. (From Colombo to Narahenpita.	2. Law enforcement on safety. (No entrance to the tracks)
3. Thalangama Environmental sensitive area. (Discussion with CEA)	3. Cotta road station (Proposed project by Dept. of Irrigation for a housing development)	3. Utility line maintenance. (Discussion with Utility State holders and provisions)	
4. Broken part disposal.	4. Over supply of local bus service.	4. Power supply for LRT.	
5. Floods associated with LRT development. (During and after construction)	5. Identification of new bus route from the project.	5. Transient load calculation.	
	6. Port city connection.	6. Using precast techniques during construction.	

Closing Remarks

Eng. Chaminda Ariyadasa, Project Director-Light Rail Transit Project thanked all the stakeholders for their participation during this discussion. He informed there will be further information sessions in future for stakeholders and public. He further invited all stakeholders to continue their support and requested to ask any clarifications through e-mail and over the phone.

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

The Awareness Meeting for the Introduction of New Light Rail system held at Colombo Divisional secretary Division

Venue: Auditorium (D.S office Colombo)

Date : 24th May 2017

Time : 10.30 am – 12.00pm

Ms. Kanchana Gunawardana (Assistant D.S) welcomed all the participants for the DS level awareness creation meeting organized by the Ministry of Megapolis and Western Development.

Mrs. K. Ranasingha (Projects Manager-CEAA), on behalf of EIA team of the proposed Light rail, stated the purpose of the meeting and invited to Ms. W. Abewickrama (Transport Engineer-WRMPP) to explain the need for the development of transport alternatives for achieving the national development targets.

Ms. Abeywickrama further explained the benefits of the proposed light rail project, with a power point presentation that includes,

1. Requirement of the traffic management plan for the Colombo and suburbs
2. Main corridors considered to introduce alternate transport solutions in Colombo and suburbs
3. Selected corridors to implement the proposed light rail
4. Reasons for select Light rail instead of other transport modes.

Then she presented the proposed light rail trace and affected GN divisions due to proposed project. She further stated that there are 21 stations along the light rail trace runs from IT Park, Malabe to Kollupitiya via Colombo Fort. She also presented some Light rail projects in various countries with some photographs and a video.

Mrs. Ranasingha explained about the socio- Economic Study that will be carried out to identify and minimize any adverse impacts to people due to the project and propose remedial steps to overcome any hardships caused by the project.

The discussion was opened to questions and comments.

Raised by	Question	Answer
G.N Ekanayake (Grama Niladhari- Grandpass)	Will the existing railway tracks get affected with proposed light rail?	No. Proposed light rail runs through a trace which is not covered by existing railway.
H.A.D Harsha (Grama Niladhari - Keththarama)	Are there any land acquisition occurs in Colombo area?	Light rail tracks will be constructed as elevated over the existing roads. Therefore land acquisition may be minimal. But there may be certain impacts on some nearby buildings and

		lands. After the feasibility study affected land owners will be consulted.
G.N Ekanayake (Grama Niladhari- Grandpass)	Will this project affect religious places?	Still there is no confirmed information about religious places that might get affected as a result of this project. However there will be an impact to Navam perahara event of Gangarama temple, since the proposed trace is along the Perahara mawatha. Still, we are in the feasibility stage and we need to have discussions with the chief priest of Gangarama temple and come to a conclusion.
H.A.D Harsha (Grama Niladhari - Keththarama)	Are there any impacts on existing buildings?	Some buildings and lands will get affected during the construction period as well as the operational phases of the project. However we will try to design the route with minimal damages to nearby structures.
K.G.V Gunarathne (Development Officer)	Are there two tracks in Light rail for both directions?	Yes. There are two tracks separately towards Colombo and outwards Colombo.
K.G.V Gunarathne (Development Officer)	What is the ticket price for a single journey from Malabe to Fort?	The ticket price will be affordable and it is not calculated yet. However, the cost of using LRT will be much cheaper than using Motorbikes and Three wheelers.
K.G.V Gunarathne (Development Officer)	What is the capacity of the train? At once how many people can travel?	It will depends on the number and the type of compartments we used. As an example with 02 compartments train can carry about 6600 PPHPD. With 03 compartments it can carry about 10000 PPHPD.

Eng. Chaminda Ariyadasa (Project Director of the LRT Project) further explained more details about the commencement date of the construction and how project finance. He stated that the proposed light Rail project will be funded by the Japanese Government with a lowest interest such as 0.1% per Annum. He further stated that the feasibility report should be submitted before the next year and negotiations to be held around February 2018. He convinced the need of the transport alternatives like LRT project to achieve national development goals and requested that the support of all Grama Niladharis and field officers to achieve the project's success. He further requested to contact him over the phone or through e-mail for any suggestions or clarifications.

Project Director thanked all participants and meeting was adjourned.

List of participants for the Awareness meeting and their contact details are presented below. (Attachment A)

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Awareness Meeting on Proposed Light Rail Transit system held at Thibirigasyaya Divisional secretary Division

Venue: Auditorium (D.S office- Thibirigasyaya)

Date : 26th May 2017

Time : 11.30 am – 1.00pm

Ms. Erandi Chamila (Asst. Director Planning) welcomed all the participants for the DS level awareness creation meeting for the Introduction of New Light Rail system from Malabe to Kollupitiya.

Eng. Chaminda Ariyadasa (Project Director-Light Rail Project), explained the purpose of the meeting and the need for the development of alternative transport modes to reduce existing traffic congestion.

Eng. Ariyadasa further explained,

- Main corridors considered and proposed transport networks under Transport Master Plan
- Need of a Rail based public transport system to reduce traffic congestion
- Reasons for selecting Malabe corridor to implement LRT
- Reasons for selecting Light rail instead of other public transport modes such as Monorail

With a power point presentation.

He also explained the features of Light Rail with some photographs of light rail transit systems in other countries.

Then He explained the design concept of LRT system and space requirement for Light Rail structures. He stated that proposed light rail trace runs above the center median of existing roads with the support of RDA.

Then He presented the proposed trace of LRT system from Malabe to Kollupitiya and affected GN divisions due to the LRT project. He also presented the proposed route, stations and depot area using Google Earth. He stated that Depot area will be constructed as elevated near Chandrika Kumaratunga Mawatha, Malabe.

Then he explained the expected social and environmental impacts of the Project and proposed mitigation measures. He stated that Environmental and Social Impact assessment and Resettlement Action Plan will be carried out to estimate those impacts.

Finally, He explained the communication mechanism and schedule of the project activities.

He further requested to contact him over the phone or through e-mail for any suggestions or clarifications.

The discussion opened to questions and further clarifications.

The questions raised and answers given during the session is presented below.

Raised by	Question	Answer
K. Wijewardana (Development officer)	Can't we use these trains for long distances?	This train cannot use for long distance journeys. The purpose of introducing light rail is to minimize the traffic congestion in Colombo area and to cover a trace that is not covered by the present railway system.
Saman perera (Grama Niladhari- Wellawatta)	What is the length of proposed LRT system?	The total distance is about 26kms from Malabe to Kollupitiya. There will be 21 stations in between.
K. Wijewardana (Development officer)	Has the project focused on the environmental impact as well?	Yes. Environmental Imapct Assessment (EIA) will be carried out by a consulting company as a part of the Feasibility Study.
K. Wijewardana (Development officer)	Though there's an environmental and social study conducted for the Uma oya project, there were so many issues arose from that project. Can something similar happen by this project as well?	When implementing a project there may be some environmental and social issues which can't be omit completely. However our expectation is to implement the project with minimum environmental and social impacts.
Saman perera (Grama Niladhari- Wellawatta)	Have you identified the buildings that might get affected as a result of this project?	Proposed LRT will be constructed as elevated over the existing roads. Therefore land acquisition may be minimal. But there may be certain impacts on some nearby buildings and lands. Still there are no confirmed information about buildings that might get affected as a result of this project. After the feasibility study affected land owners will be consulted.
Saman perera (Grama Niladhari-Wellawatta)	At once how many can travel in a train?	It will depends on the number of compartments. A train with 02 vehicles at 02 min frequency can carry about 10000 PPHPD.
Saman perera (Grama Niladhari- Wellawatta)	How much is the ticket price from Malabe to Fort?	The ticket price is not calculated yet. However, One way ticket from Malabe to Colombo will cost about 100-150 LKR.

Mr. D.A.J. Ranwala (Team Leader-EIA team) joined the Discussion and explained about the Environmental impact assessment mechanism and how to mitigate potential environmental impacts of the project.

Project Director showed a video of Light rail project to the audience before adjourning the meeting.

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Awareness Meeting on Proposed Light Rail Transit system held at Kotte Divisional secretariat Division

Venue: Auditorium, Sri Jayewardenepura Kotte Divisional Secretariat Office, Rajagiriya

Date: 31.05.2017

Time: 10.15 am - 12.00 pm

Mr. Amal Edirisooriya, Divisional Secretariat welcomed all the participants for the awareness programme and invited Mr. Chaminda Ariyadasa, Project Director to present the proposed project to the participants.

Mr. Ariyadasa explained the need of social and environmental assessment for the proposed LRT Project and the importance of holding consultation meetings with the field officers and Grama Niladharis to obtain their views and suggestions. He then presented about the proposed LRT project with a power point presentation. His presentation included following points;

- Need of an alternative transport mechanism to reduce existing traffic congestion
- Need of a Rail based public transport system like LRT to reduce traffic congestion
- Proposed LRT system and the proposed transport Network in Colombo Megapolis Region
- How the project to be financed
- Reasons for selecting Malabe corridor to implement LRT
- Design concept of LRT system and space requirement for Light Rail structures
- Proposed trace of LRT from Malabe to Kollupitiya and affected GN divisions due to the LRT project
- Expected Impacts of the proposed project and the future steps to be taken

He also explained the features of Light Rail with some photographs of light rail transit systems in other countries. He also presented the proposed route, stations and depot area using Google Earth.

He further stated that Environmental and Social Impact Assessment and Resettlement Action Plan will be carried out to estimate impacts of the project.

Mr. Yohei Suzuki (JICA study team) joined the discussion and invited everyone to share their views as it will be helpful for the success of the proposed project.

Presentation was ended by showing a video on operation of LRT and the floor was opened for questions, queries and suggestions of the participants.

Raised by	Question raised/Suggestion	Answer/Respond
Mr. Amal Edirisooriya, Divisional Secretariat	The current flyover project in Rajagiriya has acquired lands in the area, Do we need to acquire more lands for this proposed project?	We don't expect to acquire more lands for the LRT project but we will try to accommodate within the available space. Light rail tracks towards Colombo and towards Malabe will be

		constructed separately along the sides of flyover.
Mr. Sirimal Silva (Development Officer)	Will there be road developments around LRT stations parallel to the project? There is a huge traffic congestion from Pagoda Road to Nawala Road during the peak hours. The solution for that would be to build a temporary bridge across Kolonnawa Canal along the Ananda Balika Mawatha. There is a similar temporary bridge constructed in Aththidiya area about 20 years ago and it was helpful to reduce traffic congestion.	Yes, Existing roads will be widened to reduce the impact of traffic congestion after discussions with RDA. Alternative roads will be identified and developed to reduce the traffic congestion during the construction period. Building such a bridge would be cost effective compared to the budget of the proposed LRT project which will cost about 1.4 billion USD.
Ms. R.L.Suneetha (Deputy Director Planning)	Is it a must to award the contract for the construction of LRT system to a Japanese company?	No. it is not a must. We can award the contract for construction to any company selected by the Ministry. But we have to purchase 30% of the construction materials from Japan.
Mr. Dumindu Thushan (Development Officer)	In 2014, JICA conducted a similar consultation programme for the Monorail project. In that programme we suggested to extend the trace beyond Malabe up to Chandrika Kumaratunga Mawatha. I am happy to say that our suggestions were included in the proposed LRT system. I would also like to suggest to consider establishing parking facilities for LRT users at every station. Moreover, I have noticed that about 60% of the road space is occupied by private cars carrying 1 or 2 persons. This is one of the major reason for existing traffic	We will arrange Park and Ride facilities in all stations including at the depot to be established at Chandrika Kumarathunga Mawatha. For the park and ride facilities, We will try to use government lands as much as possible. We do not try to obtain lands belongs to private owners. If owners of private lands are willing to give their lands as an investment, we will consider that too. We have further planned to develop these parking facilities as business ventures with shopping complexes especially in the depot area. Owners of those

	congestion. Introducing a system like car Pooling in Sri Lanka would help to solve this issue. In addition to that a dedicated bus lane should be introduced to systemize the public transport.	agricultural lands could obtain permanent shops from the shopping complexes for their businesses. In addition to that we will introduce a mechanism to make use of the already dedicated bus lanes under transport development project.
Mr. Sajeewa Ekanayake (Development Officer)	Is it possible to introduce an express Light Rail from Malabe to Fort? What is the ticket purchasing mechanism for LRT? What mechanisms would be used to familiarize this system to locals?	We have already planned to introduce an express LRT after every two trains in the peak hours. We are still in the process of studying about that under the feasibility study. The ticket price is not calculated yet. However, we expect to charge 100 – 150 LKR for a single journey from Fort to Malabe. We do not expect to cover the project cost from the ticket price. Only the operation and maintenance cost will be covered through ticket price. Japanese instructors and the engineers will train local LRT staffs for few months.

Mr. Amal Edirisooriya, Divisional Secretariat thanked all the participants for their attendance and their valuable comments and suggestions.

The meeting was adjourned at 12 noon.

List of participants for the Awareness meeting and their contact details are presented below.
(Attachment A)

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Awareness Meeting on Proposed Light Rail Transit system held at Kaduwela Divisional Secretariat

Venue: Auditorium, Divisional Secretariat, Kaduwela

Date: 14.06.2017

Time: 10.20 am to 11.40am

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Mr. R. Pushpakumara – Deputy Project Director -LRT Project-MMWD
- Ms. K. S. Dilhani, Assistant Divisional Secretariat - Kaduwela
- Mr. Anura Ranwala, Team Leader, EIA Team - LRT Project
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Grama Niladharis and Development Officers attached to the Divisional Secretariat, Kaduwela (List of Grama Niladharis and Development Officers participated is given in Attachment A)

Ms. K. S. Dilhani, Assistant Divisional Secretariat of Kaduwela Divisional Secretariat welcomed all the participants for the awareness programme on LRT. She explained the importance of a new public transport system from Malabe to Fort considering the new Administrative city coming in Battaramulla/Malabe area with the new government offices such as Sethsiripaya Stage II and III, Suhurupaya and Sri Lanka Army Headquarters in Akuregoda.

Population in the area will be increased due to these development projects and there is a need for improved transport systems to facilitate public. Assistant Divisional Secretariat invited Mr. Chaminda Ariyadasa, Project Director to explain the proposed project and its importance to the Field officers.

Mr. Ariyadasa explained the need of social and environmental assessment for the proposed LRT Project and the importance of holding consultation meetings with the Development officers and Grama Niladharis to obtain their views and suggestions. He then presented the proposed LRT project with a power point presentation. His presentation included following points;

- Need of an alternative transport mechanism to reduce existing traffic congestion
- Need of a Rail based public transport system like LRT to reduce traffic congestion
- Proposed LRT system and the proposed transport Network in Colombo Megapolis Region
- How the project to be financed
- Reasons for selecting Malabe corridor to implement LRT
- Design concept of LRT system and space requirement for Light Rail structures
- Proposed trace of LRT from Malabe to Kollupitiya and affected GN divisions due to the LRT project
- Expected Impacts of the proposed project and the future steps to be taken

Mr. Ariyadasa's presentation was ended after showing a virtual demonstration of the proposed LRT route from Malabe to Kollupitiya and Participants were invited to state their views on the project and ask for clarifications.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. W.P.P. Perera Grama Niladhari	How much a LRT ticket will cost from Malabe to Fort?	The ticket price is not calculated yet. However, we expect to charge 100 – 150 LKR for a single journey from Fort to Malabe. We do not expect to cover the project cost from the ticket price. Only the operation and maintenance cost will be covered through ticket price.
Mr. Indika Perera, Grama Niladhari	In the past we removed some of the train engines imported from Japan as the engines could not performed after some time. Will this happen to the LRT engines if we buy them from Japan?	I am not aware about those engines you mentioned. Though the agreement is to purchase 30% of construction materials from Japan we have not yet decided what to purchase from them. However LRT is driven by electricity and does not require an engine.
Mr. M.P. Jayantha, Development Officer	There will be heavy traffic during the construction period of light rail structures. Do you have a Traffic Management mechanism to introduce alternative ways to bypass these routes? It will be helpful for the employees in the battaramulla area. Do we have to hire foreign experts and labour for the Construction and operation of LRT? What is the frequency of those trains? In 2014, there was a similar project proposal called Monorail. They also had some meetings but	Yes, we have planned to develop a traffic management plan with the support of the Police and RDA. We will introduce alternative routes as much as possible. At the moment Transport Engineering Division of University of Moratuwa is studying about possible Traffic management mechanisms. No, We can use local labour force for the construction as much as possible. But we might have to obtain technical expertise from Japan as we do

	the project did not executed. Will the same thing happen to this project?	not have our own experts for this subject. Japanese instructors and the engineers will train local LRT staffs for few months during the operation stage. During peak hours there will be a train for every 4 minutes and in night time trains will be available at 10 min frequency. Monorail system is outdated now and some developed countries have removed their monorail systems. LRT is more cost effective compared to Monorail and it is more suitable for Sri Lanka.
Mr. D.M.W.Uyangoda, Development Officer	Are the proposed stations elevated or underground? The route of the previous Monorail project is same and at that time they said that it will take only about 15 minutes to travel from Malabe to Pettah in the same route.	Elevated. Undergrounding of LRT can be considered generally the high cost is the factor. Elevated railway tracks and platforms are cost effective. Monorail is a more fast technology and the time taken to reach Pettah is lesser may be because it had lesser number of stations planned.

Project Director thanked all the participants for their attendance and their valuable comments and suggestions. He invited them to share their ideas and suggestions with the Project Team via phone and the website that will be launched at the end of June.

The meeting was adjourned at 11.40 am.

List of Grama Niladharis and Development Officers participated for the Awareness meeting and their contact details are presented below. (Attachment A)

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Awareness Meeting on Proposed Light Rail Transit system held at Kaduwela Agrarian Centre

Venue: Auditorium, Agrarian Service Centre, Kaduwela

Date: 07.06.2017

Time: 11.00 am to 12.30 pm

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Ms. Wanuji Abeywickrama-Transport Engineer-LRT Project
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Agriculture Research and Production Assistants (ARPA) attached to the Agrarian Service Center, Kaduwela (List of ARPA's participated is given in Attachment A)

An officer from the Agrarian Service Center, Kaduwela welcomed all the participants for the awareness programme and invited Mr. Chaminda Ariyadasa, Project Director to explain the proposed project to the Agrarian Officers.

Mr. Ariyadasa explained the importance of holding consultation meetings with ARPA's to obtain their views, suggestions before approaching to the paddy land owners. He then presented about the proposed LRT project with a power point presentation. Following main points were included in his presentation;

- Proposed LRT system and the proposed transport Network in Colombo Megapolis Region
- Reasons for selecting Malabe corridor to implement LRT
- Design concept of LRT system and space requirement for Light Rail structures and Depot Area
- Proposed depot location and tentative depot plan
- Typical functionalities and maintenance activities of the depot area
- Expected Impacts of the depot and LRT project
- Project Schedule and the future steps to be taken
- Opportunities for paddy land owners in Depot area
- Importance of the support from ARPA's in community consultation

Photographs of Light Rail systems in other countries and Light rail depots in Japan was also shown during the presentation.

Mr. Ariyadasa's presentation was ended after showing a virtual demonstration of the proposed LRT route from Malabe to Kollupitiya and Participants were invited to state their views on the project and ask for clarifications.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. Deeptha Panagoda, ARPA (Malabe West)	The sludge, oil, grease and other waste might get mixed with the waterways in the depot area, when cleaning the trains. Most of these waterways in the depot area lead to the Ambatale (Kelani River), which provides drinking water for the most parts of Colombo. Therefore, special attention needs to be paid during the planning stage of project. This depot will be constructed on columns in a swamp area. Though the swamp will not be filled, the columns might occupy a considerable area from the swamp. This might have an impact on the accumulation of rain water, which may lead to flooding.	We have already planned a proper waste water management system for LRT depot and it was presented here today. Thank you for your valuable feedback regarding that matter. We will consider more reliable mechanisms to dispose waste water properly. This has already been discussed. The plan is to construct columns with 40m span between two columns. Therefore area occupied by columns will be very insignificant. In addition to that, under MCUDP, there will be a new pumping station constructed at Ambatale to pump excess rain water to Kelani River.
Mr. Manjula Prasanna, ARPA (Taldiyawala)	We discussed about the proposed project with farmers earlier and they did not expressed their objections for the project. However, farmers who will release lands for this project should get a reasonable compensation for their lands. At present, one perch in Malabe area worth about 2 million LKR but the government valuation is only 5,000 LKR per perch. This is not reasonable at all. Moreover, the tenant farmers who work in those paddy lands will also lose their income, if these lands are	We are aware of the actual market value of these lands and we will make sure that the owners will be compensated reasonably. We have also made plans to provide compensation for tenant farmers. In addition to that, if anyone has any grievance, they could also share that with the grievance redress committee which will be formed to obtain public concerns. ARPA's can help us to identify such cases and solve those issues.

	acquired for the project. They should also get a compensation for losing their income and the tenancy. When obtaining lands for the project, there should be a proper mechanism to provide compensation for actual owners of lands. In the Outer Circular Highway Project, there are poor farmers who are still litigating to get the allocated compensation for their lands. This should not happen in this project and it is important to make sure that farmers who release their lands will be treated with due recognition.	JICA has its own policies to sort-out such matters. They will not release any grants for the construction until we provide proper compensation for the properties that to be acquired for the project. We will make sure that the land owners will be compensated properly. We might also consider providing special facilities to them to use LRTs, such as free life time passes for them and their immediate family members. In addition to that, the project will facilitate them in having new business opportunities as well as employment opportunities in the depot, for suitable young members of their families.
Mr. Chaminda Thuduhewa, ARPA (Thunandahena)	This depot will be constructed at a swamp where excess rain water in Colombo gets accumulated**.** This area was also flooded twice within the recent past. A flood mitigation plan should be prepared before the implementation of any development project. Earlier there were similar projects carried out in this area by the Ministry of Megapolis and Western Development but we have negative experience working with them. They are not ready to listen to our grievances and nor even respected our concerns. What guarantees that	Flooding is definitely an issue that should be considered and there are few other projects taking place to address this issue. Therefore, we will be able to mitigate flooding in the future. But if we wait till planning a flood mitigation mechanism, we will not be able to carry out any development projects. I cannot agree with this suggestion as an engineer, because climate changes are unpredictable. Projects should not depend on that. I am not aware about other projects carried out by the Ministry and I am not in a

	this project will not treat us in the same way? Do you think that the luxury vehicle owners would like to use LRT? We assume that only the Public who uses the public transport system presently will use this facility.	position to give any comments on that. However, I could assure that I also have personally experienced flooding in this area. Therefore, this project will have a special focus on the environment and social concerns and will listen to public grievances. When people recognize the ease of using LRT and the comfortable facilities available in this system they will start using it. Of course, we will have to develop infrastructure such as park and ride facilities etc. to attract them. It will take some time for people to get used to this system but it will be a great investment for the country.
Ms. Indranie Manike, ARPA (Ihala Bomiriya)	Does the Ministry of Megapolis and Western Development allow to fill swamps for construction projects? There was a housing project planned to construct over a swamp and we objected to that activity.	I am not aware about the particular incidence you mentioned.

Project Director further invited all Agrarian officers to continue their support during the public consultation and requested to ask any clarifications through e-mail and over the phone.

Agriculture Research and Production Assistants agreed to organize a meeting with affected paddy land owners to obtain their views on the implementation of this project.

Mr. Deeptha Panagoda, ARPA (Malabe West) thanked all the participants for their attendance and valuable feedback.

The meeting was adjourned at 12.30 pm.

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Meeting with Paddy land Owners - Kaduwela

An awareness program on the Light Rail Transit (LRT) System in Colombo for affected paddy land owners was held at the Sanasa Development Bank Auditorium in Malabe.

Venue: Auditorium, Sanasa Development Bank Building, Malabe

Date: 01.07.2017

Time: 03.00pm to 04.30pm

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project(JICA) – Ministry of Megapolis and Western Development
- Ms. Wanuji Abeywickrama – Transport Planning Engineer-LRT Project(JICA)
- Ms. Catherine Diomampo-JICA Study Team
- Mr. Deeptha Panagoda - Agriculture Research and Production Assistant-Malabe West
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Paddy land owners and Tenant farmers of the lands in the proposed depot area
  (List of land owners and tenant farmers participated for the meeting is given in Attachment A)

Mr. Chaminda Ariyadasa, welcomed land owners for the awareness meeting and briefed about the objective of the meeting. He explained the need of holding consultation meetings with general public and affected people to obtain their views, suggestions and support during the feasibility studies.

He then presented a powerpoint presentation about the proposed LRT project. His presentation included following information;

- Proposed LRT system and the proposed transport Network in Colombo Megapolis Region
- Reasons for selecting Malabe corridor to implement LRT
- Need of an alternative transport mechanism to reduce traffic
- Design concept of LRT system and space requirement for Light Rail structures and Depot Area
- Proposed depot location and tentative depot plan
- Typical functionalities and maintenance activities of the depot area
- Expected Impacts of the depot and LRT project
- Project Schedule and the future steps to be taken
- Funding of the Project and the Grant repaying system
- Opportunities for paddy land owners in Depot area

Mr. Ariyadasa's presentation was ended after showing a virtual demonstration of the proposed LRT route from Malabe to Kollupitiya and Participants were invited to state their views on the project and ask for clarifications.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. Mahinda Arangala	If you construct concrete pillars on the center median of the road for the LRT the available road space will be narrowed.	Size of a concrete pillar will be about 1.5mx1.5m. Existing roads will be widened to reduce the impact of traffic congestion after discussion with RDA. But, It will narrow roads where we could not provide additional space. We might consider making some roads as one way routes as a mean of addressing your concern. Though there might be side issues arising from the project, we should consider this project as addressing a national need.
Mr. K.A. Sunimal Kumara	Is there a station planned for the Battaramulla junction?	Yes, we have planned a station for Battaramulla and it is planned in the Battaramulla-Pannipitiya Road (174).
	Do you plan any parking facilities near that station or any park and ride arrangements? I have a bare land suitable for parking in that area.	We have not planned any parking facilities yet. However, if the landowners are willing to provide free lands for parking, they could approach us with business proposals.
Mr. Arjuna Perera	There was a similar project implemented in the Chandrika Kumarathunga Mawatha to widen the road. For that project we have to sacrifice our lands and we were not properly compensated for that. We were forced to sign for a paper and we didn't received any opportunity to speak. Even the government Agent (GA) could not provide answers for our queries. People who have power and authority obtained compensations but we did not receive anything. We have heard that JICA will not start a project without providing proper compensation for people. Can you confirm this?	Yes, I can confirm that JICA will not start the construction without sorting out the matters related to compensation. This same question was raised during the meeting held at the Agrarian Services Center and I explained the officers about the JICA projects.

	What is the noise impact of this project in the depot area?	There will not be a huge impact from the noise in the depot area as we have already planned mechanisms to control the noise. However in open areas in the rail track there will be a noise. We have started collecting 24 hour noise measurements along the project route. We did baseline noise measurements in Depot area and Malabe boys college for the Malabe area. We will decide appropriate noise control mechanisms during the feasibility studies.
Mr. G.P. Gunadasa	Monorail track was also planned to build through our paddy lands along the Chandrika Kumarathunga Mawatha. For that project they did some geotechnical investigations by drilling the land (Bore Hole). The machinery were running through my paddy field and destroyed the cultivation. I did not compensated for the loss incurred. Therefore, we prefer the intervention of the Agrarian Service Officers for this project.	I could personally guarantee that LRT will not affect your cultivations during the pre-construction period. However, we have already discussed with the Agrarian Service Officers and we will continuously coordinate with them for this project.
	Will you fill the paddy lands?	No, we will not fill the land as it is a flood retention area.
	I have been cultivating 2 Acres of land beyond the proposed depot area. Will that be affected from the waste water of the depot?	No. As I have explained in my presentation, the depot area will be elevated. We have also planned a proper mechanism to remove waste water into tanks and even a single drop of waste water will not be released to the ground. The mechanism will planned with the technical support of the Japanese team.
	Will there be a sufficient gap between the pillars of the depot area? Will these pillars block the sun light that should fall to the ground? What if the water is stagnated without any sunlight and flows to the cultivated lands down the depot area?	There will be gaps between pillars. We are still doing the environment impact assessment and we cannot provide a definite answer for your question yet. But I hope that there will not be such impacts from proposed elevated depot area.

	There is a concern about the proposed depot location. It is a paddy land where we are cultivating. I propose that it would be better if you could change the location where the land is not occupied for agriculture purposes. Moreover, you have said in your presentation that you expect to extend this rail track to the Kaduwela area in the near future. May be you could construct the depot area near Kaduwela somewhere closer to the Expressway.	We have already considered the option that you have suggested. However there are no other suitable locations where we can find the space that we need for the depot area.
Mr. G.P. Piyadasa	Can we cultivate these lands even if the rail road is built above the lands?	If the government and law permits we can consider that. We still cannot confirm anything as we are doing the feasibility studies at the moment.
	How much space do you need for the reservation of the rail track? Will these constructions affect the houses and buildings in the depot area?	We need only 2m per side. Contractors are responsible for damages during the construction period and you will be protected through third party insurance. If your building was damaged you could claim compensation from the Contractors.
	Dust and the sludge of the trains will flows to the ground in rainy season. Will that affect the environment?	There are certain limitations that we should understand. We could manage the waste water in the depot area but we cannot control this situation in the rail tracks. Yes, during the rainy seasons we might not be able to avoid dust and sludge of the trains releasing to the land. But when compared to the current vehicle waste that is being released to the environment this is much lesser.
	What is the plan for sewerage?	Sewerage recycling or a treatment plant might be established. However we are still doing our environmental and social assessment and we can provide a solid answer to this after that study.

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B

Minutes of the Public Engagement Meeting – Sri Jayawardanapura Kotte

Venue: Auditorium, Divisional Secretariat Office, Sri Jayawardanapura Kotte

Date: 11.07.2017

Time 10.00am – 11.10am

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Mr. R. Pushpakumara – Deputy Project Director -LRT Project-MMWD
- Mr. Herath- Financial Manager- LRT Project-MMWD
- Mr. Yohei Suzuki-JICA Study Team
- Mr. Amal Edirisooriya – Divisional Secretariat - Sri Jayawardanapura Kotte
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Grama Niladharis and Public from Sri Jayawardanapura Kotte DS Division
  (List of Grama Niladharis and Public participated for the meeting is given in Attachment A)

Mr. Amal Edirisooriya (Divisional Secretariat) welcomed participants for the public engagement meeting and briefed about the objective of the meeting. He invited Project Director to address the public.

Mr. Chaminda Ariyadasa, explained the importance of holding consultation meetings with public in the vicinity of proposed LRT route to obtain their views, suggestions and support.

He started the programme by presenting a computer-generated video about light rail transit and LRT systems around the world. He then presented a power point presentation about the proposed LRT project. His presentation included following information;

1. Proposed LRT system and the proposed transport Network in Colombo Megapolis Reigion
2. Reasons for selecting Malambe Corridor for the project
3. Other planned LRT routes in the island
4. Need of an alternative transport mechanism to reduce traffic
5. Expected Environmental and Social impacts of the LRT project
6. Benefits of a cost effective alternative transport system to Sri Lanka
7. Examples of LRT systems used in other regional countries
8. Design concept of LRT system and space requirement for Light Rail structures
9. Funding of the Project and the Grant repaying system
10. Land acquisition and the route of the proposed project
11. A map with connections of the proposed Malabe LRT route
12. Expected Impact of the proposed project
13. Opportunities available for public
14. Project Schedule and the future steps to be taken
15. Issues that might arise during the construction period and the mitigation measures planned

Mr. Ariyadasa presented a video created for the proposed LRT project which described the use of the new transportation system for the locals.

Questions, queries and suggestions of the participants were answered after the presentation.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. D.D. Gamini Perera	How long will it take to reach Kollupitiya from Malabe?	Train will stop at 21 stations and it will take 40 minutes to reach Kollupitiya.
Mr. Gamini Kulasinghe	When are you planning to begin this project?	We are still doing the feasibility study and it will hopefully be completed by the end of 2017. The detail designs will be planned after that and it will take about 1 years' time to complete. The project is planned to start its construction in the end of 2019. It will take about 3 years to complete the constructions.
Mr. Fayek	How are you planning to train our local drivers to use these trains?	Japanese instructors will operate these trains for the first 3 months' time. After that Japanese instructors and the engineers will train local LRT staffs for few months.
	Is this a completely elevated route?	Yes, entire rail track will be constructed over the pillars.
	How many seats are there in a compartment?	The capacity of a compartment is about 150. There are several train models with different capacities.
	What is the frequency of these trains?	In peak hours there will be a train in every 4 minutes. This will be increased according to the demand.
	Is this a 24*7 service?	It will depend on the demand. We might stop this service for few hours between mid-night and 4.00 a.m.
	Will you be starting the designs for other proposed 5 LRT projects as well?	That depends on the interest of the funding agencies and public. Though this is a lucrative business opportunity, investors might have to conduct feasibility studies before involve in this project.

Mr. Amal Edirisooriya, Divisional Secretariat thanked all the participants for their attendance and their valuable comments and suggestions.

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B

Minutes of the Public Engagement Meeting - Colombo

Venue: Auditorium, Divisional Secretariat Office, Colombo.

Date: 12.07.2017

Time 10.15am – 11.20am

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Mr. R. Pushpakumara – Deputy Project Director -LRT Project-MMWD
- Mr. Herath- Financial Manager- LRT Project-MMWD
- Mr. Yohei Suzuki-JICA Study Team
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Grama Niladharis and Public from Kaduwela DS Division
  (List of Grama Niladharis and Public participated for the meeting is given in Attachment A)

Mr. Chaminda Ariyadasa, welcomed participants for the public engagement meeting and briefed about the objective of the meeting. He explained the need of holding consultation meetings with public in the vicinity of the proposed LRT route to obtain their views, suggestions and support.

He started the programme by presenting a computer-generated video about light rail transit systems around the world. He then presented a power point presentation about the proposed LRT project. His presentation included following information;

1. Proposed LRT system and the proposed transport Network in Colombo Megapolis Reigion
2. Reasons for selecting Malabe Corridor for the project
3. Need of an alternative transport mechanism to reduce existing traffic congestion
4. Environmental and Social impacts of the LRT project
5. Benefits of a cost effective alternative transport system to Sri Lanka
6. Examples of LRT systems used in other countries
7. Design concept of LRT system and space requirement for Light Rail structures
8. Funding of the Project and the Grant repaying system
9. Land acquisition and the route of the proposed project
10. Opportunities available for public (Business opportunities, environment protection, job opportunities, compensation for affected)
11. Project Schedule and the future steps to be taken
12. Issues that might arise during the construction period and the mitigation measures planned

Mr. Ariyadasa presented a video created for the proposed LRT project which described the use of the new transportation system for the locals.

Questions, queries and suggestions of the participants were answered after the presentation.

Name and Designation	Question raised / suggestion	Answer / Respond
Ms.K.K.Perera	Is this something similar to tram cars that Sri Lana used to have earlier?	Trams moved on the ground with hanging cables. But this is slightly different than that. The proposed system will be elevated and will not use hanging cables to provide power. Electric power rails will be constructed on the elevated structure running parallel to the rails. (3rd rail option)
	Will this be too expensive?	No. The fares will be slightly higher compared to the current bus fares. However, ticket prices will be affordable for the public. We might consider introducing a Monthly season pass and a special senior citizen pass system.
Mr. S.Nijar	Are you planning to acquire lands for the project from Colombo?	We will be acquiring very limited number of lands and buildings where it is difficult to avoid damaging those. Most of the time the rail track will be constructed on the center median of main road as an elevated structure. We might acquire more space from the pavements to widen the road. We do not hope to acquire private lands for this project. We will be using government facilities as much as possible.
	Is this a loan or a grant?	This is a loan. The interest rate is 0.1% per annum. We are given 40 years' time to repay this and the first 10 years is a concessionary period. Only condition is that we will have to purchase 30% of the construction materials from Japan.
Mr. Zainal Abdeen	How are you planning to charge the fee?	We will introduce an electronic card system so that people can pay through machines located at stations. We will also use a cash payment system at stations to make this easier for the locals.
Ms. Shanthi Mala	Can we get into this train from Maradana?	Yes. It is possible. There will be a station near St. Joseph college and Colombo Fort MMC.
Mr. G.H. Rupasinghe	There were similar discussions organized for similar projects. But they were never implemented. Will the same scenario will happen to this as well?	This is a long term project and we started the feasibility study in the year 2015. It takes lot of time to plan this type of massive project. This costs a similar amount as the Colombo Financial City

		Project. We are still doing the feasibility study and it will hopefully be completed by the end of 2017. The detail designs will be planned after that and it will take about 1 years' time to complete. The project is planned to start its construction in the end of 2019. It will take about 3 years to complete the constructions.
Mr. Pradeep Hewage	Have you planned any public transport system from stations to the nearby cities for the users of these trains?	Yes. When the project starts, local buses will lose their income as many people will be using this system. We are planning to make use of buses to establish a well-organized shuttle service system from stations.
Mr. Premasiri	Currently it takes 1 hour to travel 20kms in a motor bike in this traffic. Therefore, LRT will be a very useful system for us. But can you guarantee that this project will implement and it will not be ended like the monorail project?	There are many different transportation models in the world and we will only introduce what is best for Sri Lanka. Earlier we thought that monorail is the best but later we understood that LRT will be much usable and practical for local usage.

Mr. Ariyadasa thanked all the participants for their attendance and valuable feedback. He invited them to share their ideas and suggestions with the Project Team via phone and the website.

The meeting was adjourned at 11.20 am.

Attachments

List of participants for the Public Engagement Meeting and their contact details - Attachment A

Photographs of the Meeting - Attachment B

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B






Minutes of the Public Engagement Meeting - Thimbirigasyaya

Venue: Auditorium, Divisional Secretariat Office, Thimbirigasyaya

Date: 12.07.2017

Time: 1.30 p.m-3.00 p.m.

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Mr. R. Pushpakumara – Deputy Project Director -LRT Project-MMWD
- Mr. Herath- Financial Manager- LRT Project-MMWD
- Mr. Yohei Suzuki-JICA Study Team
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Grama Niladharis and Public from Kaduwela DS Division
  (List of Grama Niladharis and Public participated for the meeting is given in Attachment A)

Mr. Chaminda Ariyadasa, welcomed participants for the public engagement meeting and briefed about the objective of the meeting. He explained the need of holding consultation meetings with public and land owners along the proposed LRT route to obtain their views, suggestions and support.

He started the programme by presenting a computer-generated video about light rail system and uses around the world. He then presented a powerpoint presentation about the proposed LRT project. His presentation included following information;

1. Proposed LRT system and the proposed transport Network in Colombo Megapolis Reigion
2. Reasons for selecting Malabe Corridor for the project
3. Need of an alternative transport mechanism to reduce existing traffic congestion
4. Environmental and Social impacts of the LRT project
5. Benefits of a cost effective alternative transport system to Sri Lanka
6. Examples of LRT systems used in other countries
7. Design concept of LRT system and space requirement for Light Rail structures
8. Funding of the Project and the Grant repaying system
9. Land acquisition and the route of the proposed project
10. Opportunities available for public (Business opportunities, job opportunities, compensation for affected)
11. Project Schedule and the future steps to be taken
12. Issues that might arise during the construction period and the mitigation measures planned

Mr. Ariyadasa presented a video created for the proposed LRT project which describes the use of the new transportation system for the locals.

Questions, queries and suggestions of the participants were answered after the presentation.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. M. Indika Tharanga	This project might affect the livelihood of three wheel drivers. Can you consider providing them with an alternative income generating programme?	Yes, we can consider providing them employment opportunities at LRT stations and in the depot if they are qualified. We have already planned to obtain services of local buses for a shuttle service from stations to nearby cities. We can consider similar programme for three wheel drivers as well.
	It is better if you could provide a certificated training for the staffs of the LRT programme.	Yes. We can consider that too. Japanese instructors will be operating these trains for the first 3 months' time. After that our drivers will be given a 3 month on the job training by the Japanese Instructors and Engineers. This can be a certificated training programme.
Mr. Milinda Senanayake	What is the proposed time duration for the project?	We are still doing the feasibility study. It will hopefully be completed by the end of 2017. The detail design will be planned after that and it will take about 1 years' time to complete. The project is planned to start its construction in the end of 2019. It will take about 3 years to complete the constructions.
	How much is the ticket from Malabe to Colombo Fort?	The ticket price is not calculated yet. However, we expect to charge 100 – 150 LKR for a single journey from Fort to Malabe. We do not expect to cover the project cost from the ticket price. Only the operation and maintenance cost will be covered through ticket price. Currently it will cost about 800 LKR to travel Colombo by a three wheel from Malabe. This train will cost lesser for the same distance and it will have comfortable AC compartments too.
	Is there a way to reduce the proposed travel duration from Malabe to Colombo?	Yes, we are planning to introduce an express train during the peak hours which will stop at limited number of stations.
	How many can travel in one compartment?	The capacity of a compartment is about 150. There are several train models with different capacities. We will select an appropriate model based on the demand.

	Is this proposed project cost covers compensations as well?	No. Compensations will be calculated separately.
	If this is a 100% elevated structure, have you planned emergency exits?	Yes, in every station there will be an emergency exit. In addition to that we will always have an emergency train ready.
	What is the frequency of these trains?	There will be a train every 4 minutes in peak hours and this will be increased according to the demand.
	Why did you decided that this will be an elevated route?	We cannot use electric power system on the ground for these trains. If we use electric cables hanging over the trains it would have been impacted the land scape of the city. Therefore, we decided to build an elevated rail track with an electric power system that runs parallel to the rails (3rd rail option). In addition to that, if we built this on the ground we will need more radius when taking bends. Elevated track is more practical when considering the difficulties, in acquiring lands.
Mr. Amila Perera	What is the process for land acquisition?	We have applied for cabinet approval for a LARC and superLARC for this project (showed the draft Cabinet Paper at the meeting). If we get the approval people will be benefitted. We hope to provide market values for the acquired lands.
	Currently there is a land acquisition taking place in Kollupitiya junction where this project has also planned to start. At the moment, we have filed a court case against that project as we are not properly compensated by the UDA. If you give us a reasonable compensation for our lands we will gladly give them for this project. What is your stand on this?	I am not aware about the other project or the land acquisition issue in Kollupitiya area until now. However, we will compensate according to the market value of the land if we are to acquire them. If the LARC and the super LARC is established people will be more benefitted.
Mr. Alfred Sampath	Before planning this project have you obtain views of the SLTB, private bus unions and the Railway department? This new project will definitely impact those services. If you have not discussed this with them before the project implementation, there will be problems in the future. That affects us as a country as this will be a loan	We have a steering committee with 34 member organizations. (showed the list of steering committee members at the meeting) Our first meeting will be held on 18th July. We will also form small groups with these members to address specific issues arising from the project.

	and we will be paying for it later whether we use this system or not.	
Mr. Tissa Gonagala	Will you be obtaining lands along Cotta Road? I am specifically asking this question because I have economic ventures in Cotta Road where you have planned the project.	No. At the moment there is no reason to acquire lands along the Cotta Road. We believe that we can manage within the available right of way. Sometimes we might obtain space from the pavement if we feel that the width of the road is not sufficient for vehicles after construction of pillars. However, this can be confirmed only after the completion of the feasibility study.

Mr. Ariyadasa thanked all the participants for their attendance and valuable feedback. He invited them to share their ideas and suggestions with the Project Team via telephone and the website.

The meeting was adjourned at 3.00pm.

Attachments

List of participants for the Public Engagement Meeting and their contact details - Attachment A

Photographs of the Meeting - Attachment B

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B

Minutes of the Public Consultation Meeting - Kaduwela

Venue: Auditorium, Divisional Secretariat Office, Kaduwela.

Date: 18.07.2017

Time 10.30am – 12.00pm

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT Project – Ministry of Megapolis and Western Development
- Mr. R. Pushpakumara – Deputy Project Director -LRT Project-MMWD
- Mr. Herath- Financial Manager- LRT Project-MMWD
- Mr. Yohei Suzuki-JICA Study Team
- Mr. D.D.Pathmasiri-Administrative Grama Niladhari- Kaduwela DS
- Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd
- Grama Niladharis and Public from Kaduwela DS Division
  (List of Grama Niladharis and Public participated for the meeting is given in Attachment A)

Mr.D.D. Pathmasiri welcomed participants for the public engagement meeting and briefed about the objective of the meeting. He invited Project Team to address the public.

Mr. Chaminda Ariyadasa, explained the importance of holding consultation meetings with public and land owners along the proposed LRT route to obtain their views, suggestions and support.

He started the programme by presenting a computer-generated video about light rail transit and LRT systems around the world. He then presented a power point presentation about the proposed LRT project. His presentation included following information;

1. Proposed LRT system and the proposed transport Network in Colombo Megapolis Reigion
2. Reasons for selecting Malabe Corridor for the project
3. Need of an alternative transport mechanism to reduce existing traffic congestion
4. Environmental and Social impacts of the LRT project
5. Benefits of a cost effective alternative transport system to Sri Lanka
6. Examples of LRT systems used in other countries
7. Design concept of LRT system and space requirement for Light Rail structures
8. Funding of the Project and the Grant repaying system
9. Land acquisition and the route of the proposed project
10. Opportunities available for public (Business opportunities, job opportunities, compensation for affected)
11. Project Schedule and the future steps to be taken
12. Issues that might arise during the construction period and the mitigation measures planned

Presentation was ended by showing a video on operation of LRT and the floor was opened for questions, queries and suggestions of the participants.

Raised by	Question raised / suggestion	Answer / Respond
Mr. T.A.S. Thilakarathne	What is the ticket price from Malabe to Colpetty?	Currently it will cost about 100-150 LKR to travel Colpetty from Malabe by a motor cycle. We planned to charge a similar amount for the ticket of LRT. But this will be a more comfortable and convenient. We do not expect to cover the project cost from the ticket price. Only the operation and maintenance cost will be covered through ticket price.
Mr. Thissa Yapa	Does this rail route goes through the Buthgamuwa and how this will be built near the Water's Edge?	No. The proposed route will not go through Buthgamuwa. Rail track will be built on the pillars above Diyawanna lake and Diyatha uyana.
	Have you planned a station at Rajagiriya?	Yes, proposed station will be built near the HSBC building at Rajagiriya. However the exact location is not yet confirmed.
Mr. Nuwan Kumarathunga	There will be huge traffic congestion during the construction period. Will there be road developments around LRT stations parallel to the project?	Existing roads will be widened to reduce the impact of traffic congestion after discussion with RDA. Alternative roads will be identified and developed to reduce the traffic congestion during the construction period.
	Will you be providing any opportunities for the local people in the Kaduwela Division to involve in this project?	We need to hire international contractors since local contractors are not familiar with LRT construction technology. But we expect to provide opportunities for local labour force to work in these project sites.
	Will you be extending this to Katunayake area?	We have a plan but it will not be implemented soon. We need more time to attract investors for this kind of projects. The initial LRT track will be constructed between Malabe and Colpetty with the financial support of JICA.
	How much is the interest rate for the JICA loan?	It is 0.1% per annum. This is a very low interest rate compared to the other similar loans provided by the World Bank and the Chinese Government.
	Do you have a plan to use solar power system for these trains? We cannot rely on the Sri Lankan Electricity Board's service to	We have not planned to use solar power but we will have two backup systems to provide power at emergency situations.

	provide electricity without any failures.	
	Will you be providing an insurance for the public who uses these trains? It is available in other countries.	No. we have not yet considered providing such facility.
Mr. Mervin Shrilantha	Do you have any plans to reduce the number of private vehicles coming to the city after the implementation of this project?	That will depend on the attraction of the public to this new transport system. If the system is comfortable people will use it often. Government has not yet planned to limit the number of private vehicles that enters the city.
Mr. E.A. Jagath Kumara (0777375300)	I have a 4 storey building in the Battaramulla Junction. According to the proposed route plan it will be affected completely. I have a bare land and another building next to that. It was bought very recently. 1 perch is worth more than 5 million in that area.	You will be compensated properly. We are introducing LARC and Super LARC processes for such grievances. We will be in touch with you to discuss about that further.
Mr. P.K.S. Perera	What is the plan for the LRT route in the Talangama EPA area? From where are you planning to enter and leave this zone?	We will enter from a location near the Central Environmental Authority and will join the Battaramulla-Kaduwela road (B263) at a location near the Laughs Gas Station.
Ms. Ranjanie Weerasinghe	We have a paddy land near the 8th Mile Post (Near Koswatte Junction). Will that be damaged?	The exact route is not yet confirmed. You will be compensated for the damage if it is affected. However, We will not completely fill the paddy land. The LRT structure will be constructed on the concrete pillars. That will not affect any activities in the paddy area except the space that will be occupied by the pillars.
Mr. M.K. Kariyawasam	How long will it take to complete this project?	This is a long term project and we started the feasibility study in the year 2014. It takes lot of time to plan this type of massive project. The cost of the project is similar to the Port City Project. We are still in the feasibility study. It will hopefully be completed by the end of 2017. The detail design will be planned after that and it will take about 1 years' time to complete. The project is planned to start its construction in the end of 2019. It will more than 3 years to complete the constructions.

Mr. D.G.P. Kumara	Are you planning to establish park and ride facilities at every station?	We cannot confirm that yet. If private investors are interested to provide their lands we can consider providing that facilities.
Mr. S. Wickramasinghe	Will proposed LRT be stopped if the Government change?	I don't think this will be stopped. We are carrying out this project according to a long term plan. Change of government will not affect the project.

Mr. Ariyadasa thanked all the participants for their attendance and valuable feedback. He invited them to share their ideas and suggestions with the Project Team via telephone and the website.

The meeting was adjourned at 12.00pm.

Attachments

List of participants for the Public Consultation Meeting and their contact details - Attachment A

Photographs of the Meeting - Attachment B

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B

Colombo Light Rail Transit (LRT) Project – 31.08.2017

Minutes of the Meeting with Affected Business Owners due to the proposed LRT Project

Venue: 18th floor "Suhurupaya", Sri Subuthi Road, Baththaramulla, Sri Lanka.

Date: 31st August 2017

Time: 2.30 pm – 4.30 pm

Organized by: Ministry of Mega polis and Western Development

Participants:

- List of invitees – according to the proposed light rail trace around 40 – 50 structures may be affected. Most of them have not participated in the public engagement meetings, organized at the Divisional Secretariats. Before the commencement of Survey for RAP it is very important to increase awareness regarding the project activities and the impacts it will cause. PMU decided to contact the people who may be directly affected by the project. There were 18 people, who participated in the meeting. (Refer to Attachment A)
- Eng. Chaminda Ariyadasa, Project Director, Light Rail Transit (LRT), Mr. R. Pushpakumara – Deputy Project Director -LRT Project Mrs Irine and Representatives of the Consulting Engineers and Architects Associated (Pvt) Ltd were participated.

Eng. Chaminda Ariyadasa (Project Director – Light Rail Transit Project) welcomed all participants for the meeting. Project Director then made the Opening Remarks regarding information disclosure followed by a power point presentation about the LRT. His speech included following topics:

- The Megapolis Transport Master Plan foresees a significant increase in transport demand in Colombo and its suburbs. The government has proposed a transport network, composed of a rapid transit system within Central Business District (CBD) that is intended to operate seven (7) main lines covering a length of approximately 75 km.

- The LRT project will initially consist of approximately 21-km elevated railway structure that will connect Colombo with the Malabe suburb. The road corridors covered by the proposed LRT route have been identified as the most congested in the Colombo Metropolitan Region. The proposed LRT will have a capacity of 30,000 passengers per hour per direction and will cover the distance in 25 minutes, rather than one and a half hours by road today. The LRT will complement other modes of transport.

- The LRT will be operated through a public-private partnership and will have five more lines which will be ready to be advertised in parallel with the Japan International Co-operation Agency (JICA) feasibility study. Japan will provide a US$1.25 billion soft loan to fund the LRT.

After the tea break, all members were welcome to express their perspectives on the project and ask for clarifications.

Details of Discussions

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. Y. A. Palliyaguruge, Deputy Manager, Perera & Sons	What is the extent of the possible damage to the Perera & sons buildings?	The building (Perera & Sons) situated at Kollupitiya junction will be totally affected. According to the CAD drawings the fully affected area would be around 601.57 m^2
Mr. T.M. Marzook, Manager, Noritake	Through CAD drawings show the extent of the possible damage to the building (Noritake)?	This building(Noritake) would be fully damaged and according to the CAD drawings the extent will be around 557.85 m^2
	Will it be possible to cause only half the building?	Can't give a direct answer as it might affect the structure/foundation of the building.
	Show how the columns/curves run over the building	The design team is still in the process of identifying the exact areas that the columns/curves would run. This will take another 2 months' time. If the curvature radius is reduced below 100, engineering will be more difficult and costs will be higher.
Mr. S. L. Niles, Director, Regal Theater	What is the extent of the possible damage to the building of Regal cinema?	Building won't be damaged but the parking area will be partially affected.
Mr. Yasas Rajapakse, Representative, Peoples' Bank	What is the extent of the possible damage to the building owned by CGR situated at Bastiam Mawatha? The Peoples Bank Branch is functioning at the building.	This particular building will be totally affected. However, there is another project going on related to the development of the port city by the Ministry of Megapolis and Western Development. Therefore, there is a possibility of this building being highly affected through either of these projects.
Mr. Manjula Senevirathna, Manager, Burger King	What are the possible damages to the building of Burger King? (Slave Island Junction) We are willing to support towards this project.	This building (Burger King) will be totally affected due to the bend and even the station will be located closer to this building.
Dr.I.V.P Dharmawardena (CMC)	Is there any income restoration program to be introduced? There are around 250 traders are doing their business activities inside the Boralla Super Market. The super Market is owned by the CMC. There may be an issue with the traders/vendors.	Yes, The Income restoration program will be included the compensation package.

Mr. Senake Amarasinghe, Chairman & Mr. Yasendra Amarasinghe, CEO, Carmart (pvt) Ltd. (Peugot & Mazda)	What is the extent of the possible damage to the building own by the Car Mart at Ibbanwala Junction?	This building will be partially affected.
	Other than for Peugeot car sale,(Car Mart) Mazda car sale (adjacent Car Mart) too belongs to us. Therefore, let us know the total area that will be affected?	According to the available drawings a total area of 119.46m^2 will be affected.
	Show how the columns/curves run over the building	We are still in the process of identifying the exact areas that the columns/curves would run. This will take another 2 months' time.
	How about the height of the columns?	Column lay out also has not been finalized. Column height would be 6 m.
	What is the procedure for the compensation or how are the estimations to be done?	GOSL has given approval to pay the compensation, according to the LARC & Super LARC policies & regulations. Further Mrs. Irene explained (Acquisition Officer attached to the PMU) that the process of the acquisition procedure. Most probably value of the lands will be estimated according to the current Market Value. If the estimated amount of money is not sufficient for their properties acquired by the project, they can appeal for more compensation. The relevant Divisional Secretariats and the Project office will consider these grievances together.
	When is the construction activities are planned to commence?	It will be commenced in 2019. However, compensations will be paid before the commencement of the construction activities and hoping to complete the project by the end of 2023.

Attachment A- List of Participants

Attachment A- List of Participants

Note: Personal information cannot be disclosed due to confidentiality.

Attachment B- Photographs

Ministry of Megapolis and Western Development (MMWD)

New Light Rail Transit System from Kollupitiya to Malabe

Minutes of EPA Stakeholder Meeting

Date: 6th September 2017 from 2:20PM-4:30PM

Venue: 11th Floor, Sethsiripaya Stage II, Battaramaulla

Organized by: Ministry of Megapolis and Western Development

Participants:

- Mr. Chaminda Ariyadasa – Project Director -LRT(JICA)– MMWD
- Mr. Vinasithamby Ravi – Environmental Specialist -LRT(JICA)
- Mr. Anura Ranwala – Team leader(EIA) - CEAA
- Dr. Dewaka Weerakon – Ecologist(EIA) - CEAA
- Ms. Catherine Diomampo – Consultant- JICA Study Team
- Mr. Deshan Gamage – Project Coordinator – CEAA
- Mr. E. Percy Perera – Talangama farmer Organization
- Ms. Piyumi Kalyanawansha- Assistant Manager(Investigations) – Environmental Foundation Limited
- Mr. Ranjan Karunanayaka – Co-ordinator-Centre for Environmental Justice

Speeches & Presentations:

Eng. Chaminda Ariyadasa, Project Director–LRT(JICA) welcomed all participants for the EPA stakeholder meeting. Project Director then made the Opening Remarks with a brief introduction about the LRT project and explain the objective of the meeting.

Mr. Ariyadasa explained the need of Environmental Impact Assessment for the proposed LRT Project and the importance of holding meetings with the stakeholders to obtain their views and suggestions. He then presented the proposed LRT project with a power point presentation. His presentation included following points;

- Need of an alternative transport mechanism to reduce existing traffic congestion
- Need of a Rail based public transport system like LRT to reduce traffic congestion
- Proposed LRT system and the proposed transport Network in Colombo Megapolis Region
- Reasons for selecting Malabe corridor to implement LRT
- Design concept of LRT system and space requirement for Light Rail structures
- Three Optional routes through the EPA, bordering the EPA and through Koswatta junction (Out of the EPA)
- Pros and Cons of each alternative route
- Expected Impacts during the construction and operational stage
- Details of mitigation measures and conservative steps

Mr. Ariyadasa's presentation was ended after showing a video on Proposed LRT system. Participants were invited to state their concerns.

Details of Discussions

Table 01: *Comments and Questions by Participants of Talangama EPA Stakeholder Meeting-06th September 2017*

Raised by	Comments and/ or Questions	Answered by	Answer
Mr Percy Perera	- Are there any land fillings during the construction stage? If it runs above the ground there won't be a considerable issue to the EPA.	Mr. Chaminda Ariyadasa (PD)	- All the impacts to the environment will be rectified. There will be some temporary land fillings when preparing the pilot roads and facilitating the construction work. Those temporary fillings will be removed and we can guarantee that the site will be prepared as it was before. - JICA is ready to support with technology and financially for further protecting and rectification work. JICA does not allow to dig or fill if the client of contractor want to do so. We appreciate your suggestions for the safeguard work making least impact to the area.
	- Going through the Talangama EPA won't cause issues, as the area section to the project is less than 200m. There should be a proper demarcation of the acquired area, to avoid further encroachments to the EPA area.	Mr. Chaminda Ariyadasa (PD)	- Within the project there are no provisions for that still we will try for that.
Ms. Piyumi Kalyanawansha	- How many pillars will be located through Talangama EPA? - Do you have the GPS locations of the pillars (Columns for the LRT)?	Mr. Chaminda Ariyadasa (PD)	- The distance between two columns will be about 40m. - The locations of the columns are not finalized yet. - We will share the coordinates with you once they are finalized.
Mr. Ranjan Karunanayaka	- What will be the exact route of the LRT from Malabe to Kollupitiya?	Mr. Chaminda Ariyadasa (PD)	- Project Director described the route using Google Earth. - The new office will be at 8th floor of Suhurupaya. You are invited to come there, if there are any clarifications to be sorted out during the weekdays.

Mr. Percy Perera	- Does the route lie over the anicut or if not, what is the proximity to the anicut from the LRT route?	Mr. Anura Ranwala	- Route lies to the LHS of the anicut and it traverses close to the anicut. There is a large map displayed in the project office and anyone can come and see it during the week day at the project office at 8th floor of Suhurupaya. Can make clarifications regarding the route by visiting there.
Ms. Piyumi Kalyanawansha	- What will the height of LRT from the ground level?	Mr. Chaminda Ariyadasa (PD)	- Height of pillars (Clear height to the road) will be 5.5m from the existing ground level. Height of the platform will be around 2m.
	- Initially there were 44 acres in the EPA and now there are only 27 acres due to illegal land filling and encroachments in the area. Illegal fillings will be stopped after the project as the pillars lie as a boundary. It is very difficult to stop encroachments as there is no any hard boundary.		
Ms. Piyumi Kalyanawansha	- Are the affected lands in the EPA are private or public? - Are the private land owners aware about the land acquisition?	Mr. Chaminda Ariyadasa (PD)	- We will start the Socio-Economic survey next week. - The cutoff date is declared as 11th September.
Mr. Ranjan Karunanayaka	- Do land owners like land filling in depot area?	Mr. Chaminda Ariyadasa (PD)	- Most of the people have understood the increase in value of their existing lands and the importance of the project. The value of the neighboring other lands will be increased due to infrastructure development and the owners of the paddy land will be given attractive compensation packages.
Mr. Ranjan Karunanayaka	- What will be the solution for the flooding issue in Malabe depot area and along the rest of the LRT trace?	Mr. Anura Ranwala	- A separate study is going on with the collaboration of SLLRDC regarding the flooding levels. An analysis regarding the impact of temporary landfills will be done with the existing SLLRDC flood model. Effects for the future flooding and Kelani river high flood levels for 100 years return period will be studied. The construction will be done above the possible flood level. Also the flood risk will be reduced after the establishment of Ambathale pumping station. These things will be further studied under the basin investment plans of CRIP project. Those information will be also utilized for the study once it is

			finished.
Mr. Ranjan Karunanayaka	- How the new railway system will be powered? Will it require energy from the national grid and if so What will be the power requirement?	Mr. Chaminda Ariyadasa (PD)	- Power consumption will be 30MVA. There will be 3 feeding locations for LRT. That can be arranged from the national grid. This will be the highest electricity consumer in Colombo city when come to functioning. Special power arrangement will be obtained from CEB for the project and still they are being discussed.
Mr. Ranjan Karunanayaka	- What will be the travel time from Malabe to Kollupitiya?	Mr. Chaminda Ariyadasa (PD)	- The trains will be stopped at each station only for 30-40 seconds for passengers to get in and out. Total travel time from Malabe to Kollupitiya will be around 45 minutes.
Ms. Piyumi Kalyanawansha	- What will be the frequency or the number of train trips?	Mr. Chaminda Ariyadasa (PD)	- There will be trains in 3-5 min intervals in peak hours. Trains will consist of, 6 compartments and can occupy 165 persons per compartment.
Mr. Ranjan Karunanayaka	- Is the maintenance and services done by Ceylon Government Railway?	Mr. Chaminda Ariyadasa (PD)	- A new Organization will be recruited for operation and maintenance and they will be given a complete training in Japan. Further training institute will be established here by JICA funds. Operators will be initially deployed by JICA itself and the whole system will run by JICA for few months. By the end of training period, it will be gradually transferred to the trained staff.

Minutes of the Public Consultation Meeting (EIA Disclosure)

Colombo DS Division

An awareness program on the Light Rail Transits (LRT) System in Colombo was held at the Colombo Divisional Secretariat Office

Venue: Auditorium, Colombo Divisional Secretariat Office, Pettah

Date: 17.11.2017

Time: 10.35 am to 12.00 noon

Participants:

- Mr.H.M.J.J. Herath - Project Accountant , LRT Project
- Ms. Iyerin Nanayakkara – Consultant , LRT Project
- Mr.V.Ravi- Senior Environmental Officer , LRT Project
- 05 Grama Niladharis' from the Colombo DS Division
- 10 officers representing the Colombo DS office.
- 20 public representatives from Colombo area
- Members from the Consultant Engineers and Architects Associated (Pvt) Ltd

Mr.H.M.J.J. Herath, Project Accountant welcomed participants for the awareness programme and he explained the progress of the LRT project to the participants.

Mr.H.M.J.J.Herath's presentation was started by showing a video on use of LRT and he explained the social and environmental impacts, mitigation methods, management plan and monitoring plan for the LRT Project. He further explained the importance of holding consultation meetings with public to obtain their views and suggestions. His presentation included following matters;

- Proposed LRT System in Colombo Megapolis Region
- Proposed Transport Network in Colombo Megapolis Region
- Proposed LRT project for Feasibility study
- Selection of the Malabe Corridor
- Purpose of the Public Engagement Meeting
- Project Details
    - Proposed LRT Route
    - Alternative Route Analysis (Overview)
    - Proposed LRT Structure & Rolling Stock
    - Proposed LRT Train Station
    - Propose LRT Depot (Parking & Maintenance Area)
    - Power Supply
    - Proposed Project Schedule
    - Operation
    - Maintenance Activities

- Existing Environment

- Existing Land Use
- Social Environment
- Traffic Condition
- Noise (Sensitive Receptors)
- Bo Trees along the LRT Route
- Protected Areas
- Wetlands and Streams

- Anticipated Environmental and Social Impacts and Proposed Mitigation Measures
- Proposed Environmental and Social Monitoring Plan
- Items for Monitoring

Then floor was opened for questions, queries and suggestions of the participants.

Name and Designation	Question raised / suggestion	Answer / Respond
Ms. J.P.A.L. Weerasighe, Assistant Divisional Secretary, Assistant Divisional Secretariat Office-Colombo	According to this project, how many trains will be used?	We have planned to use about 15 - 25 trains. There will be a train every 6 minutes. More trains will be used during peak hours. This will be a 24 hour service.
	How do you plan to mitigate environmental impacts?	Noise and vibration impact is expected. Therefore, we have conducted of noise and vibration monitoring. A waste water treatment plant will be established to treat the waste water produced at the Depot.
Mr. P.A. Podi Appuhami, A shop owner near the Gamini Hall, Suduwalla?	Why did you invite only me from the Suduwalla area?	We invited only you because your property will be affected by this project. We might have to acquire your premise but we will be providing a new business venture for you.
Mr. Govinda Pille	When do you plan to start constructions of this project?	In 2019 we plan to start constructions.
	Will project affects shops located in the Olcott Mawatha (in front of the Ceylon Government Railway	No. LRT will not runs across this area (Olcott Mawatha).

	Market) during the construction period? Will there be any project impact for this place in future?	If any damage occurs, that will be definitely compensated according to calculations based on your income and your property. No. But in future another Ceylon Government Railway (CGR) Development projects will be implemented.
Mr. Krishan Somarathna	Osu Sala (a government pharmaceutical network) near Fort Railway Station is a branch of Rajya Osu Sala. Did the LRT project implementing party has officially informed the management of the Rajya Osu Sala? About this project? Is it the responsibility of the branch manager or the LRT project implementing party to inform about this to the management of the Osu Sala network?	It is a responsibility of the branch manager Branch should inform their management. After that they can contact us for further clarifications. The land is belonged to CGR. Therefore you must discuss the matter with CGR.

Mr.H.M.J.J. Herath thanked all the participants for their participation.

The meeting was adjourned at 12 noon.

Minutes of the Public Consultation Meeting (EIA Disclosure)

Thimbirigasyaya DS Division

An awareness program on the Light Rail Transits (LRT) System in Colombo was held at the Thibirigasyaya Divisional Secretariat Office

Venue: Auditorium, Thibirigasyaya Divisional Secretariat Office, Narahenpita.

Date: 16.11.2017

Time: 2.45 pm to 4.00 pm

Participants:

- Mr.H.M.J.J. Herath - Project Accountant , LRT Project
- Ms. Iyerin Nanayakkara – Consultant, LRT Project
- Mr. V.Ravi- Senior Environmental Officer , LRT Project
- Mrs. Priyantha Dissanayaka - Divisional Secretary , Divisional Secretariat Office Thibirigasyaya
- Grama Niladharis' from the Gothamipura, Kollupitiya, Kirula GN Divisions.
- 06 officers from the Thibirigasyaya DS office.
- 09 public representatives from Thibirigasyaya area
- Members from the Consultant Engineers and Architects Associated (Pvt) Ltd; Consultancy Team

Mr.H.M.J.J. Herath, Project Accountant welcomed participants for the awareness programme and explained the progress of the LRT project to the participants.

Mr.H.M.J.J.Herath explained the social and environmental impacts, mitigation methods, management plan and monitoring plan for the proposed LRT Project and the importance of holding consultation meetings with public to obtain their views and suggestions. He then presented a PowerPoint presentation about the proposed LRT project. His presentation included following matters;

- Proposed LRT System in Colombo Megapolis Region
- Proposed Transport Network in Colombo Megapolis Region
- Proposed LRT project for Feasibility study
- Selection of the Malabe Corridor
- Purpose of the Public Engagement Meeting
- Project Details
    - Proposed LRT Route
    - Alternative Route Analysis (Overview)
    - Proposed LRT Structure & Rolling Stock
    - Proposed LRT Train Station
    - Propose LRT Depot (Parking & Maintenance Area)
    - Power Supply
    - Proposed Project Schedule
    - Operation
    - Maintenance Activities

- Existing Environment
    - Existing Land Use
    - Social Environment
    - Traffic Condition
    - Noise (Sensitive Receptors)
    - Bo Trees along the LRT Route
    - Protected Areas
    - Wetlands and Streams

- Anticipated Environmental and Social Impacts and Proposed Mitigation Measures
- Proposed Environmental and Social Monitoring Plan
- Items for Monitoring

Then floor was opened for questions, queries and suggestions of the participants.

Name and Designation	Question raised / suggestion	Answer / Respond
Ms. D. Wijesighe GN officer – Wanaathamulla	According to my knowledge, traffic is higher near Kelaniya to Wanawasala area. Will this project plan a LRT route across the Kelaniya to Wanawasala?	We have already planned to introduce an express LRT between Colombo and Polgahawela.
Mr. M. Hazeem	I feel that LRT do not have the capacity to transfer a large amount of passengers. Peliyagoda, Highlevel Road, Malabe-Kaduwela are main entrance to Colombo city. What I understand is that more than 35000 passengers enters Colombo city during peak hours daily. Will this project be able to provide transport for 15000 passengers per hour? I feel that Ragama-Kotuwa and Kalaniwali Railway development was more useful than New LRT system. The main reason for high traffic in Peliyagoda is that long vehicles and private busses use this route I would also like to suggest to construct a dry deport in	We have already considered introducing an express LRT for Kalaniwali. We have already planned to introduce an express LRT between Borella and Peliyagoda. According to our traffic survey, we identified Malabe - Kotuwa route has high traffic due to many government offices are located in along this route. Therefore this route was selected.

	Paliyagoda. Hope you will consider my suggestion.	
Mr. Reid President of Trade Association – Borella super market	What is the mechanism to acquire Borella Super market premise?	We have planned to introduce two alternatives for Borella Super market land acquisition. As we have informed previous day.
Mr. Mangala Ariyadasa Manager- DFCC Banka Borella Branch	We have planned to move to an alternative place. But how do we find out that the new location is not affected by this project?	We have already planned to run this electrical Train up 9 meters. You will be compensated if your property is affected according to calculations based on your income and your property.
	What is the mechanism to acquire lands? Whom should we contact to obtain more information about this?	According to government regulations, an initial survey will conduct by the Survey Department. Then a public notice will be published about lands that will be acquiring. Finally, you will be given a chance to take necessary decisions.

Mr. H.M.J.J. Herath thanked all the participants for their participation. .

The meeting was adjourned at 4.00 pm.

Minutes of the Public Consultation Meeting (EIA Disclosure)

Kaduwela DS Division

An awareness program on the Light Rail Transits (LRT) System in Colombo was held at the Kaduwela Divisional Secretariat Office

Venue: Auditorium, Kaduwela Divisional Secretariat Office, Malabe.

Date: 17.11.2017

Time: 2.00 pm to 3.30 pm

Participants:

- Mr.H.M.J.J. Herath - Project Accountant , LRT Project
- Ms. Iyerin Nanayakkara – Consultant of Land Acquisition , LRT Project
- Mr. V.Ravi- Senior Environmental Officer , LRT Project
- 07 Grama Niladharis' (GN) from Kaduwela DS Division
- 26 officers from the Kaduwela DS Office.
- 27 public representatives from Kaduwela area
- Members from the Consultant Engineers and Architects Associated ((CEAA) Pvt) Ltd

Mr. H.M.J.J. Herath, Project Accountant welcomed participants for the awareness programme and he explained the progress of the LRT project to the participants.

Mr.H.M.J.J.Herath's presentation was started by showing a video on use of LRT and he explained the social and environmental impacts, mitigation methods, management plan and monitoring plan for the LRT Project. He further explained the importance of holding consultation meetings with public to obtain their views and suggestions. His presentation included following matters;

- Proposed LRT System in Colombo Megapolis Region
- Proposed Transport Network in Colombo Megapolis Region
- Proposed LRT project for Feasibility study
- Selection of the Malabe Corridor
- Purpose of the Public Engagement Meeting
- Project Details
    - Proposed LRT Route
    - Alternative Route Analysis (Overview)
    - Proposed LRT Structure & Rolling Stock
    - Proposed LRT Train Station
    - Propose LRT Depot (Parking & Maintenance Area)
    - Power Supply
    - Proposed Project Schedule
    - Operation
    - Maintenance Activities

- Existing Environment
    - Existing Land Use
    - Social Environment
    - Traffic Condition

- Noise (Sensitive Receptors)
- Bo Trees along the LRT Route
- Protected Areas
- Wetlands and Streams

- Anticipated Environmental and Social Impacts and Proposed Mitigation Measures
- Proposed Environmental and Social Monitoring Plan
- Items for Monitoring

Then floor was opened for questions, queries and suggestions of the participants.

Name and Designation	Question raised / suggestion	Answer / Respond
Mr. K.A.D. Premarathna	According to this project, what are the paddy lands that you will acquire near Chandrika Kumarathunga Mawatha, Malabe?	We cannot exactly confirm anything about paddy land acquisitions at the moment. We will provide more information on paddy land acquisitions in March 2018. According to government regulations, an initial survey will be conducted by the Survey Department. Then a public announcement will be published about lands that will be acquired If any damage occurs, that will be definitely compensated according to calculations based on your income and your property.
Mr. Wierathna	When do you plan to start constructions of this project? What are the economic advantages that we will be receiving? Will you be filling paddy lands for construction purposes?	In 2019. You can start vehicle parking system and it costs a fee. No. We have already planned to have a Green Buffer Zone in paddy lands.
Mr. Arjun Perera	Are there any connecting points planed between Malabe and Kaduwela. Will this project acquire paddy lands or lands in Chandrika Kumarathunga Mawatha, Malabe?	Yes. We have already planned to introduce an express LRT between Malabe and Kaduwela. We have planned to acquire paddy lands.
Mr. N.D.A.Kumara	Is this similar to Monorail system?	No. LRT is different than Monorail. It is

		a new technology.
Mr. Thissa Yapa GN- Kotuwegoda GN Division	Does this project runs through Kotuwegoda GN Division?	No The route will be the same as we have informed earlier. It will not be changed.
Mr. Waliwita	How many passengers can be transported by this train?	Approximately 400 passengers. We have planned to use about 15 - 25 trains. There will be a train every 6 minutes.
Mr. Sunimal Kumara	How have you planned to construct the Battaramulla LRT stations?	We have planned to establish stations near Sethsiripaya, Baththaramulla junction and Palam Thuna junction. These stations will be formed at bends along the route to slow down the speed of the train.

Mr.H.M.J.J. Herath thanked all the participants for their participation.

The meeting was adjourned at 3.30 pm.

Minutes of the Public Consultation Meeting (EIA Disclosure)

Sri Jayawardhanapura Kotte DS Division

An awareness program on the Light Rail Transits (LRT) System in Sri Jayawardhanapura Kotte was held at the WP/ Jaya/Sirihada Vidyalaya, Rajagiriya.

Venue: Auditorium, WP/ Jaya/Sirihada Vidyalaya, Rajagiriya

Date: 21.11.2017

Time: 10.20 am to 12.00 noon

Participants:

- Mr. H. M. J. J. Herath - Project Accountant and the Project Team, LRT Project
- Ms. Iyerin Nanayakkara –Consultant and the Project Team, LRT Project
- Mr. V.Ravi - Senior Environmental Officer and Project Team, LRT Project
- Five officers from Divisional Secretariat Office , Sri Jayawardhanapura Kotte
- Ms. S. M. Welege- Grama Niladhari from the Welikanda North GN Division
- Six public representatives from Sri Jayawardhanapura Kotte area
- Members from the Consultant Engineers and Architects Associated (CEAA) (Pvt) Ltd; Consultancy Team

Mr. H. M. J. J. Herath, Project Accountant welcomed participants for the awareness programme and He explained the proposed project to the participants.

Mr. H. M. J. J. Herath's presentation was started by showing a video on use of LRT and explained the social and environmental Impacts, Mitigation methods, management plan and monitoring plan for the proposed LRT Project and the importance of holding consultation meetings with public participants to obtain their views and suggestions. He then presented a PowerPoint presentation about the proposed LRT project. His presentation included following matters;

- Proposed LRT System in Colombo Megapolis Region
- Proposed Transport Network in Colombo Megapolis Region
- Proposed LRT project for F/S study
- Selection of the Malabe Corridor
- Purpose of the Public Engagement Meeting
- Project Details
    - Proposed LRT Route
    - Alternative Route Analysis (Overview)
    - Proposed LRT Structure & Rolling Stock
    - Proposed LRT Train Station

- Propose LRT Depot (Parking & Maintenance Area)
- Power Supply
- Proposed Project Schedule
- Operation
- Maintenance Activities

– Existing Environment
  - Existing Land Use
  - Social Environment
  - Traffic Condition
  - Noise (Sensitive Receptors)
  - Bo Trees along the LRT Route
  - Protected Areas
  - Wetlands and Streams

– Anticipated Environmental and Social Impacts and Proposed Mitigation Measures
– Proposed Environmental and Social Monitoring Plan
– Items for Monitoring

Then floor was opened for questions, queries and suggestions of the participants.

Name and Designation	**Question raised / suggestion/ Ideas**	**Answer / Respond**
Mr. L. A. Millavithanaarchchi Residential	How have you plan the route of the LRT train near the fly over bridge in Rajagiriya?	LRT route will go either sides of the fly over bridge. The height of the rail track will be increased at this point compared to other locations
Mr. Nandana Kumara Businessmen	What is the technical difference between Light Rail and Mono Rail? There are many apartments around the Rajagiriya. But, those buildings are constructed environmental sensitive areas. CEA has not taken any actions for this problem. Some of these	It is pleasure to given your ideas or suggestions. We have already taken permission from the minister for this project.

	constructions have been legally charged. Marsh lands are destroyed by development project in Sri Lanka. But, CEA has not taken any actions for this. The traffic problem cannot solve by developing the road network in Sri Lanka; Attitudes of people should also be changed accordingly. There are many issues when compensating people for their loses by development projects. It is useless to discuss these problems without the presence of any responsible politians or responsible officers.	
Mr. S. G. A. Edirisingha Businessmen	Due to these development projects, I have to face many problems. Walls are cracked in a building that I own due to construction work of a development project. There is a land behind my building and all the trees are died due to lack of water in soil. My business has been closed for the last 5 months now. RDA did not provide reasonable compensation for people who were affected by these development projects.	We are not in a position to handle these problems. We are here only to provide awareness about the LRT project. It is better if you could discuss these problems with RDA.

Mr. H. M. J. J. Herath was thanked all the participants for their attendance and valuable feedback.

The meeting was adjourned at 12 noon.

Workshop on Accessible Station for Disabled People

Workshop on Accessible Station for Disabled People

The Study emphasizes the accessibility of the LRT to all beneficiaries such as pregnant women, women with small children, elderly persons, and persons with disabilities. The design accessible to such population is beneficial for all passengers such as passengers with large luggage. By introducing the example of Japan and other countries, the workshop pursues the station design accessible to all users.

JICA promotes the idea of "Mainstreaming disability" which aims to include disabled people in the development process of infrastructure as well as gender mainstreaming. Under the ideas, the Study involves the disabled persons and women in the design stage to directly reflect their opinions.

(1) Current condition on the barrier-free transportation in Sri Lanka

1) Legal and Institutional Arrangement

The government of Sri Lanka prescribes "Protection of the Rights of Persons with Disabilities Act, No. 28 of 1996" to ensure the equal rights of the disabled persons. In addition, Minister of Social Services and Social Welfare prescribed "Disabled Persons (Accessibility) Regulations, No. 1 of 2006" to ensure the accessibilities of disabled people in all public buildings and transportation. The regulation was developed through the consultations with party organization and referred the regulation of the United Nations.

Ministry of Health, Directorate for Youth, Elderly and Persons with Disabilities prescribes "Design Considerations on Accessibility for Persons with Disabilities" in 2013. However, this design consideration has not regally stipulated such as regulation and gazette. The sizes described in the design consideration are partly different from the "Disabled Persons (Accessibility) Regulations", and it is not widely recognized as the accessibility regulation.

According to the interview with a party organization official, the "Disabled Persons (Accessibility) Regulations" is in the process of revision to modify the mistakes of the figures and usability of disabled persons.

2) Government Stakeholder of Disability Sector

As for government sector, Ministry of Social Empowerment, Welfare and Kandyan

Heritage is the leading agencies regarding to securing accessibility of disabled persons by prescribing the law and the regulation and implements social welfare activities. National Secretariat for Persons with Disabilities (NSPD) and Department of Social Services implement programs such as providing monthly allowance for PWDs, operating a vocational training center, facilitation for recreational activities for disabled children and so on. Ministry of Health, Nutrition & Indigenous Medicine also covers mainly health issues of persons with disability and has a department called Department of Youth Elderly Disabled & Displaced.

3) JICA's cooperation of the Disability Sector

JICA has been implementing various kinds of technical assistance and projects in Sri Lanka and has strong working relationship with government stakeholders and party organization. For example, JICA Distance Learning and Multimedia Education Project provided trainings to transfer the technology of DAISY conversion in 2003. Japan Overseas Cooperation Volunteer (JOCV) has been contributing to the disability sector such as occupational therapist, physiotherapist, and social welfare sector in Sri Lanka and as of September 10 volunteers has been dispatched in entire Sri Lanka. In addition, R/D of "The Project for Strengthening Education for Children with Special Needs through Inclusive Education Approach in Sri Lanka" was signed in November 2017 and the Project is expected to start in April 2018.

4) Challenges of the disabled persons using public transportation

In response to the above-mentioned regulation, a certain number of facilities installed the slopes, handrails elevators. However, the contractors often do not understand the meanings of the regulation and install the barrier-free measure improperly, for example, too sleep ramps with slippery material and randomly equipped guiding blocks. Regarding to the railway facilities, most of the train stations were constructed before the regulation and its designs are far from barrier-free. Poorly equipped facilities and the design of the station currently prevent disabled persons from going out and using the public transportation comfortably by themselves. According to the interview with the participants of the accessible LRT system workshop, certain numbers of disabled people manage to commute by themselves, and they sometimes get lost due to insufficient information for disabled people

(2) Current condition on the gender issues regarding to the public transportation in Sri Lanka

According to the UNDP's Human Development Index (HDI) in 2016, Sri Lanka was rated 0.766 and ranked as 73rd of 188 countries while Inequality-adjusted HDI (IHDI) was rated 0.678 and 65th of 188 countries. The difference between HDI and IHDI is lower than other South Asian countries such as India, Bangladesh, Nepal, and Pakistan[1]. That indicates gender inequality is smaller than other neighboring countries, yet economic status and political participation remains to be coped. In Sri Lanka, Ministry of Women and Child Affairs is the leading ministry to promote gender equality such as policy making and awareness raising activities.

Even though there is no detailed statistics available in this specific sector, the major issues regarding to the women in public transportation in Sri Lanka are sexual harassment in the crowed vehicles and minor offenses such as pick pockets since women are more likely to be the target of such offences. Extremely crowded vehicle, unavailability of escalator and elevator, high and wide gap between platform and vehicle can be major deterrence of using public transportation especially for women in later stage of pregnancy.

(3) Overview of the workshop on accessible station for disabled people

The workshop was a consulting process with preferable parameters of design standard for barrier-free facilities such as platform, ticketing gate and steps for disable people, pregnant and elders in the workshop. The workshop (WS) with the model of the station facilities was held with the participants of disable people, women, pregnant women, elderly persons to understand their needs and preferable size for LRT facilities. The contents of the workshop were described as follows:

1) Objective of the workshop

The objective of the workshop is to understand the needs of expected users who needs special cares to be barrier-free station areas in the new LRT system and to raise the awareness of counterpart agencies regarding to the barrier free design.

Throughout the communication with the party organizations, it is designed to mutually understand the difficulties relating to the mobility of persons with disabilities by experiencing the limitation of movement. It was expected to formulate the action plan by the group discussion with various stakeholders.

[1] While the difference in Sri Lanka is 11.6, that of India is 27.2, Bhutan is 29.4, Nepal is 27.0, and Pakistan is 30.9. (http://hdr.undp.org/en/composite/IHDI : accessed on Dec.4th December, 2017)

Also trial of the actual size of the station facilities can verify the usability of major facilities such as LRT station buildings to be constructed in the future (ticket gates, elevators, ticket vending machines, platform, and handrail) and usability of the dimensions.

2) Participants of the workshop

The participant of the workshop is shown in the table below.

Table 1 Expected participants of the workshop

Stakeholders	**Government officials**
・Development with Disabled Network ・Sri Lanka Federation of the Visually Handicapped ・Mobility Handicapped Technician Association Sri Lanka ・Sri Lanka Council for Blind ・Sri Lanka Foundation for Disabled (SLFD) ・DAISY Lanka Foundation ・Sri Lanka Spiral Cord Network ・Janathakshan ・Disability Organization Joint Front	・MMWD ・Ministry of Social Empowerment and Welfare ・Ministry of Women and Child Affairs ・UDA ・Sri Lanka Police
	Expected passengers
	・Pregnant women ・Elderly persons ・Disabled persons and those who are supporting the going out (Visually impaired, physically impaired using wheelchair and staff, hearing impaired)

Source: Study Team

3) Program of the workshop

The workshop was conducted as a two-day program. The objective of the first day was to understand the barrier-free transportation in Japan and current challenges of the public transportation in Sri Lanka.

Foundation for Promoting Personal Mobility and Ecological Transportation (ECOMO Foundation) made two presentations about explanation of barrier-free concepts, its history of development, and practices of barrier-free transportation in Japan as well as examples of human resource development activities. These presentations enabled participants to have general understanding of disability and barrier-free and more

concrete examples of what to be achieved in Sri Lanka. Group discussion followed after these presentations with different topics toward accessible LRT system in Sri Lanka. Each group presented the result of the group discussion.

After having understanding of barrier-free/accessible transportation from the first day's program, the second day, all participants had opportunities to learn the actual challenges for persons with disability to use public transportation. In order to verify the usability of barrier-free facilities (ticket vending machine, ticket gate, handrail, elevator, platform) at LRT station, disabled participants and participants without disability using supporting tools (wheel chair, crutches, eyes mask, elderly experience kits) tried the models of actual size of the station facilities and gave their specific comments and suggestions on each item.

1st day, September 6, 2017 (Wednesday)

Theme: Introduction of the Japanese Barrier-free activities

Time	Item	Lecturers
8:30-9:00	Registration	
9:00-9:20	Opening Remarks Ice Breaking	Mr. H.M.J.J Herath MMWD
9:20-9:30	Introduction of the LRT Project	Mr. H.M.J.J Herath MMWD
9:30-10:00	Understanding disability	Mr. Atsushi Matsubara ECOMO-foundation
10:00-10:30	Effort for barrier-free transportation in Japan	Ms. Keiko Takeshima ECOMO-foundation
10:30-10:40	Coffee Break	
10:40-10:55	Introduction of the concept of station design	Mr. Yoshihisa Asada JICA Study Team
10:55-11:25	Group Discussion (Topic: Issues on barrier-free in Sri Lanka and Action Plan to solve the issues)	All Participants
11:25-11:50	Presentation on the result of the Group Discussion	All Participants
11:50-12:00	Closing Remarks	Mr. H.M.J.J Herath MMWD

2nd day, September 7, 2017 (Thursday)

Theme: Needs for accessible LRT Station

Time	Item	Lecturers
8:30-9:00	Registration	
9:00-9:20	Opening remarks	Mr. Chaminda Ariyasada MMWD

9:20-9:40	Challenges to use public transportation	Mr. Nishantha Kumara Mr. C. Siriwardena
9:40-10:00	Preparation and explanation of the assessment of the accessible route for disabled persons	Facilitators: Ecomo-foundation, JICA Study Team
10:00-11:00	Needs/evaluation on sizes of facilities for LRT station for all (Target: ticket wicket /ticketing machine / handrail/ elevator/ slope/platform)	
11:00-11:10	Coffee Break	
11:10-10:50	Wrap up of the assessment on route (Mutual understanding of barriers)	All Participants
11:50-12:00	Wrap up and closing remarks	Mr. Chaminda Ariyasada MMWD

Source: Study Team

1) Reasonable accommodation for the participants

The participants of the workshop included visually impaired persons, hearing impaired persons and wheelchair users. In order to assure the physical and information accessibility for the participants, following reasonable accommodations were arranged.

- The venue of the workshop was accessible by elevator. Eventually, the venue was the same building as Ministry of Social Welfare, so a lot of participants especially visually impaired persons could arrive at the venue by themselves because they occasionally visit the building.
- The workshop was held with sign language translation. In Sri Lanka, Ministry of Social Welfare employs three sign language translators who can provide translation services.
- The project compiled a DVD of the workshop which includes the proceeding of the workshop, movie of the lecture with sign language translation and DAISY version of the proceeding so that every participant could access the proceeding and lecture of the workshop.

2) Result of the workshop

The result of the workshop was complied as the proceeding of the workshop. For the detailed contents, please refer to Appendix 11 Proceeding of the workshop.

Throughout the implementation of the workshop, the Sri Lankan side understood the importance of actal trial of the facilities and the difficulties of disabled people. Height and width of the facilities will be considered based on the result of the workshop. The Project also consider the station facilities raised by the participants such as proper

arrangement of the guiding blocs, audio announcement of the destintion, understandable signature, help desk and botton and so on. Participants commented that a certain number of visually impaired persons cannot read braille especially for those who lost the sight in the middle of their lives. Audio information is essential as well as braille when providing necessary information in the station and vehicle.

Annex K

Noise Modelling

Noise Map for Proposed Light Rail Transit System In Colombo

Report No:CTS-1708659

Prepared for

Consulting Engineers & Architects Associated (Pvt) Ltd

Prepared by

Electro Technology Laboratory
Industrial Technology Institute
N0:363 ,Bauddhaloka Mawatha
Colomo 07

2017 November 12

Report Documentation Page

Customer by their letter dated 12thof June 2017 requested Industrial Technology Institute (ITI) to develop a noise model for Proposed Light Rail Transit System In Colombo. The objective of this noise modeling is to predict potential rail traffic noise impacts at identified sensitive locations.

Customer	Date of Report	Report Type
Consulting Engineers & Architects Associated (Pvt) Ltd	2017 November 12	Final Report

Title	Report No
Noise Map for Proposed Light Rail Transit System In Colombo	CTS - 1708659

Perform Organization Name & Address

Industrial Technology Institute
Electro Technology Laboratory
363, BauddhalokaMawatha,
Colombo 07.

Project Team

Mr. A. S. Pannila	– Additional Director General, Technical Services
Mr.Ruwan Weerasinghe	– Senior Deputy Director, Electro Technology Laboratory
Mr.Asanka Perera	– Research Scientist
Mr.Chathura Pannila	– Research Scientist

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1. Introduction

The technological advancement of last decade has allowed an exciting new type of assessment "Noise Mapping". It has proved a useful tool for strategic planning purposes for developers, local councils and industrial customers.

Noise mapping is a very powerful calculation tool which can provide noise control plots cover an area, or noise levels at individual locations. It enables complex calculations for many noise sources to be undertaken over a large geographical area. Changes in situation, for example the addition of new noise sources or the effects of mitigation can be readily assessed and presented visually.

Noise mapping indicates the predicted levels of noise on contours or areas of colour on a noise map, similar to isobars on a weather map. The noise mapping process requires a computer noise model to calculate the noise levels at a given location. The noise model is a 3D virtual environment, which incorporates the various noise sources along with any environmental factors which may affect the spread of sound (buildings, noise barrios, etc).

Through the use of noise mapping acoustic engineers and consultants are able to assay complex environments and design a range of noise solutions for any existing industries or proposed industrial projects. This can include potential alternations to the industrial buildings and or providing noise solution at the sources.

There are several technical and practical reasons why noise maps are normally produced using computer prediction rather than from actual noise measurements. To produce a map based on measurements would require many measurements to be taken over long periods and this would have been prohibitively expensive. In most cases, the noise at a location is produced by a combination of different sources.

The objective of this noise modeling is to evaluate predicted traffic noise impacts to the residential & sensitive areas due to the sky train system going to be constructed.

1.1 Background of the project

Based on current traffic condition in major roads in Colombo city, and to have an efficient public transport mode compared to the private vehicles, introduction of efficient and quality public transportation system is urgently necessary. The Colombo Urban Transport Survey Project (CoMTrans) conducted by Oriental Consultants Global Co., Ltd. (OCG) from 2012 to 2014 found that out of seven major corridors heading towards the center of Colombo, Malabe Corridor is observed to have the most serious traffic condition with the largest number of private cars with lowest movement speed at peak hours. Therefore, the new public transport system namely SKYTRAIN along to Manabe corridor was proposed and studied followed by CoMTrans.

The Ministry of Megapolis and Western who is responsible for urban development in the Colombo metropolitan area has set out the "Western Region Master Plan - 2030". A priority concern of this master plan is to solve the traffic congestion in Colombo Metropolitan Area by introducing a better and quality public transport system. Therefore, the GoSL officially requested to introduce the proposed Light Rail Transit (LRT) system to the government of Japan.The Feasibility study for the LRT system was started in March 2017.

1.2 Assessment Locations

The horizontal grid noise maps were generated at a height of 1.2m from the ground level by considering the assessment locations within the area by calculating predicted noise levels. The selected sensitive locations are shown in Table 01. Further the predicted vertical noise contour maps were generated by considering only the railway track and a buildings to calculate the noise levels for the facade of the building at a distance 8m and 12.5m from the nearest railway track.

Assessment Locations		UTM Coordinate	
		East / m	North / m
L1	National Hospital – Ward Place	399826.22	490921.21
L2	Windsor Tower apartments – Ward Place	400694.05	490726.47
L3	Rajagiriya Ayurweda Hospital	402378.80	490233.23

Table 01 – Assessment locations and their coordinates

2.0 Acoustic Methodology

Acoustic weighting

All noise levels reported in this analysis are given in "A"weighted decibels dB (A). "A"weighting places the greatest emphasis on the human ear's audible spectrum, particularly the range that most humans commonly hear (1,000Hz to 6,000Hz). The human ear's detectable threshold between two sound pressure levels is approximately 3dB (A). "A" weighting is the most accepted scale for measuring traffic noise because it closely simulates the human ear's hearing response and correlates well with perceived auditory nuisance patterns.

Noise level reporting

Predicted noise noise levels are reported in terms of $L_{A,Eq}$, i.e., the "A"-weighted equivalent noise level during a fixed period of time. $L_{A,eq(h)}$ represents the acoustical energy of noise levels during a time period. It provides a single, convenient value that contains the same acoustical energy over that period as the acoustical energy generated by the variable readings over the same period.

2.1 Noise modeling software - IMMI(WölfelMeßsysteme)

Since 1986, WölfelMeßsysteme IMMI is international recognized software package for environmental pollution mapping that integrates air dispersion modeling (gases, dust, odours), outdoors sound propagation (road traffic, railway, industrial and recreational noise) and interfaces to CAD and GIS packages.

Figure 01 – IMMI logo

IMMI is used by professionals working with public authorities, consulting engineering companies and the industry. IMMI covers a wide range of applications ranging from noise mapping modeling. IMMI integrates noise pollution in a single software package. , IMMI is one of the leading packages worldwide.

IMMI is continuously adapted to meet the requirements of evolving regulations and standards. Depending on the calculation method, IMMI calculates L_{eq}, L_{day}, $L_{evening}$, L_{night}, L_{den}, L_{Amax}, L_{10} and other sound or statistical indicators. Currently IMMI equipped withroad traffic noise, railway traffic noise, air transport noise and industrial/recreational noise. Also it contains more than twenty national and international noise calculation methods.

Noise mapping gained additional importance with the arrival of EU Directive 2002/49/EC relating to the assessment and management of environmental noise. IMMI is equipped with a full set of functions to produce Strategic Noise Maps of major roads, major railways, major airports and major agglomerations.

Special acoustics features

- Calculation in either overall "A" weighted levels or frequency-dependent in octave or third-octave bands.
- Difference maps: compare the noise impact of different planning scenarios.
- Energetic and arithmetic addition and subtraction of noise maps.
- Databases of noise spectra and transmission loss/absorption spectra.
- Façade level calculation.
- Calculation of noise levels and peak levels at single receiver points and grid receivers.
- Calculation of (mainly) outdoors propagation of noise in compliance with national and international (ISO/EU) noise calculation standards/methods.
- Works with fully geo-referenced data.
- Interpolation and drawing of contours, filled coloured or gray-shaded contours, isolines, etc.
- Calculating digital terrain models using original data or applying optimization algorithms.
- Presenting results in electronic form, numeric/text tables and coloured maps.
- 2D and (animated) 3D visualization of pollution maps and clippings.
- Interfacing with horizontal GIS applications, especially the ESRI ArcGIS™ family of products, MapInfo™ and GoogleEarth™.
- Distributed calculation of pollution maps on networked and multi-core computers.
- Use of meteorological data.

2.2 Data Collection

In order to develop a noise map for area under consideration, it is necessary to provide the rail traffic volume data, geographical information and background information to the noise model. The building details which supposed to construct the physical environment were entered to the modeling software based on the information given by Consulting Engineers & Architects Associated (Pvt) Ltd. Also the building heights were updated by using "LiDar" – (Light detection and ranging) data from the survey department of Sri Lanka.

2.3 Traffic Volume Data

The required traffic data for the noise model was extracted by using the predicted traffic volume data given by the Consulting Engineers & Architects Associated (Pvt) Ltd .Attention was given to traffic data passes through railway lines since it is the main noise source for this modeling. Further for modeling purpose the predicted traffic flow during the day time and night time were considered. The *Table 02* shows the daily traffic volume data for day time and night time.

Track	Day Time (0700h – 2200h)		Night Time(2200h – 0700h)	
	Volume / day	Speed / kmh^{-1}	Volume / day	Speed / kmh^{-1}
Rail Track - 1	176	40	33	40
Rail Track - 2	176	40	33	40

Table 02 – Daily sky train traffic Volume and Speed

2.4 Modeling Assumption

Following assumptions were made during the modeling work.

- Use the noise emission spectrum of a single Train according to " SRM II" element library

  This element library contains the Dutch calculation method for railway noise. IMMI implements the SRM II railway noise. SRM is an acronym for *"Standard Reken-Methode"* .This Dutch calculation method for railway noise is fully compliant with the requirements of both EU directive 2002/49/EC and recommendation 2002/613/EC.

Frequency / Hz	63	125	250	500	1000	2000	4000	8000	Sum
Sound Pressure Level / dB(A)	72.0	79.6	92.2	97.6	94.2	90.5	84.1	76.0	100.6

Table 03 – Noise spectrum of a single train unit at 40kmh^{-1}

- Environmental parameters

  Following values were considered as environmental parameters for noise mapping.

  Day Time – Temperature 31°C and Relative humidity 60%
  Night Time – Temperature 26°C and Relative humidity 80%

3.0 Noise Modeling
3.1 Presentation of Modeling Results

- Horizontal grid calculation

  To represent the modeling results, Color contour noise maps were generated with 5dB steps for assessment locations as mentioned in Table 01. The horizontal grid calculation is performed at a height of 1.2m from the ground level which is the height of a receiving person.
  [See Annexure 01 to 06]

- Vertical grid calculation

  To find out the predicted noise levels at different heights, vertical grid calculation was performed. Calculation conditions as follows. [See Annexure 07 to 09]

  - ✓ Case 1 - Without Building nearby LRT structure.
  - ✓ Case 2 - When a 20m height building is located at 8m away from the nearest railway track.
  - ✓ Case 3 - When a 40m height building is located at 12.5m away from the nearest railway track.

4.0 Results
4.1 Predicted Horizontal Grid Noise Maps

The noise maps were generated considering the following situations considering daily sky train traffic volume and speed.

Annexure 1 – Noise Map for Location 1 – National Hospital (Day Time)
Annexure 2 – Noise Map for Location 1 – National Hospital (Night Time)
Annexure 3 – Noise Map for Location 2 – Windsor Tower Appartment (Day Time)
Annexure 4 – Noise Map for Location 2 – Windsor Tower Appartment (Night Time)
Annexure 5 – Noise Map for Location 3 – Ayurweda Hospital (Day Time)
Annexure 6 – Noise Map for Location 3 – Ayurweda Hospital (Night Time)

4.2 Predicted Vertical Grid Noise Maps

The LRT noise of the equivalent noise level (LAeq) was predicted for different cases with various receiving points. The result is shown in below table.

Case 1 - Without Building near LRT structure. [See Annexure 07]

Receiver Point	Relative Height	Noise level at 12.5m from nearest rail track - (L_{Aeq}) / dB(A)	
		Day Time	Night Time
P1	1.2m	52.8	47.8
P2	4.2m	55.1	50.1
P3	7.2m	57.4	52.4
P4	10.2m	65.9	60.9
P5	13.2m	67.5	62.5
P6	16.2m	65.8	60.8

Table 04 – Case 1

5.0 Discussion

Horizontal Grid Noise Maps

All horizontal grid noise maps were generated 1.2m height from the ground level. Horizontal grid noise maps illustrate the propagation of noise in vertical plane. The propagation of noise highly depends on the location of obstacles such as buildings. Therefore a location and geometry of a building are directly affected to the propagation of noise.

It is clear, most of buildings located near the sky train lines are affected with the range 50dB(A)-55dB(A) average noise level at day time for assessment location L1.Also at the night time the average noise level range is 45dB(A)-50dB(A).

When consider locations L2 and L3 , buildings located near the sky train lines are affected with the range of 55dB(A)-60dB(A) average noise level at day time and 50dB(A)-55dB(A) average noise level for the night time.

Vertical Grid Noise Maps

According to the vertical grid noise maps, it is clear that at around 13.0m height above from the ground level will give the highest noise level for all three cases for Day time and Night time. This is due to the elevation of the Sky train lines since the rail lines are driven about 11.0m height from the ground level.

The noise from the sky trains is gradually increased up to the 13m height from the ground level and above this level the noise from sky trains is gradually decreased. Therefore the critical height is the 13.0m height from the ground level.

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2017/11/12

CTS-1708659

Noise Map for Location 1 – National Hospital (Day Time)

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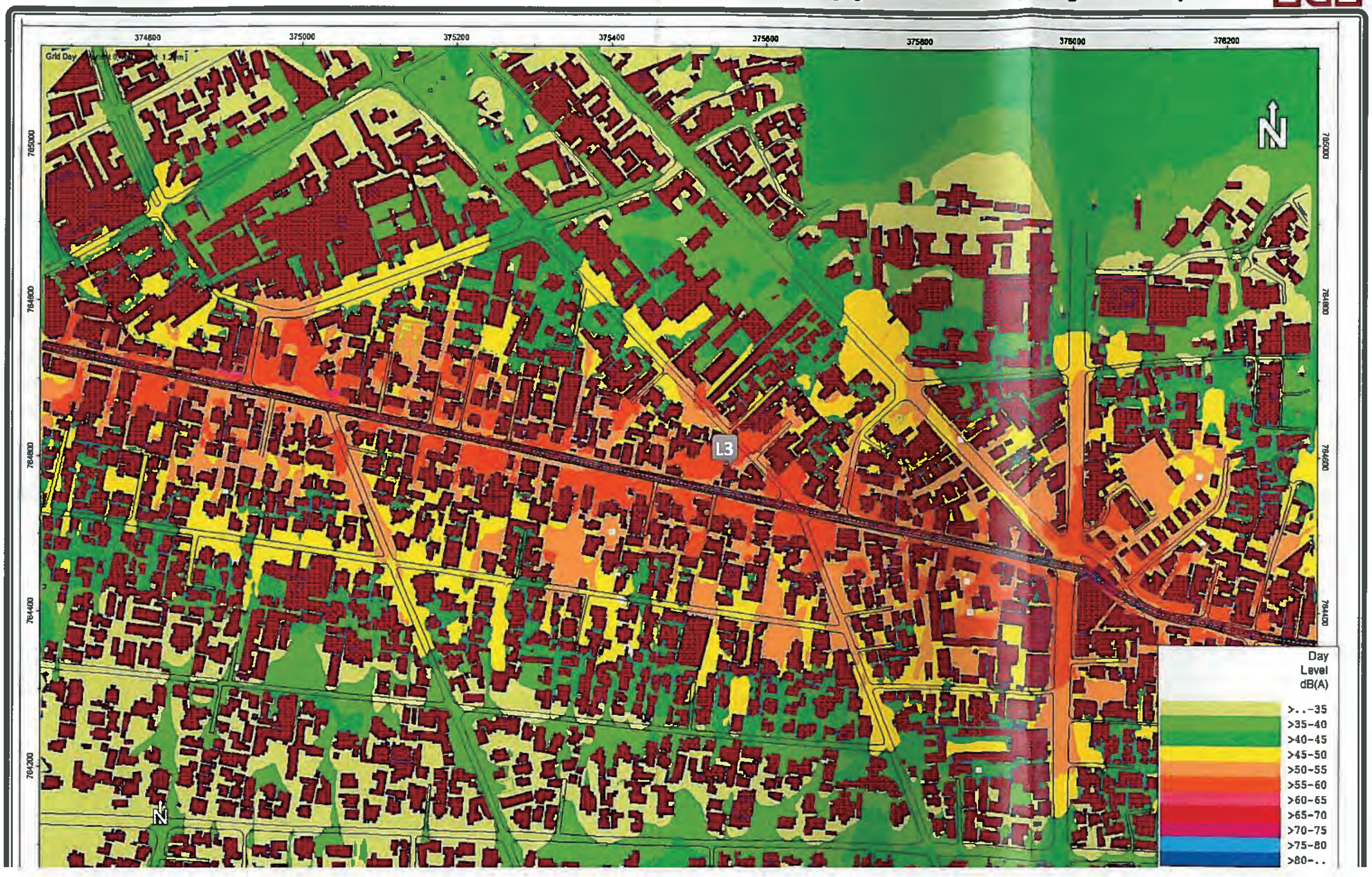
Noise Map for Location 1 – National Hospital (Night Time)

CTS-1708659

Noise Map for Location 2 – Windsor Tower Appartment (Day Time)



Noise Map for Location 2 – Windsor Tower Appartment (Night Time)

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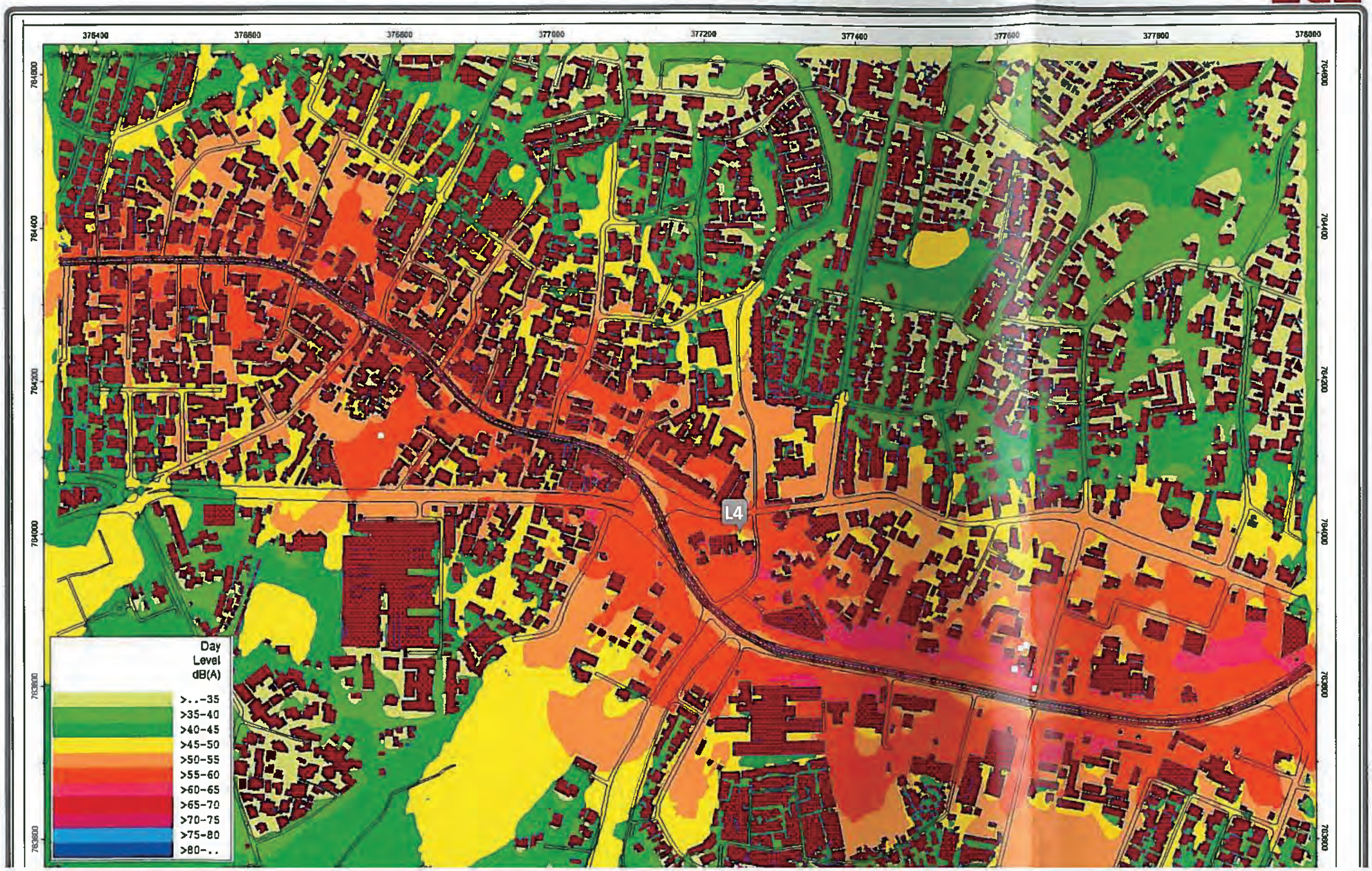
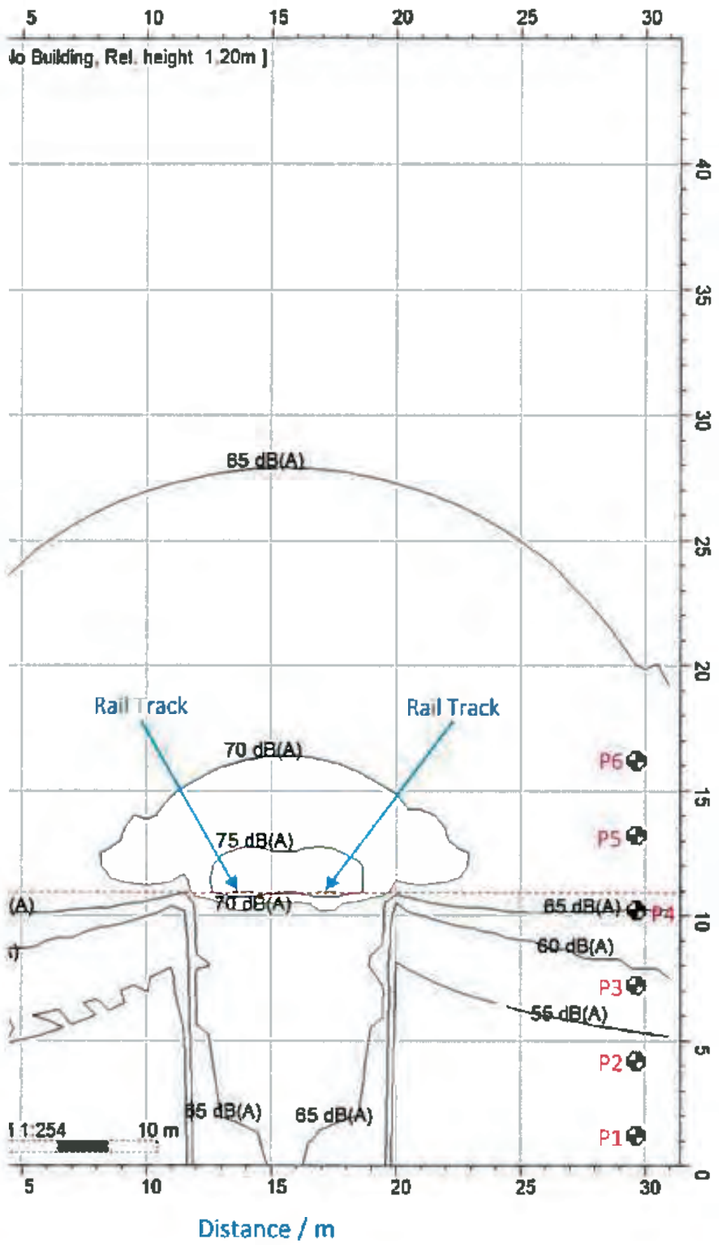
Noise Map for Location 3 – Ayurweda Hospital (Day Time)

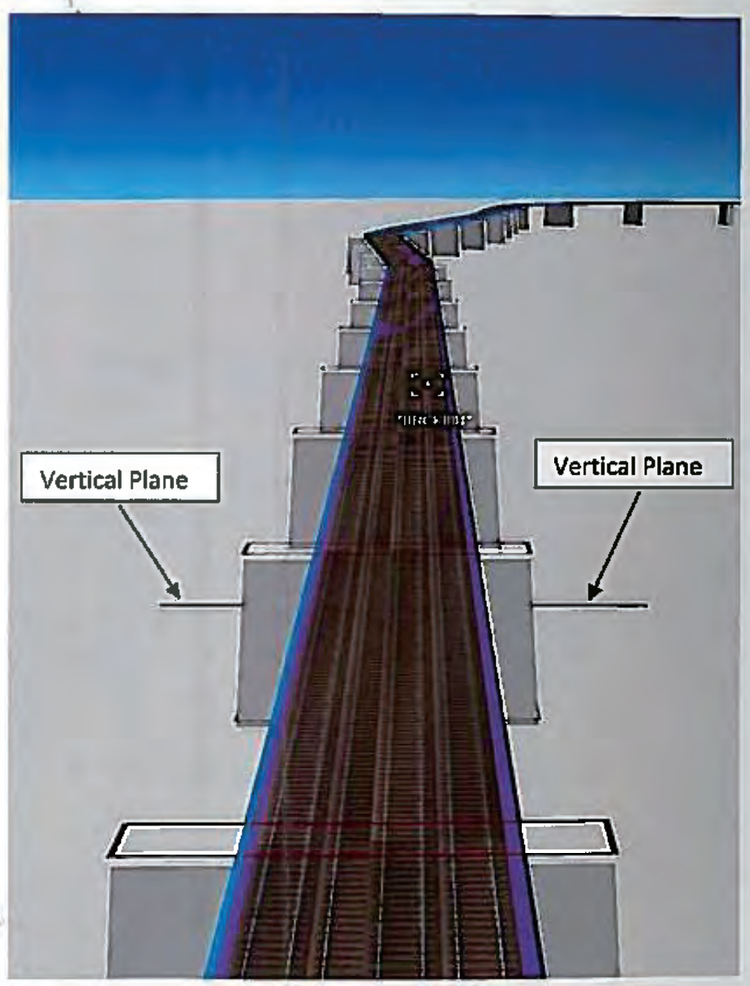


Noise Map for Location 3 – Ayurweda Hospital (Night Time)

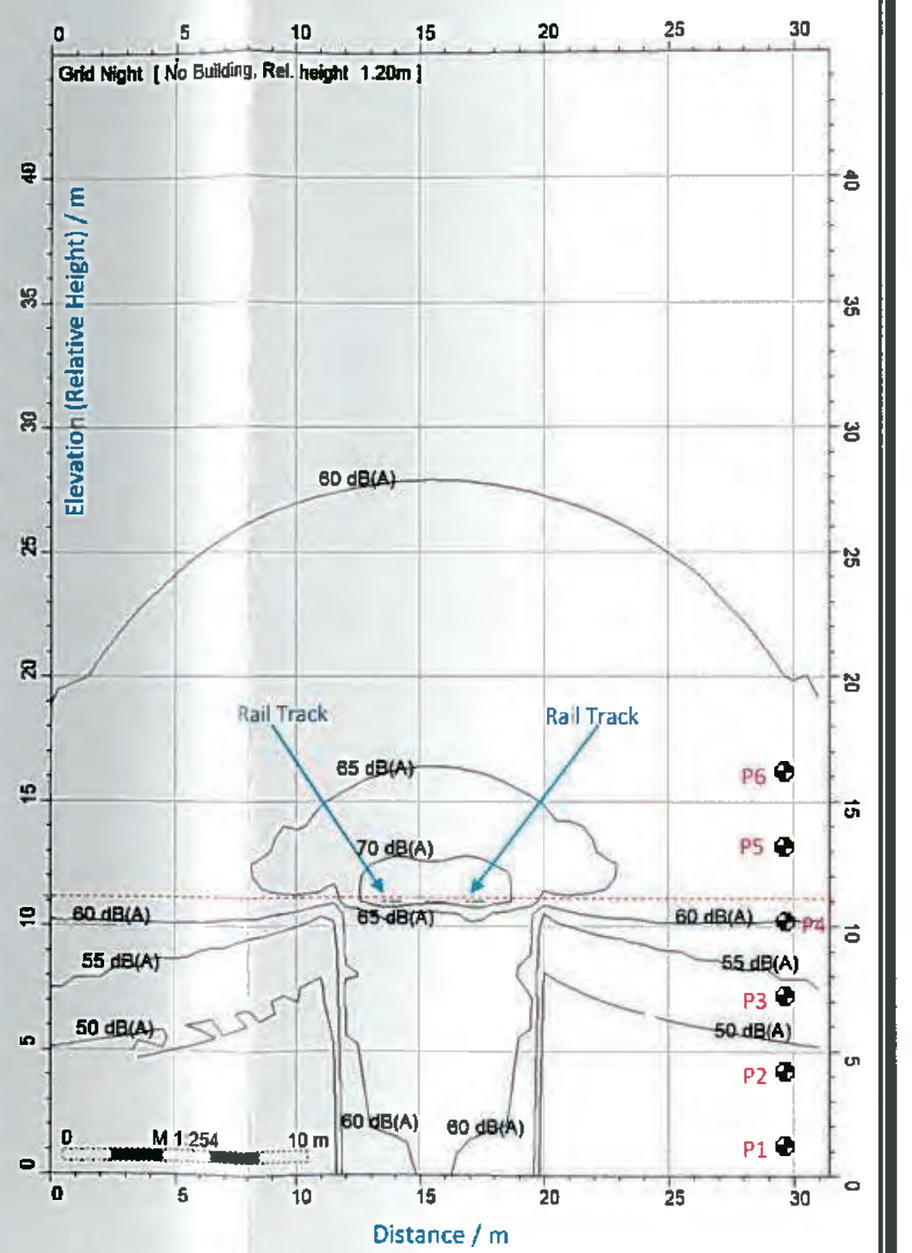
Noise Propagation in Vertical Plane – Case1

Day Time





Night Time



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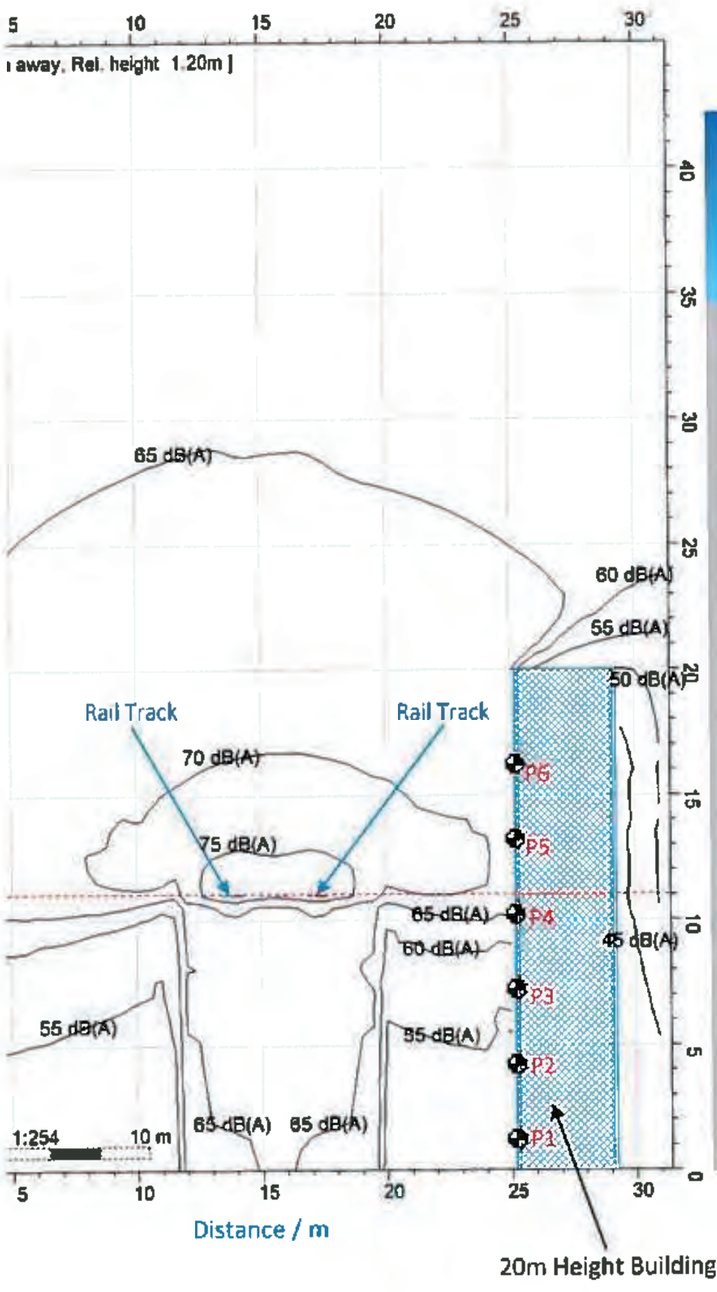
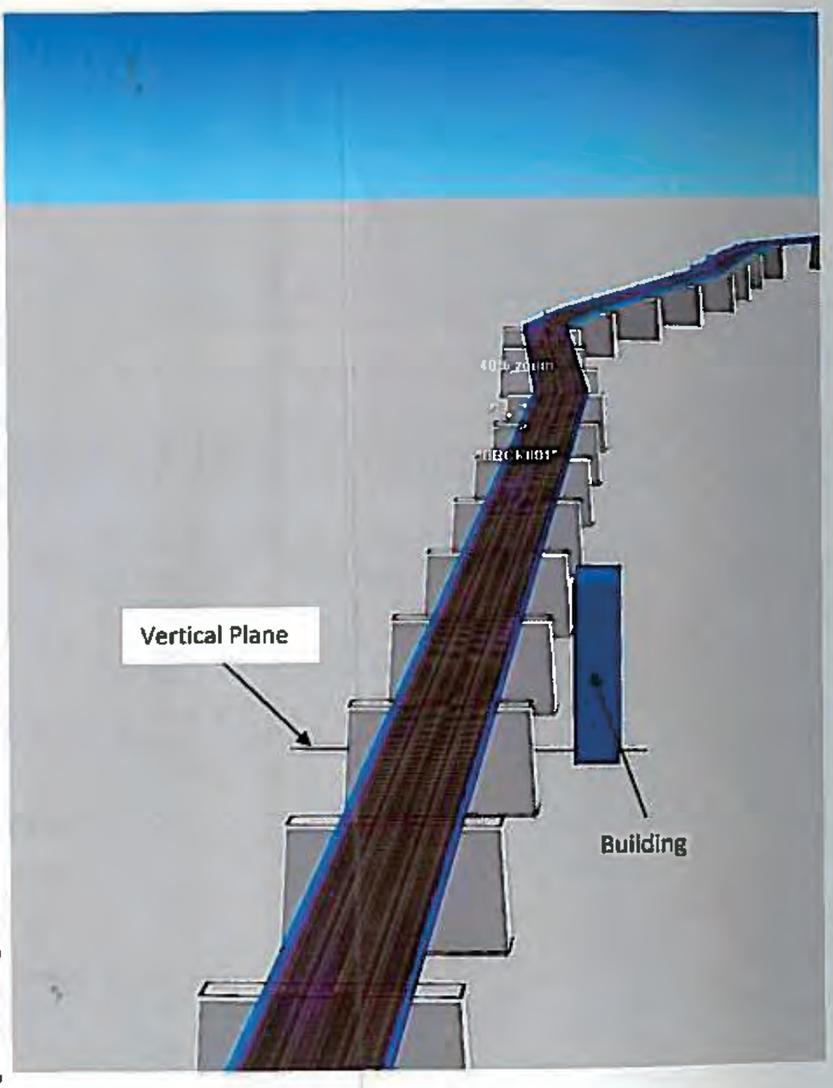
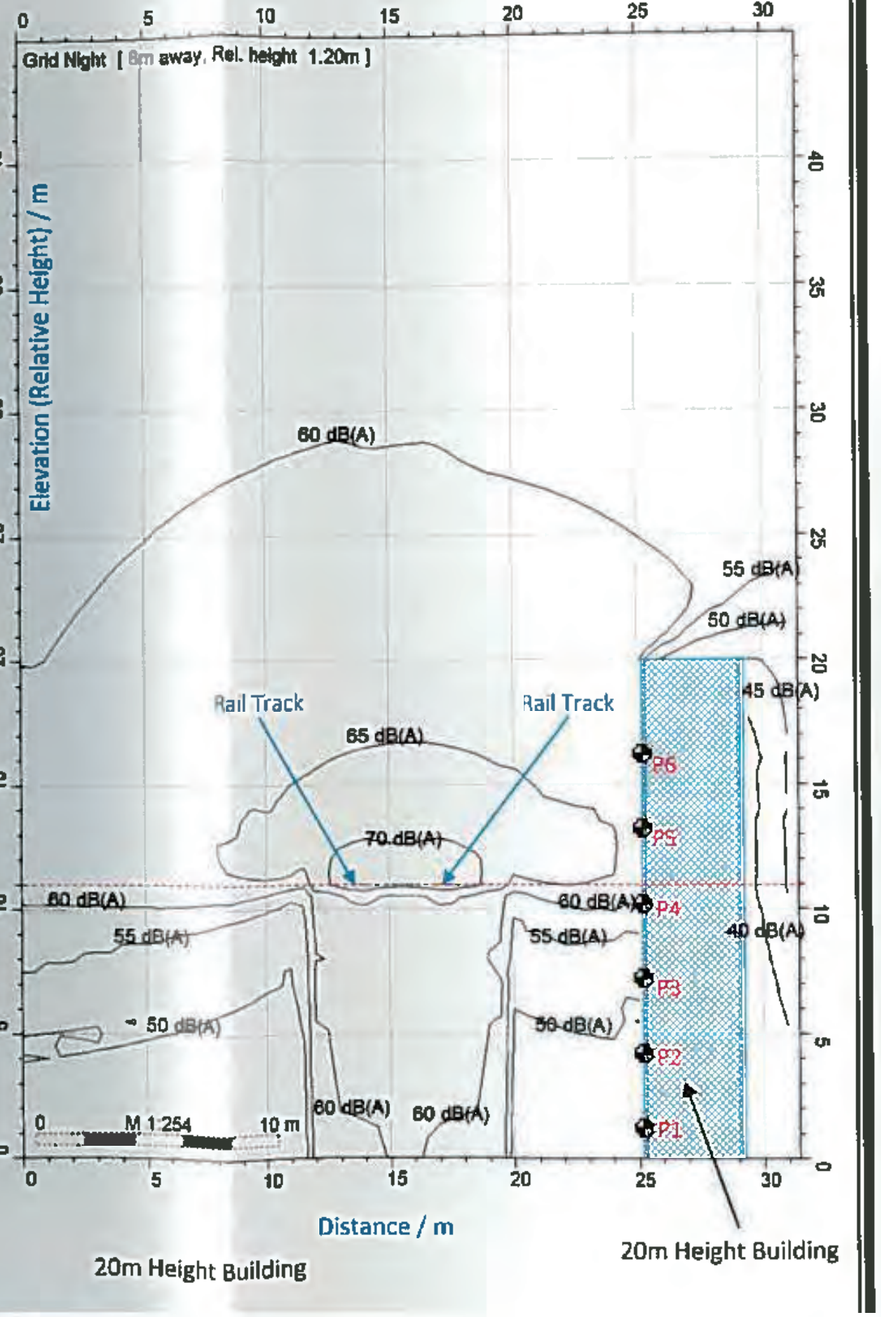
Noise Propagation in Vertical Plane – Case2

Day Time





Night Time



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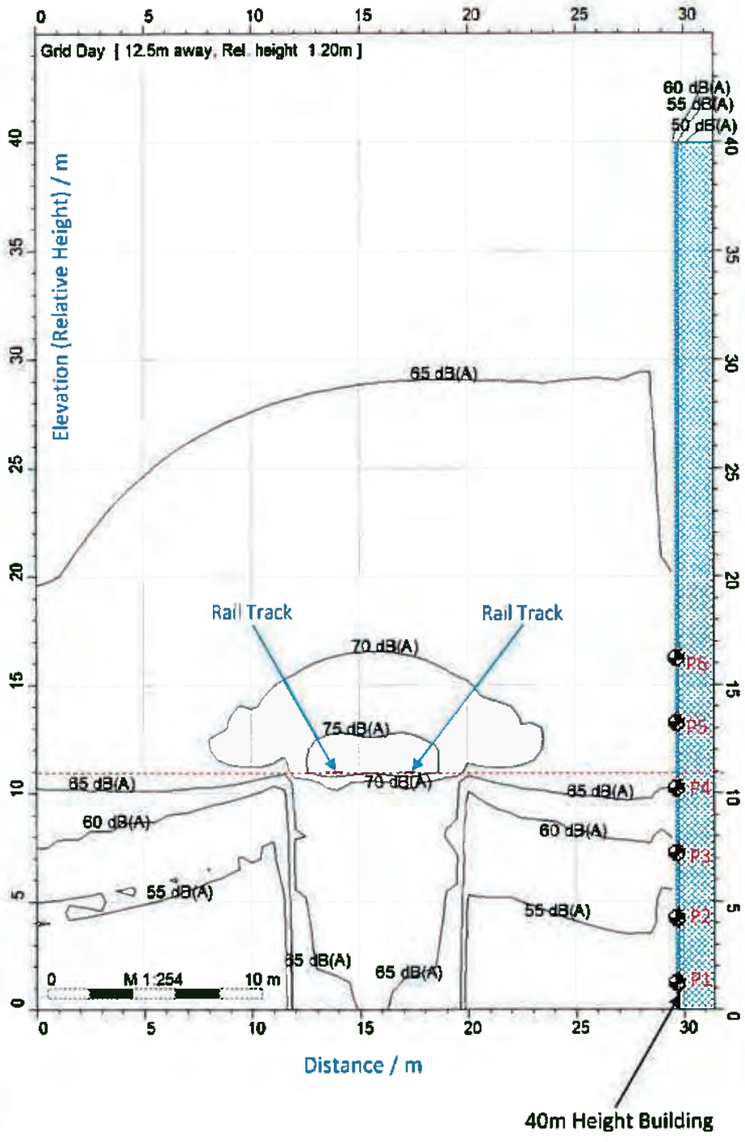
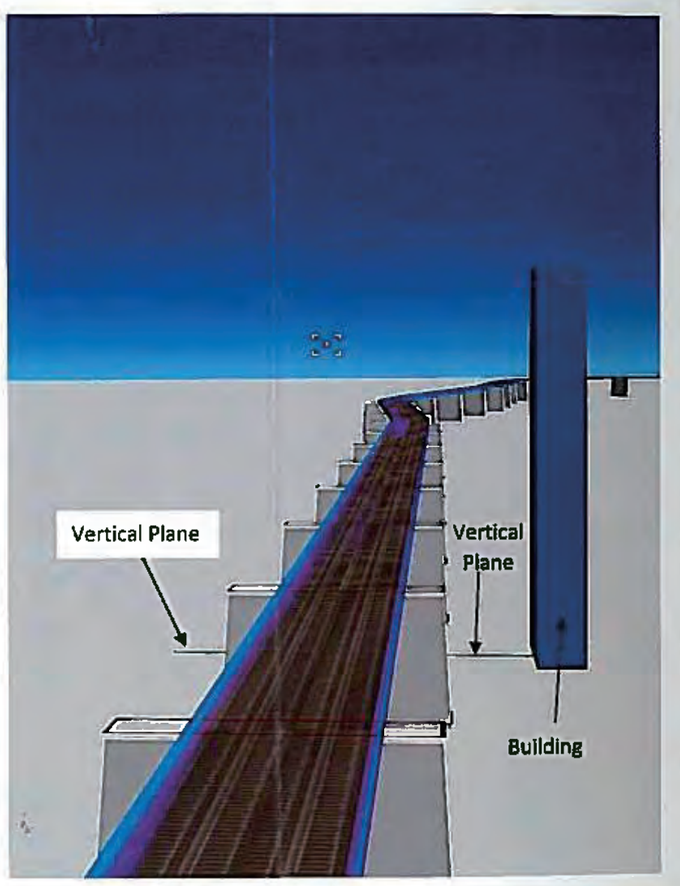
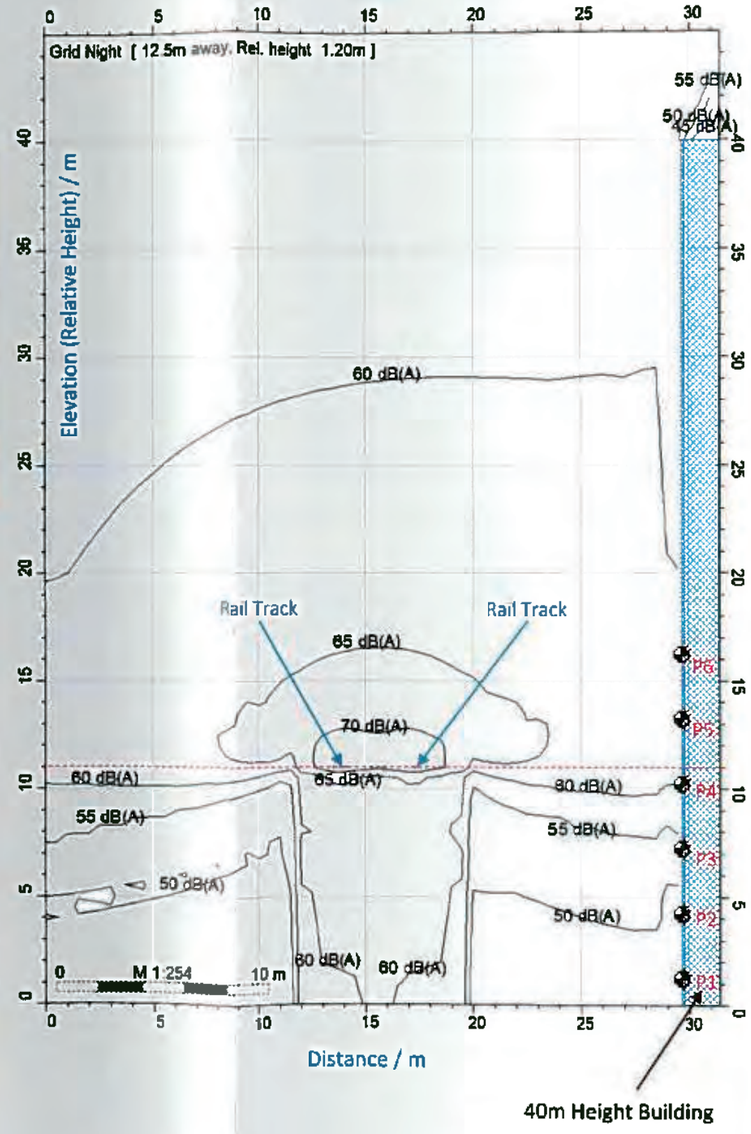
Noise Propagation in Vertical Plane – Case3

Day Time





Night Time



Calculated Condition (Case 3): Consider the noise generated from sky trains on piers and there is a 40m height building at 12.5m away from the nearest railway line.

Industrial Technology Institute
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Annex L

Flood Modelling

Flood Modelling and Other Flood Studies for the Proposed LRT Project

Mitigation Hydrological Impacts

The LRT may aggravate flood lift and delay flood recession during its construction and operation stages. The 2D modelling undertaken by SLLRDC using Sobek Model presents the baseline flood levels and the project induced flood levels for both construction and operation stages. The model also shows the delays in flow recession, if any.

Sub Models for Sensitive Flood Plains

SLLRDC uses one dimensional flood model to model flood scenarios of the Metro Colombo area. MIKE 11 flood model which is a product of Danish Hydraulic Institute is being used for this purpose. This main flood model was used to extract basic parameters for two 2D sub models using Sobek 2D flood model. Two 2D sub models were created for the following areas:

- Sub Model 1-Parliamentary lake and the flood plains of Parliament Lake (Diyawanna Lake)
- Sub Model 2-Depot area and the entry route to the proposed depot are from Malabe Kaduwela Road to the low-lying area on to the left of Chandrika Bandaranayaka Kumaranathunga Mawatha. on the flood plains of Madewela East Diversion Canal. The Depot area is situated.

The selected 2D areas that show sensitive flood plains are depicted in the figures below.

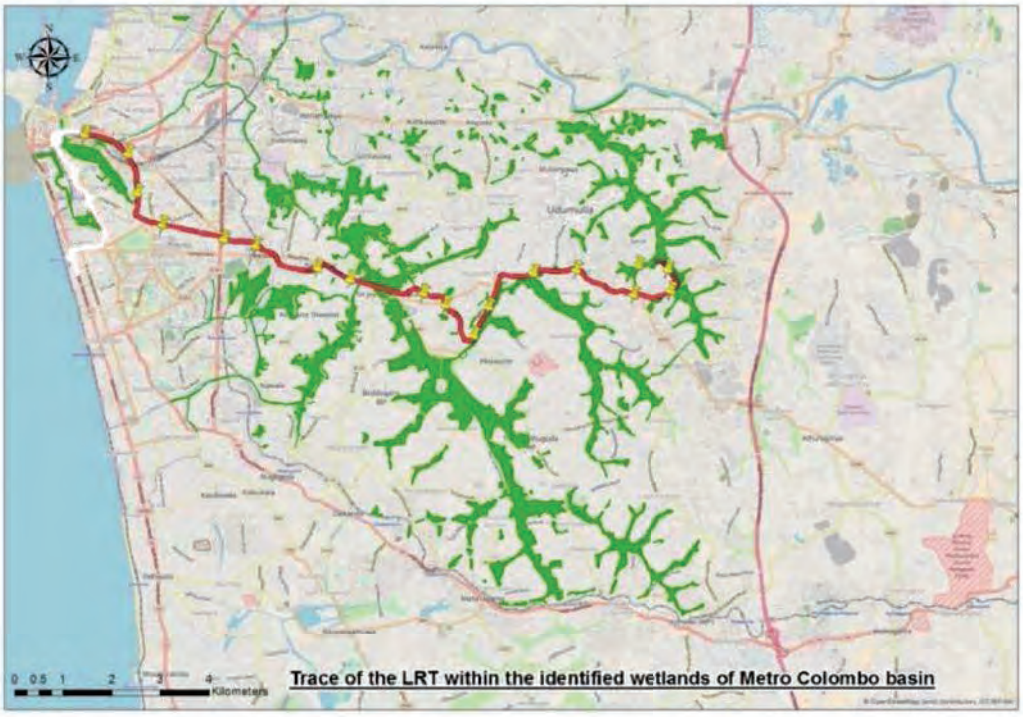


Figure 1- Trace of LRT with Identified Wetlands

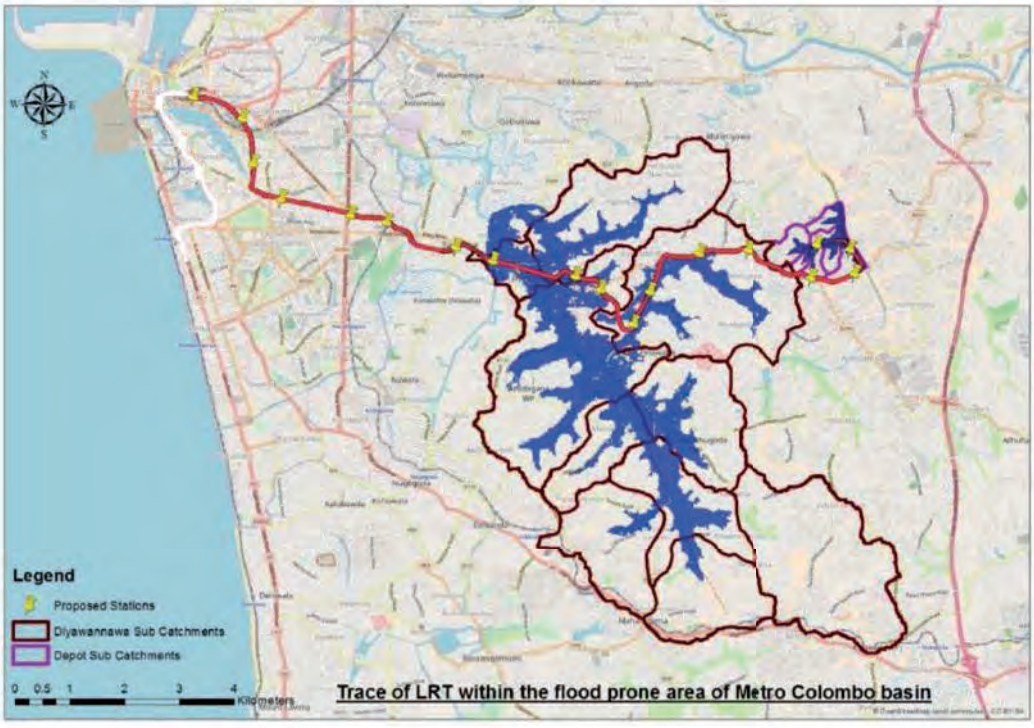


Figure 2- Trace of LRT with Flood Prone Areas

Model Calibration

As the sub models were used only to measure the sensitivity of construction for stochastic events no model calibration was done. However, the sub models were inherited from the SLLRDC master models which have been subjected to some calibration process.

Representation of the LRT in the Model

Representations of the pilot road section was done through raising the elevations of the cross sections beds and the bottom levels of the 2D model area represented by a Digital Elevation Model [DEM]. Similar techniques were used to represent pillars of the LRT on the flood plain for the operational stage. A typical representation of the LART trace at Diyuawanna Lake is depicted in the figure below.

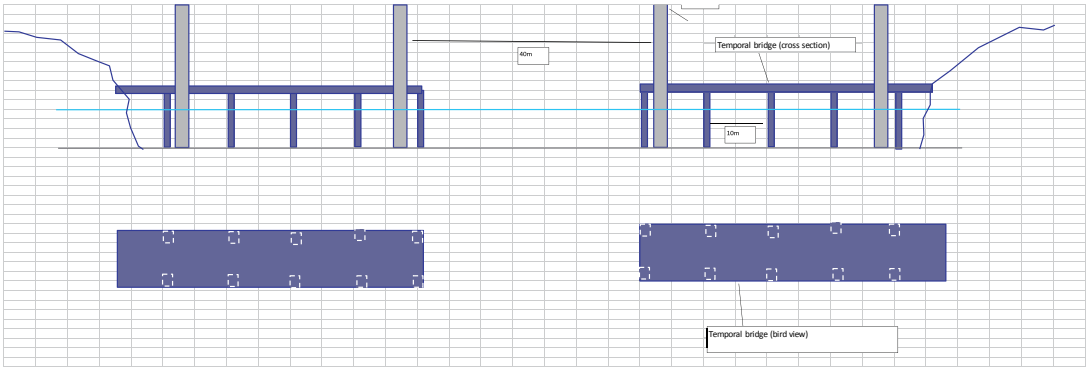


Figure 3- LRT Pillar Representation in Diyawanna Lake

Geometric Parameters Used for The Model

Following main geometric parameters were used to represent the LRT in the flood model for the construction and operational stages

Construction Stage

- Maximum temporary fill height for the depot 0.6m from existing ground level

Operational Stage

- LRT pillar size 1mx1m, LRT pillar spacing 10m,LRT Depot pillar spacing 10mx10m grid

Modelled scenarios

The following scenarios were considered for flood modelling.

1. 10 Year – Without LRT **[Baseline] – for both Diyawanna Lake and Depot**
2. 10 Year – With LRT- **[Construction]- for both Diyawanna Lake and Depot**
3. 50 Year – Without LRT **[Baseline]-Depot**
4. 50 Year – With LRT- **[Operational]-Depot**
5. 100 Year – Without LRT **[Baseline]-Diyawanna Lake**

6. 100 Year – With LRT- **[Operational]-Diyawanna Lake**

As the hydrological impacts on the Pilot Road will be short term (Say 5 years of maximum construction period) 10-year return period was selected for the operational stage standard 100-year return period was selected. Model simulation were carried out for each of these scenarios.

Hydrologic Modelling

For the hydrologic modelling HEC HMS hydrologic model was used. Hydrologic input was through HEC HMS model was provided to the selected sub model area in the hydrodynamic model. A typical inflow hydrograph for one sub catchment is given in the figure below.

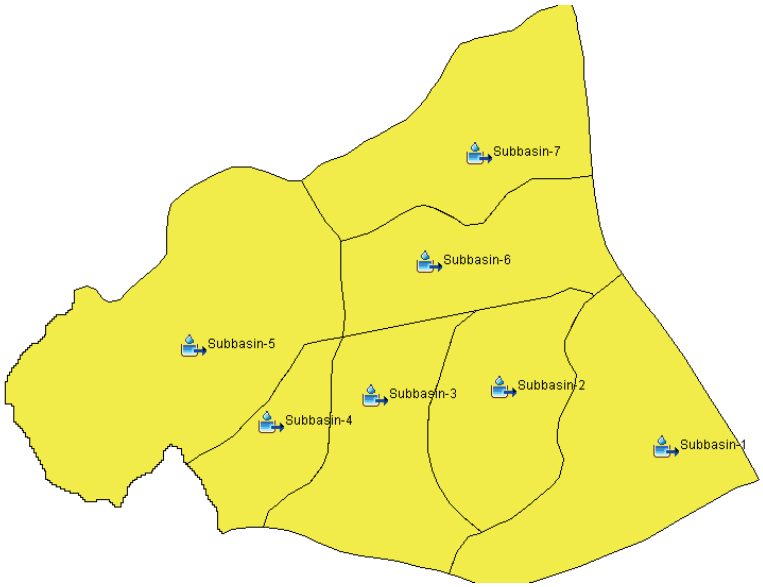


Figure 4-Hydrologic model for the depot area

Hyetograph Formulation

Hyetographs used for 10 Year and 100 Year return periods (using the updated IDF curve for Colombo)

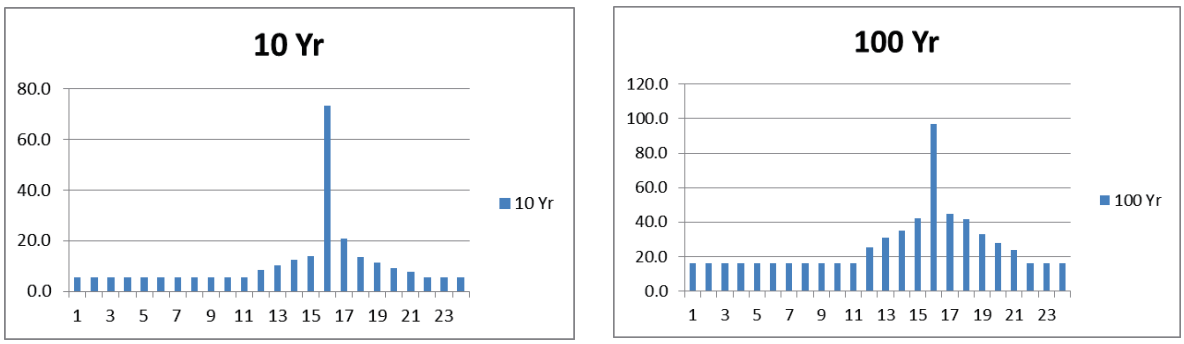


Figure 5-Hyetographs (Rain Histograms) for 10-year and 100-year return periods

Table 1- Hyetographs for Different Return Periods -Alternating Block Method

Time (hr)	Return Period					
	T2	T5	T10	T25	T50	T100
	2	5	10	25	50	100
1	2.5	3.8	5.4	8.2	11.5	16.0
2	2.5	3.8	5.4	8.2	11.5	16.0
3	2.5	3.8	5.4	8.2	11.5	16.0
4	2.5	3.8	5.4	8.2	11.5	16.0
5	2.5	3.8	5.4	8.2	11.5	16.0
6	2.5	3.8	5.4	8.2	11.5	16.0
7	2.5	3.8	5.4	8.2	11.5	16.0
8	2.5	3.8	5.4	8.2	11.5	16.0
9	2.5	3.8	5.4	8.2	11.5	16.0
10	2.5	3.8	5.4	8.2	11.5	16.0
11	2.5	3.8	5.4	8.2	11.5	16.0
12	3.8	5.9	8.5	13.0	18.2	25.5
13	4.5	7.0	10.1	15.7	22.0	31.0
14	5.7	8.2	12.3	20.8	28.1	35.3
15	5.8	9.9	14.0	24.1	31.7	42.5
16	57.0	66.1	73.2	84.5	90.8	96.7
17	14.2	18.0	20.7	25.1	33.4	45.0
18	5.8	9.2	13.4	21.5	29.4	41.6
19	5.0	7.9	11.5	17.7	25.0	32.9
20	4.1	6.4	9.2	14.1	19.9	27.9
21	3.6	5.5	7.9	12.1	17.0	23.7
22	2.5	3.8	5.4	8.2	11.5	16.0
23	2.5	3.8	5.4	8.2	11.5	16.0
24	2.5	3.8	5.4	8.2	11.5	16.0
sum	144.0	196.6	256.1	363.8	476.5	626.5

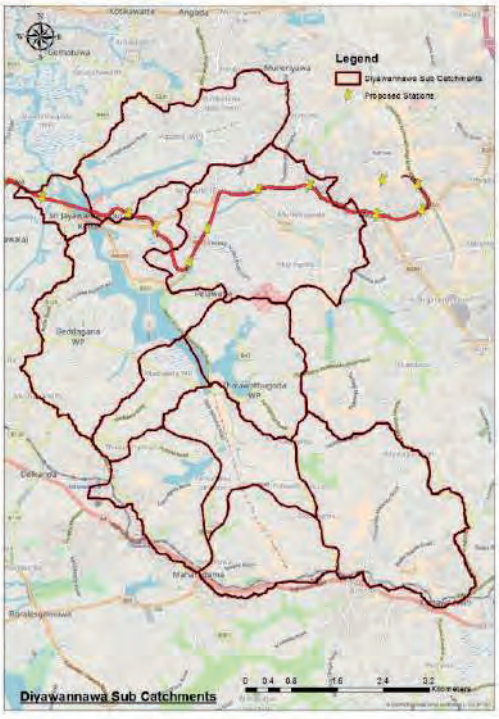


Figure 6-Sub Catchment Areas for Diyawanna Lake

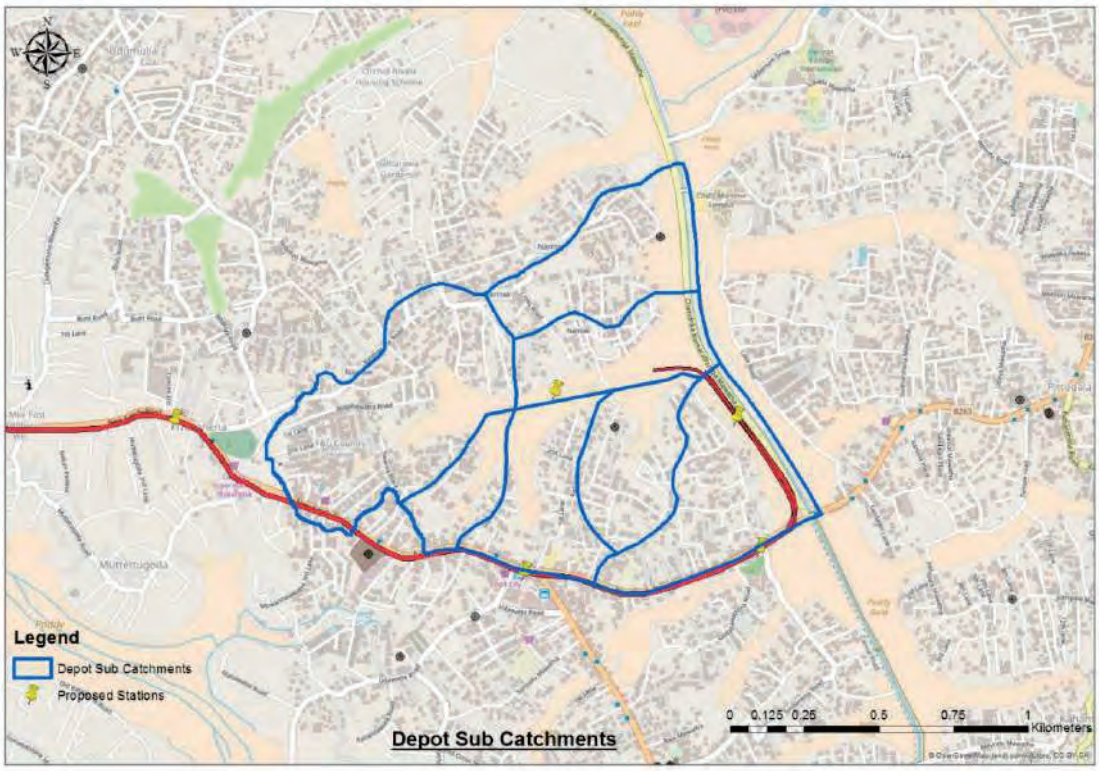


Figure 7-Sub Catchment Areas for Proposed Depot Area

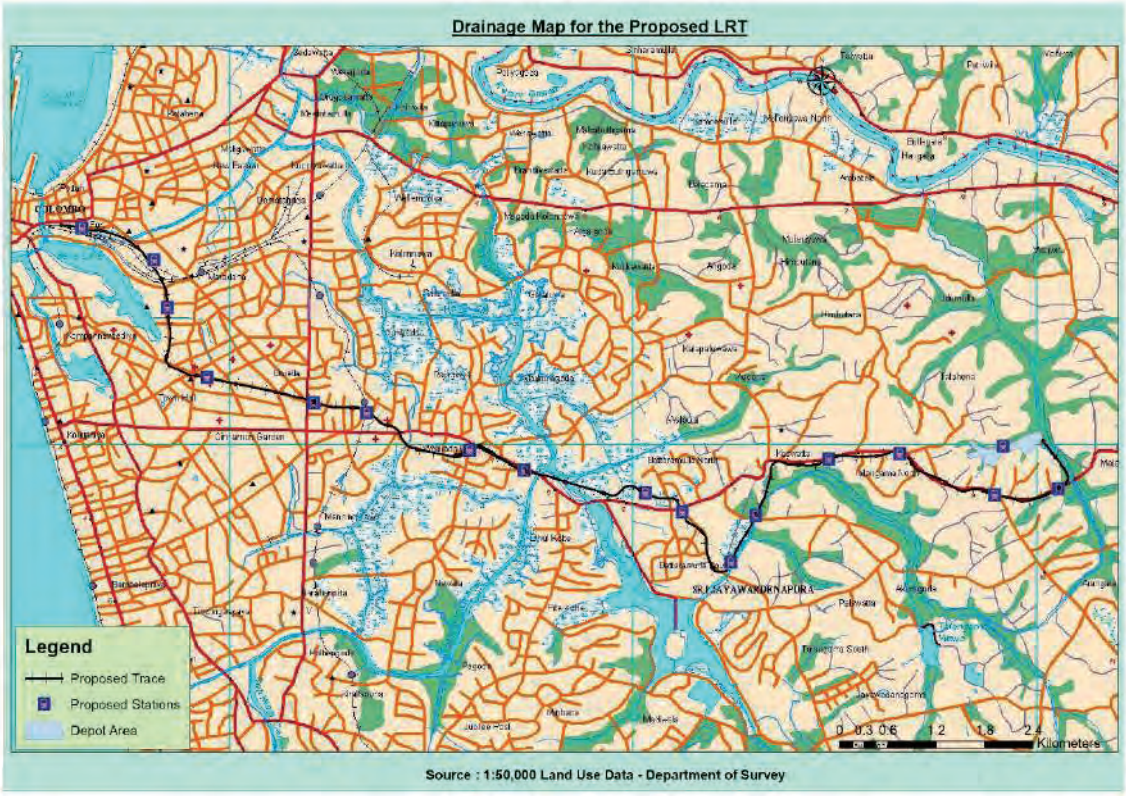


Figure 8-River Network for the Main Model of Colombo Metro Area with LRT Trace

Modelling Results for Different Scenarios

The following model results are presented inter alia.

(1) Water levels with and without LRT for different scenarios for Diyawanna Lake, Depot Area and Parliament

(2) Flood recession times with and without LRT for different scenarios for Diyawanna Lake, Depot Area

(3) Flood extent maps for Depot Area for different scenarios

(4) Flood hydrographs for Depot Area and Diyawanna Lake for different scenarios

Modelling Results

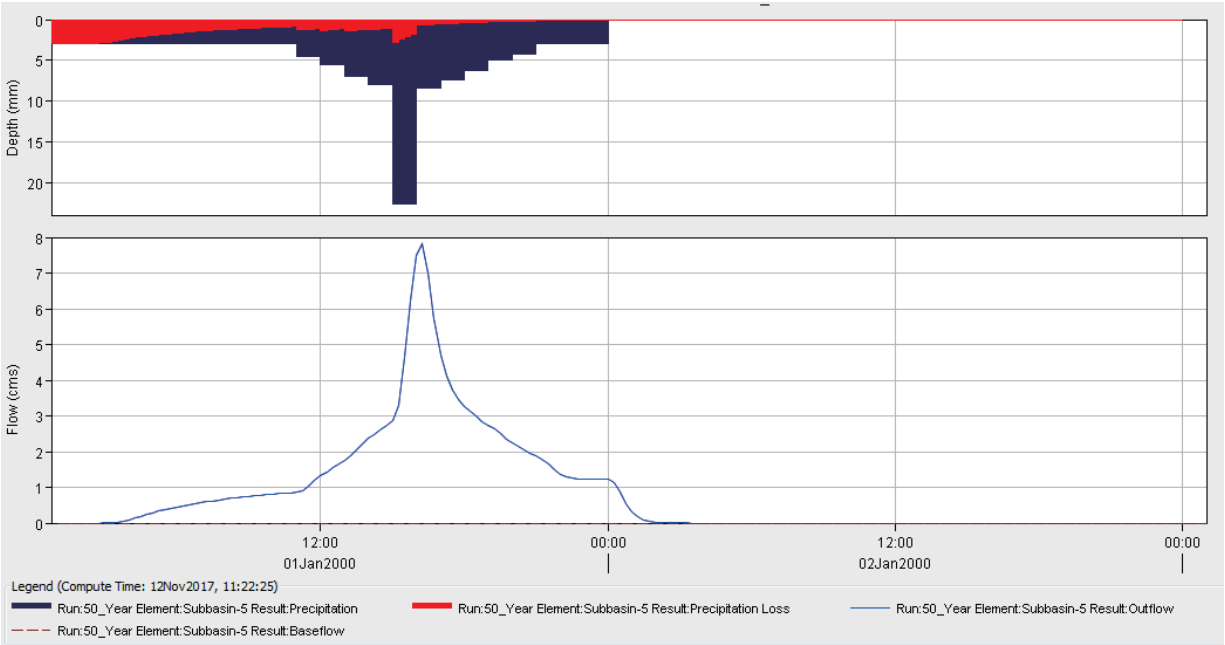


Figure 9-Typical Inflow Hydrograph(Discharge Vs Time Graph) of a sub catchment

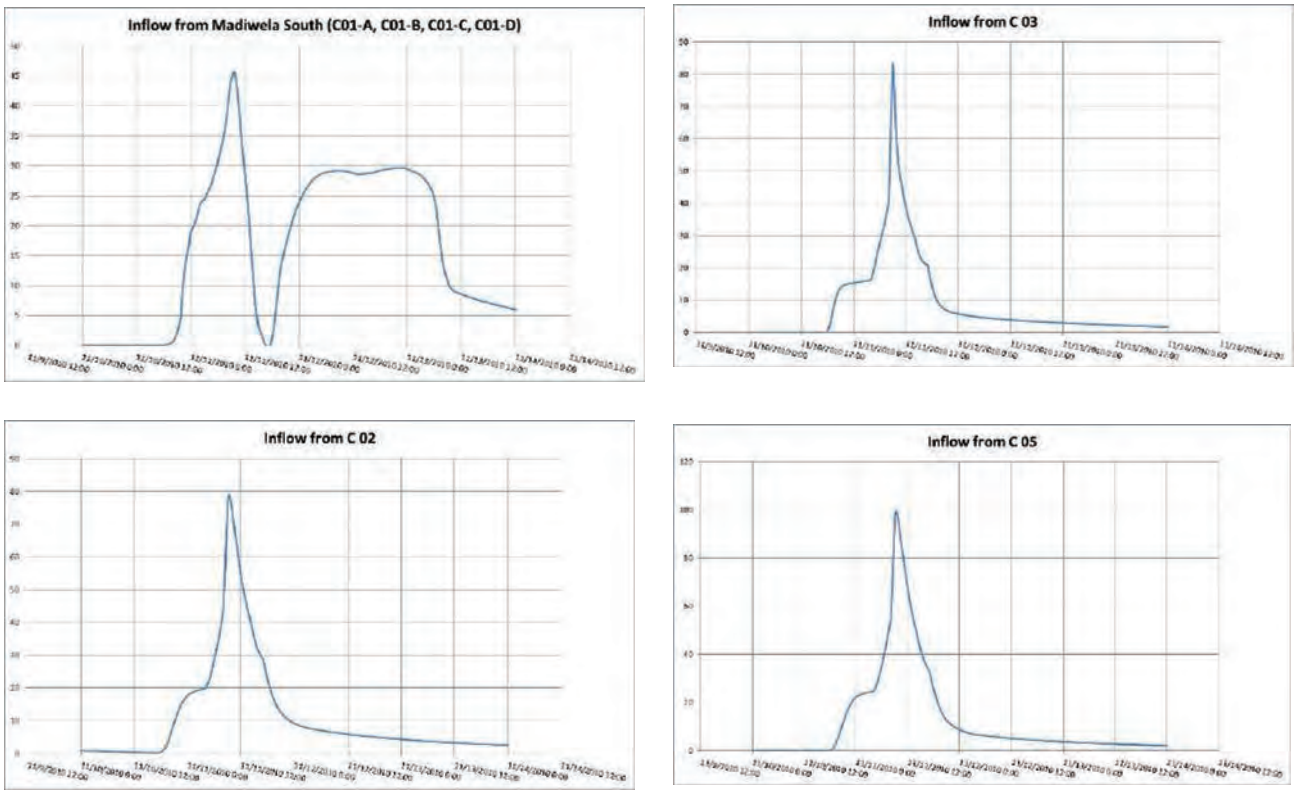


Figure 10-Inflows (Discharge Vs Time) from sub catchments

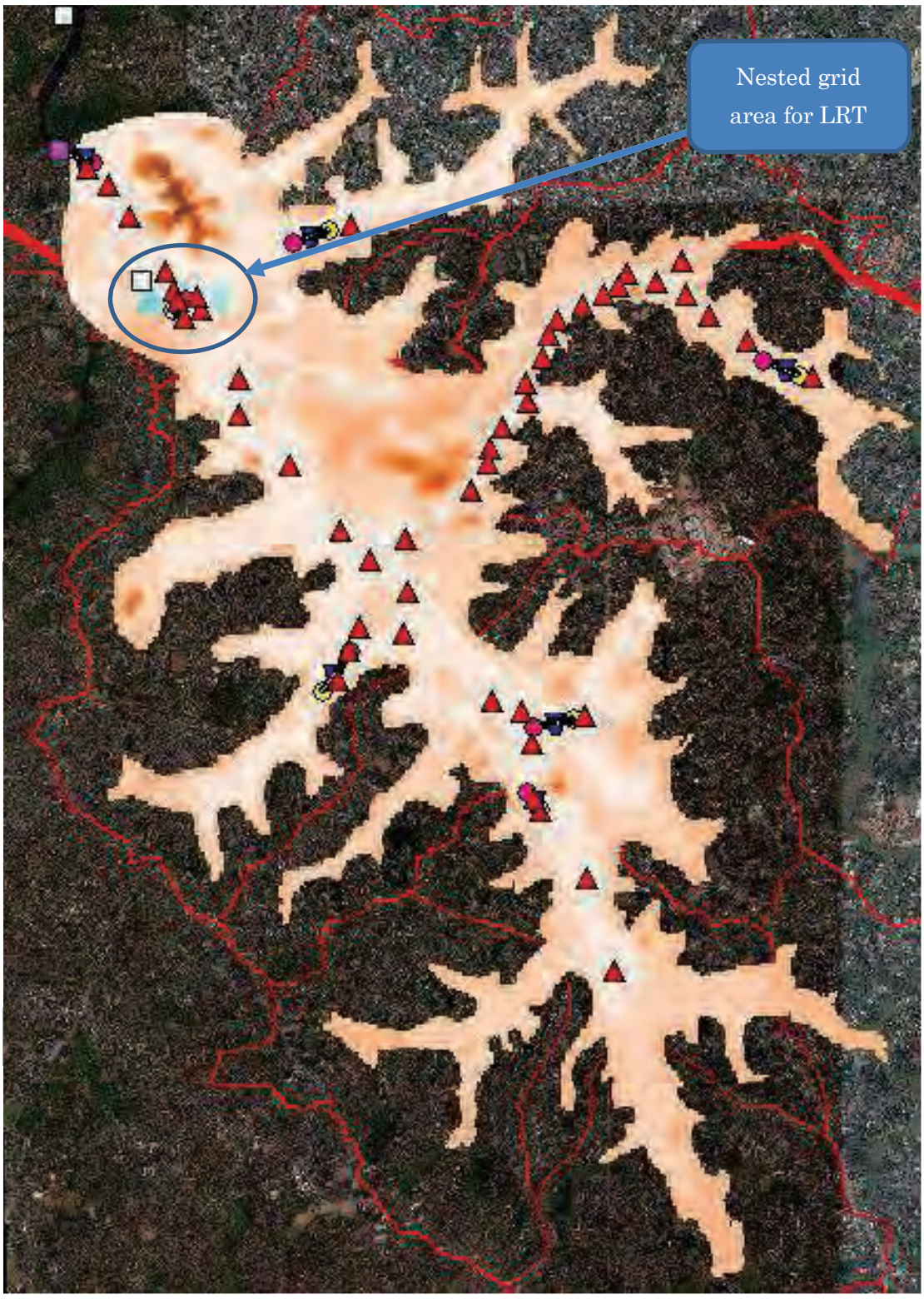


Figure 11-Diyawannawa Sobek 2D Model (Flood Spread with Levels) with nested grid (Finer Grid for LRT Crossing) option

Flood extent maps for depot area for different scenarios are shown in the figures below.

10 Year Flood Extent (Baseline)

10yr flood extent construction period)

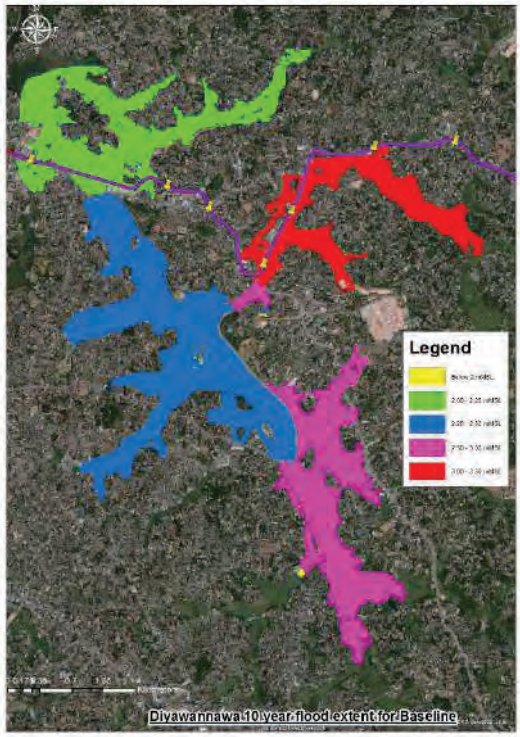
50yr flood extent (Baseline)

50yr flood extent (operational period)

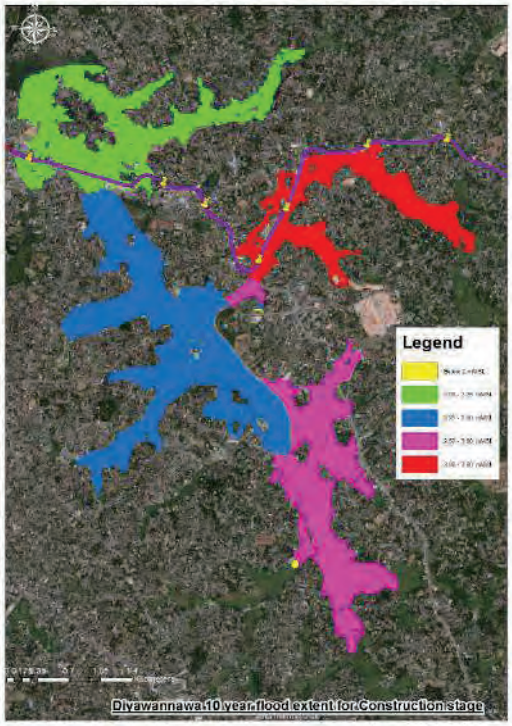
100yr Flood Extent (Baseline)

100yr flood extent (operational period)

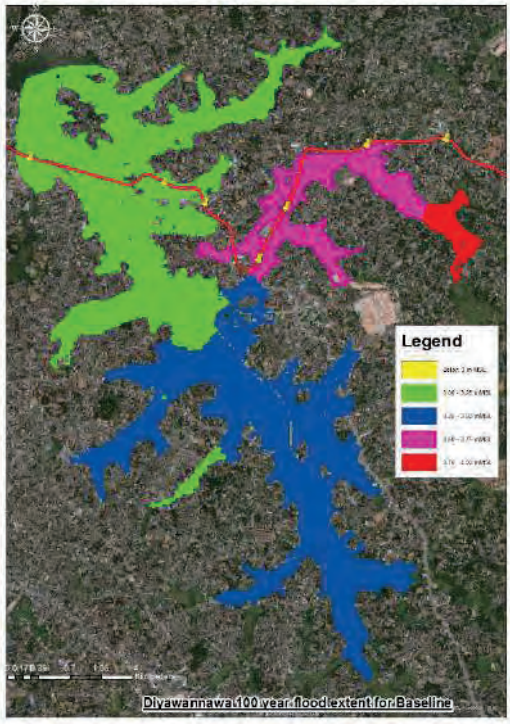
Figure 12-Depot Area flood spread (with levels) under baseline operational conditions



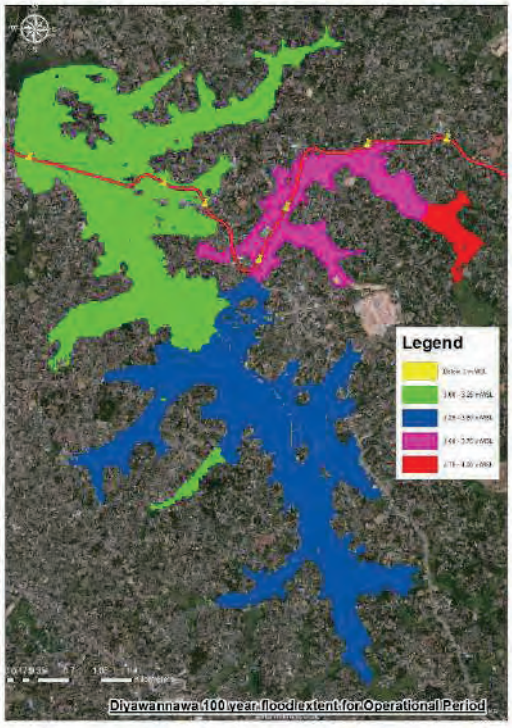
10 Year (Baseline)



10 Year (Construction)



100 Year (Baseline)



100 Year (Operational)

Figure 13-Diyawanna Oya flood spread (with Flood Levels) for the operational condition

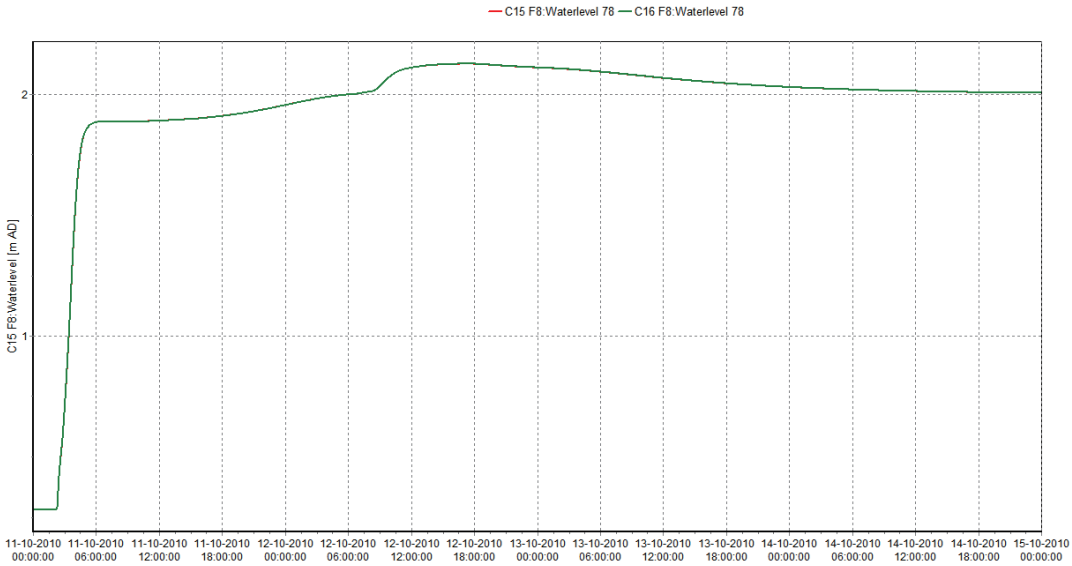


Figure 14-Stage Hydrographs (Water Level vs Time) for Diyawanna Lake for Construction and Operational Conditions

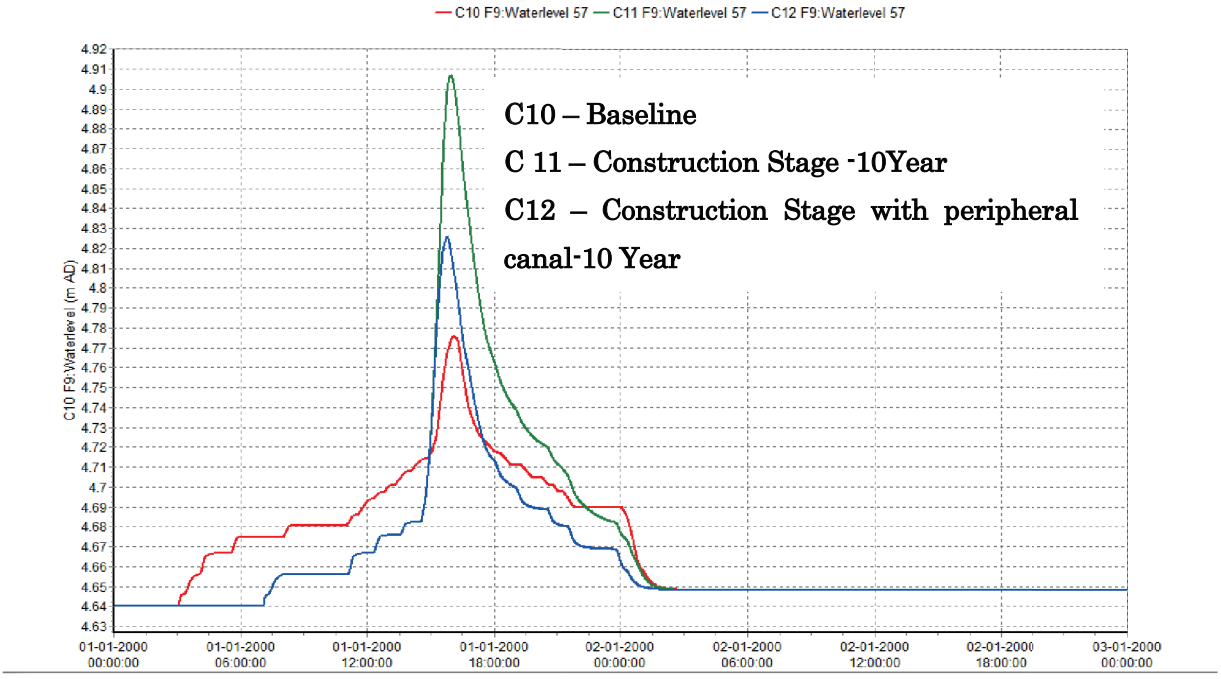


Figure 15-Stage Hydrographs (Water Level vs Time) for Depot for Construction and Operational Conditions including the peripheral canal

Table 2 - Water levels and extra flood lift (backwater) for selected scenarios

No	Scenario	Place	Flood Level-Without LRT MSL (m)	Flood Level-With LRT MSL (m)	Backwater (Extra Flood Lift) (m)	Remarks
1	Baseline-10 Year	Diyawanna Lake	2.1	2.1	Nil	No significant backwater
2	Construction-10 Year					
3	Baseline-10 Year	Depot Area	4.62	**	**	**
4	Construction-10 Year		**	4.91	0.29	Backwater is considerable
5	Construction-10 Year with 3m wide peripheral canal		**	4.8	0.18	Backwater reduces with the proposed canal
6	Baseline-50 Year/100 Year		7.16/8.38	**	0.09/0.04	No significant backwater during the
7	Operational-50 Year/100 year		**	7.25/8.42		
10	Baseline-100Year	Parliament	3.16	3.16	**	There is no difference in WL due to introduction of LRT pillars
11	Construction-100 Year		**	3.16	0.00	

Flood recession times with and without LRT for different scenarios for Diyawanna Lake, Depot Area is shown in the table below.

Table 3-Delay in flood recession for selected scenarios

No	Scenario	Place	Flood Recession Time without LRT (hrs)	Flood Recession Time with LRT (Hrs)	Flood Recession Delay (hrs)	Remarks
1	Baseline-10 Year	Diyawanna Lake	As there is no backwater no change in recession time.			Flood recession delay is significant with temporary filling. Proposed canal reduces recession time.
2	Construction-10 Year					
3	Baseline-10 Year	Depot Area	16	**	14	
4	Construction-10 Year		**	More than 30		
5	Construction-10 Year with 3m wide peripheral canal		**	15	-1.0	
6	Baseline-50 year/100 Year		19.5/20	**	0/ 0	
7	Operational-50 year/100 Year		**	19.5 /20		
8	Baseline-10 Year	Parliament	Since there is no backwater for both construction and operational stages for Diyawanna Oya Lake there is no backwater near Parliament which is upstream.			
9	Construction-10 Year					
10	Baseline-100Year					
11	Construction-100 Year					

Note: The durations are based on animation and propagation of flood of 2D simulation.

Determination of 100 Year Flood Level for the Depot

One hundred flood level for the depot site was independently obtained using the flood frequency analysis of Kelani River water levels at Ambatale which is the closest river gauging station for the Depot. The flood frequency curve and the flood frequency analysis table are given below. Depot elevation will be kept above 100-year flood level.

Table 4– Flood Frequency Details for Kerlani River at Ambatale

Return Period	Frequency Factor	WL in m
2	-0.151	4.29
5	0.888	5.30
10	1.575	5.96
20	2.235	6.60
50	3.089	7.43
100	3.728	8.05

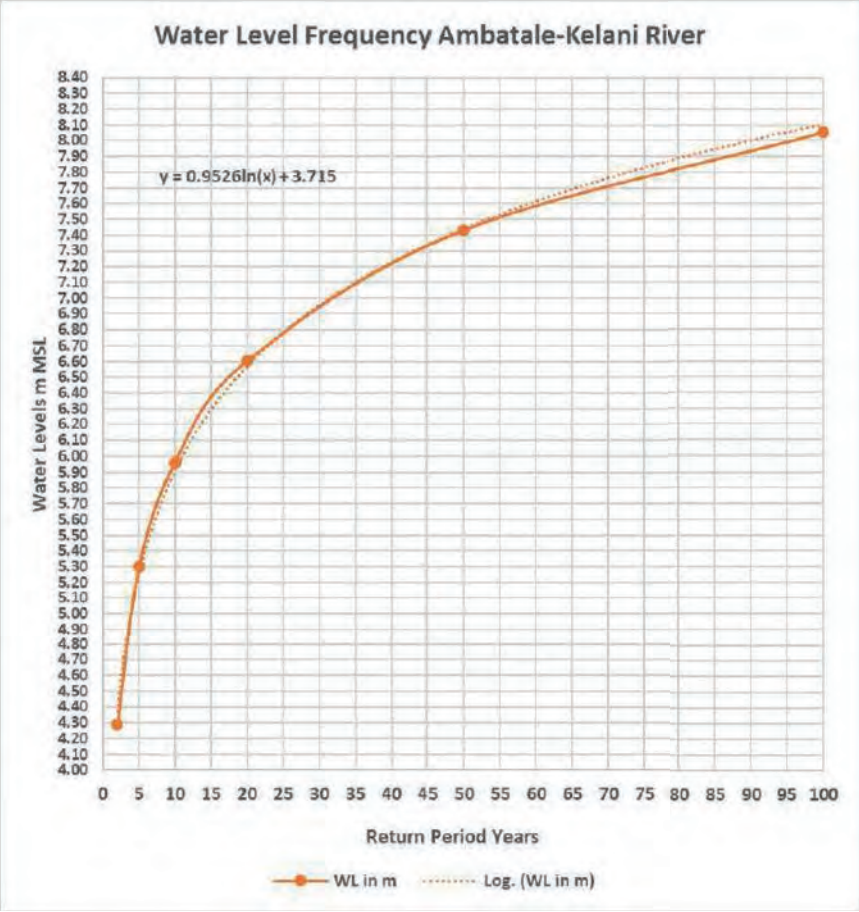


Figure 21 - Flood Frequency Curve Kelani River at Ambatale

Conclusions

It could be concluded that proposed LRT can cause backwater impacts near the depot site because of temporary filling if a 3m wide temporary peripheral canal is not provided. Hence the temporary canal provision is a vital need.

Also, the LRT will not cause any considerable hydrological impact in terms of flood lift (backwater) or flood recession (Delay in flood receding) during its operational stage because of the pillars in Diyawanna Lake and in the Depot site near Chandrika Bandaranayaka Kumasranathunga Mawatha.

Annex M

Scoping and Impact Assessment based on JICA TOR

Impact assessment based on JICA TOR

1 Environmental Scoping Results

Potential environmental and social impacts that may be caused by the project were identified and rated by the Study Team according to JICA TOR. The results are summarized in the table below.

Table 1 Scoping Results

Items	Assessment		Explanation and Points to Remember	
	Construction	Operation	Construction	Operation
Pollution Control				
Air Pollution	A-	B+	Air pollution can increase because of construction works, operation of machineries and movement of workers and materials.	Emissions will be limited to operation of machineries for the maintenance of the rolling stocks at the depot area. The project can reduce volume of traffic, which can lead to improved air quality.
Water Pollution	B-	B-	Wastewater will be produced during construction activities. Also, contaminated water may be generated from the construction of pillars' foundation on the surface.	Wastewater will be produced during maintenance works at the depot and stations. Sewage will also be produced.
Noise & Vibration	A-	A-	Noise will be generated from construction equipment and construction works.	LRT will use steel wheels. Noise will be generated from the movement of the LRT. During maintenance works, the depot area can generate noise and vibration.
Waste/ Soil Contamination	B-	B-	Excavated soil, sludge and general waste will be generated.	Solid and liquid wastes will be generated from the stations and depot area.
Foul Odour	D	D	It is assumed that foul odour will not be generated during construction and	

Items	Assessment		Explanation and Points to Remember	
	Construction	Operation	Construction	Operation
			operation.	
Natural Environment				
Hydrology	C	C	The proposed LRT route will pass through Diyawanna Lake and the depot area is planned to be built on agricultural land/ watershed area. Thus, there is a possibility of altering the hydrology of the area.	
Topography & Geology	D	D	The project area is comparatively flat. There will be no major soil cutting and embankment is planned.	
Benthic environment (bottom sediment)	B-	D	There is a possibility that the project will affect benthic environment. There is a need to thoroughly investigate how to minimize impacts, when bridges are built.	No impact is assumed.
Protected Areas	B-	C	There is a possibility that the planned LRT route will pass through DWC (Department of Wildlife Conservation) designated Sri Jayawardana Bird Sanctuary and CEA (Central Environmental Agency) designated Thalangama Environmental Protected Area.	
Ecosystem	B-	C	Trees and plants along the planned LRT route may be removed or cut. These may include culturally important and old trees (e.g. Bo trees).	There is a possibility of impacts due to the management of plants in order to recover trees felled during construction period.
Social Environment				
Land acquisition and involuntary resettlement	A-	C	The project will need to acquire public and private land, particularly for the stations. Also, around 6-7 ha of agricultural land and wetland will be acquired for the depot area. It is projected that more than 50 households will be resettled due to	There is a possibility that impacts due to land acquisition, resettlement and loss of livelihood will remain.

Items	Assessment		Explanation and Points to Remember	
	Construction	Operation	Construction	Operation
			the project.	
Local economy (employment & livelihood)	B+	B+	It is projected that the local economy will be revitalized with the increase in employment opportunities for technical and general workers.	The project will contribute in developing the local economy through the reduction of commuting time and increased access to traffic.
Land use and local resource use	B-	B+	In this project, existing roads and current land use will be utilized as much as possible. Approximately 7ha of agricultural land in Malabe area will be used as depot area.	Effective land utilization along the planned LRT route and development of regional economy are expected. Increased urbanization may lead to environmental concerns such as increase in waste generation.
Social capital and social institutions (e.g. local decision-making bodies)	D	D	No particular impact is assumed.	
Existing social infrastructures and services	A-	B+	There is a possibility that exiting social infrastructures (e.g. road, relocation of electricity wires, water pipelines) will be affected during construction.	The project will contribute in the development of the local economy and improvement of surrounding social infrastructure and services
Poverty	C	D	There are no slums along the planned LRT route. However, affected households in land acquisition may include poor families.	
Minority Groups. Indigenous People	D	D	There are no minority groups or indigenous people residing within the project site.	

Items	Assessment		Explanation and Points to Remember	
	Construction	Operation	Construction	Operation
Unequal distribution of benefits and damages	C	C	No significant impact on unequal distribution of benefits and damages is expected from this project. However, there is a need to carefully address compensation payment to affected people, who will be resettled or lose livelihood.	
Conflicting interests in the region	C	C	There may be some impact on local conflict of interests	
Gender	C	C	There may be some impact on gender	
Child's rights	C	C	there may be some impact on impact on child's rights t.	
Cultural heritage	A-	C	The project may affect culturally important festivals and Bo trees. There are Bo trees and festival activities held along the planned LRT route. Among these, the Perahera Festival held around the Gangaramaya Temple and the Bo tree in Borella junction, are considered to have high religious value.	The number of temple visitors may increase due to the introduction of the LRT.
Landscape	A-	A+/-	During construction, landscape is temporarily affected due to dust and presence of construction machineries.	The introduction of the elevated structures in Colombo will create a new landscape. It is important to carefully consider the impacts of this new landscape.
Infectious diseases such as HIV and AIDS	C	D	The influx of construction workers may increase the risk of spreading infectious diseases.	No particular negative impact related to infectious diseases is assumed
Work environment (including occupational	B-	B+	Traffic flow will be restricted in areas surrounding construction works. This restriction may increase traffic	The project will introduce a safer transportation system.

Items	Assessment		Explanation and Points to Remember	
	Construction	Operation	Construction	Operation
safety)			accidents.	
Others				
Cross-border impacts & climate change	D	B+		The project will contribute in the reduction of greenhouse gases such as CO_2 from the transport sector.
Light and Ventilation	D	B-		Structures may block sunlight by casting shadows on surrounding areas, particularly those along the LRT route and depot area. Also, the elevated structure may block the flow of air in some areas.

Source: Study Team

2 Impact Assessment

The assessment of potential impacts due to the project during construction and operation phases is summarised inTable2 below. Ratings are given to provide an idea of the scale and type of the impacts.

Based on the assessment results, most of the negative environmental and social impacts will be generated during construction phase. Particular attention will be given to land acquisition, impact on existing facilities/utilities, land use and landscape changes, air pollution, waste management and disposal, and impact on trees (particularly Bo trees) along the proposed route. During operation phase, significant impacts that need to be mitigated and managed include noise, vibration and wastes (solid and liquid).

Table 2 Impact Assessment Summary

IMPACT	RATING	CONSTRUCTION PHASE	RATING	OPERATION PHASE
POLLUTION CONTROL				

IMPACT	RATING	CONSTRUCTION PHASE	RATING	OPERATION PHASE
AIR QUALITY	A-	• Dust will be generated from material transport and handling and excavation activities • Construction machineries and vehicles will also generate air emissions	B+	• Air emissions will be limited to operation of machineries for the maintenance of the rolling stocks at the depot area. • The project can contribute to the reduction of traffic volume, which can lead to improved air quality.
WATER AND SOIL QUALITY	B-	• Excavated materials, spoil and other wastes from construction activities may be prone to erosion • Wastes will be generated by construction workers • There is risk of spillage, leakage and accidental discharge of oil from construction vehicles	B-	• Approximately 100m^3/day of wastewater (containing oil and grease, detergent, dust) will be generated from maintenance activities at the depot during operation. • There may be risk of spillage, leakage, and accidental discharge. • Wastewater from toilets and washing facilities at train stations will also be generated
NOISE	A-	• Increased noise levels due to operation of heavy equipment and machineries, in the vicinity of the construction site • Baseline survey results already show exceedances of noise limits at some noise sensitive receptors	B-	• Noise modelling results meet noise level standards for peak noise (LAmax) and equivalent noise (LAeq) levels set in Japan and Australia. • There may be disturbance, especially to noise sensitive areas (6 hospitals, 5 schools and 4 educational institutions)
VIBRATION	A-	• In general, vibration from construction activities is considered to have low likelihood to cause structural damage to surrounding buildings • For areas with narrow roads (distance of roadside to the vibration source is around 8m or less), vibration levels may exceed maximum permissible limits for structures built with light materials and archaeologically important structures	B-	• Vibration level from the LRT operation may potentially exceed the perceptible threshold for humans, but significant adverse impact on surrounding structures is not expected.
SOLID WASTE	B-	• Construction wastes (e.g. building rubble, excavated soil, construction wastes) will be generated which may cause nuisance to pedestrians and other road users. • Temporary impact on the aesthetics of the city	B-	• Wastes generated from the depot area consist of lubricant oil, sludge, brake shoe, metal scraps and rubber tubes. • Wastes will be generated by LRT users at the train stations.
FOUL ODOR	D	Foul odour will not be generated during construction	D	No impact assumed
NATURAL ENVIRONMENT				

IMPACT	RATING	CONSTRUCTION PHASE	RATING	OPERATION PHASE
HYDROLOGY	B-	• The LRT route will cross Diyawanna Lake and the depot will be built on a flood plain • Based on flood modelling (10-yr return period) results, significant backwater (flood lift) may occur at the depot area during construction stage • Construction activities may hamper and block existing drainage flows.	D	• Based on flood modelling (50-yr return period) results, backwater (flood lift) is not expected to occur at the depot area during operation stage
TOPOGRAPHY & GEOLOGY	D	• The project area is comparatively flat. There will be no major soil cutting and embankment is planned.	D	No impact assumed
BENTHIC ENVIRONMENT	B-	• The proposed LRT route will cross Diyawanna Lake. • Construction of piers may affect the benthic environment (bottom sediments) of the lake. • The ecosystem in the lake has already been altered significantly due to reclamation activities	D	No impact assumed
PROTECTED AREAS	D	• The LRT will not have any direct impact on Sri Jawardenapura-Bird Sanctuary and Thalangama EPA. • The LRT route has been designed to avoid these protected areas	D	No impact assumed
ECOSYSTEM (FLORA & FAUNA)	B-	• 89 trees planted along Denzil Kobbekaduwua Mawattha, may need to be removed. • Several other trees need to be trimmed • Loss of green area (e.g. agricultural land) in the proposed depot area	D	No impact assumed
SOCIAL ENVIRONMENT				
LAND ACQUISITION & INVOLUNTARY RESETTLEMENT	A-	• Land acquisition and resettlement of 2 households and 101 totally and partially affected businesses • About 250,000m^2 of land needs to be acquired. Around 82% of this is private land and a bulk of which is paddy land for the proposed depot area	C	• There is a possibility that impacts due to land acquisition, resettlement and loss of livelihood will remain.
LOCAL ECONOMY (EMPLOYMENT & LIVELIHOOD)	A-	• Impact on livelihood and economic activities of project affected persons (business premises that need to be acquired): » 58 property owners, 101 business owners and 456 employees » 35 paddy land owners and 5 tenant farmers • Temporary loss or impedance of access to business premises	A+	• Generation of new jobs to operate and maintain the LRT • Improve local economy through increased mobility and reduced travel time

IMPACT	RATING	CONSTRUCTION PHASE	RATING	OPERATION PHASE
	B+	• It is projected that the local economy will be revitalized with the increase in employment opportunities for technical and general workers.		
LAND USE & LOCAL RESOURCE USE	B-	• Approximately 15ha of paddy land in Malabe area will be used as depot area.	B+	• Increased urbanization may lead to improvement of local economy
			B-	• Increased urbanization may lead to conversion of paddy lands/green areas to give way to infrastructures
SOCIAL CAPITAL & SOCIAL INSTITUTIONS	D	No particular impact is assumed	D	No impact assumed
EXISTING SOCIAL INFRASTRUCTURES & SERVICES	A-	• Reduction of traffic capacity by 30-50% due to construction activities • Impact on a wider road network due to congestion, especially at 7 critical intersections • Impact on underground (e.g. electricity cables, telecommunication lines, sewerage pipes, storm water conduits and water supply lines) and overhead utilities (e.g. electricity and telecommunication lines) • There are two high voltage lines crossing the LRT route, which need to be shifted or lifted up	B+	• Improvement of social infrastructure and services through increased mobility and connectivity of densely populated suburban areas
POVERTY	D	• There are no slums along the planned LRT route.	D	No impact assumed
MINORITY GROUPS/ INDIGENOUS PEOPLE	D	• There are no minority groups or indigenous people residing within the project site.	D	No impact assumed
UNEQUAL DISTRIBUTION OF BENEFITS	D	• No significant impact on unequal distribution of benefits and damages is expected from this project.	D	No impact assumed
CONFLICTING INTERESTS	B-	• Impact on existing modes of transportation (e.g. 3-wheerlers, bus operators) due to closed roads and/or worsened traffic condition.	B-	• Potential reduction in number of passengers/ users for existing transport operators (e.g. 3-wheerlers, bus operators) due to another mode of transportation
			B+	• The project can ease traffic congestion in Colombo that can lead to smoother operation for buses and 3-wheelers • It can increase the connectivity of existing bus routes through multi-modal transport centers/hubs
GENDER	D	• No particular impact is assumed	D	No impact assumed

IMPACT	RATING	CONSTRUCTION PHASE	RATING	OPERATION PHASE
CHILDREN'S RIGHTS	D	• No particular impact is assumed	D	No impact assumed
CULTURAL HERITAGE	B-	• Branches of around 14 Bo trees along the route may need to be trimmed to give way to the LRT structure. No uprooting of Bo trees is necessary.	D	No impact assumed
	D	• No impact designated archaeologically important structures		
LANDSCAPE	B-	• There could be adverse impacts on aesthetics due to construction activities.	B-	• Impact on special values associated with aesthetics (e.g. nature, views of heritage structures) such as Ward Place, Ceremonial Drive, and Densil Kobbakaduwa Mawatha
			B+	• The LRT may be viewed as increasing the urban feel of the Colombo
INFECTIOUS DISEASES	B-	• The influx of construction workers may increase the risk of spreading infectious diseases.	D	No impact assumed
WORK ENVIRONMENT (OCCUPATIONAL HEALTH)	B-	• Risks related to occupational health and safety (e.g. operating heavy machineries, handling materials, working at heights)	B-	• Risks to occupational health and safety due to improper work practice
OTHERS				
CROSS-BORDER IMPACTS & CLIMATE CHANGE	B-	• Carbon loss from disturbance of paddy land to give way to the depot construction	B+	• Emission of CO_2 from the transport sector can be reduced by approximately 77,200 t-CO_2eq in 2035 due to potential decrease in volume of traffic.
LIGHT & VENTILATION	D	No significant impact assumed	D	• Limited impact on light and ventilation during construction » Adequate space for roadside buildings to get legal light and ventilation is provided with the current structure design » Majority of the LRT route runs from West to East direction with minimal shadowing impact on surroundings
UNUSUAL EVENTS	B-	• Impacts of unexpected events such as accidents and natural hazards	B-	• Impacts of unexpected events such as accidents and natural hazards • Depot structure is designed to be above high flood level

Annex N

Monitoring Form

Monitoring Form

Construction Phase

1) Traffic

Monitoring Item	Monitoring Results during Report Period
Flow of vehicles *Check traffic condition using online traffic density applications*	

2) Community and Occupational Health and Safety

Monitoring Item	Monitoring Results during Report Period
No. of incidents/accidents No. of complaints *Check compliance to occupational H&S management plan*	

3) Water Quality- spill and leakage

Monitoring Item	Monitoring Results during Report Period
Oil and Grease Visual inspection	

4) Water Quality (Surface Water Quality)

Measurement Period		Excess of national standard (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Parameter	Unit	Measured Value		National Standards*1
			Mean	Max	
	pH				
	temperature,				
	DO				
	turbidity				
	BOD_3				
	Oil&grease				
	total suspended solid				

*1: Proposed ambient Water Quality Standards for Inland Waters in Sri Lanka

5) Noise

Measurement Period		Excess of national standards (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement	Unit	Measured Value	National Standards	Referred International

Point		Mean	Max		
	dB			75 (6am-18pm), 50(18pm-6am)[*1]	70 (7AM-10PM), 70 (10PM-7AM) [*2] 55 (7AM-10PM), 45 (10PM-7AM) [*3]

[*1]: the National Environmental (Noise Control) Regulations No. 1 of 1996, Schedule III (construction activity)
[*2]: IFC EHS Guidelines, General EHS Guidelines (April 30, 2007), Industrial area, p.53 (the latest version shall be referred to http://www.ifc.org/)
[*3]: IFC EHS Guidelines, General EHS Guidelines (April 30, 2007), Residential area, p.53 (the latest version shall be referred to http://www.ifc.org/)

6) Vibration

Measurement Period		Excess of national standards (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Unit	Measured Value		National Standards[*1]
		Frequency Range (Hz)	Vibration in ppv (mm/sec)	
				0-10 Hz: 2.0 mm/sec 10-50 Hz: 4.0 mm/sec over 50Hz: 8.0 mm/sec

Measurement Point	Unit	Measured Value		National Standards*1
		Frequency Range (Hz)	Vibration in ppv (mm/sec)	

*1: Interim Standard for Vibration Levels by the CEA (Type 3 structures, made of lightweight materials)

7) Removal and trimming of trees

Monitoring Item	Monitoring Results during Report Period
Number and type of species to be cut Visual observation and record	

Operational Phase

1) Water Quality from Depot

Measurement Period		Excess of national standard (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Parameter	Unit	Measured Value	Project Standards*1	National Standards*1
			Mean		
	pH			-	6.0-8.5
	temperature,			-	-
	BOD_5			15	30
	COD			75	250
	TSS			15	50
	TKN (Total Kjeldahl nitrogen)			2.5	150
	Ammoniacal N			2.5	50
	NO3-N			10	10*
	T-P			3	-
	Soluble P			2	5

*1: the level which CEA agreed for the discharge to Diyawannawa from proposed wastewater treatment plant at Kalapaluwawa
*2: General standards and criteria for the discharge of industrial effluent into inland surface waters (Schedule 1, list 1), CEA

2) Water Quality (Surface Water Quality)

Measurement Period		Excess of national standard (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Parameter	Unit	Measured Value		National Standards*1
			Mean	Max	
	pH				
	temperature,				
	DO				
	turbidity				
	BOD_3				
	Oil&grease				
	total suspended solid				

*1: Proposed ambient Water Quality Standards for Inland Waters in Sri Lanka

3) Noise

Measurement Period		Excess of national standards (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Unit	Measured Value				National Standards	Referred International Standards
		Laeq		Lmax			
		Day (7am-10pm)	Night (10pm-7am)	Day (7am-10pm)	Night (10pm-7am)		
	dB					There is no applicable national standard	Laeq*1 60 dB(7AM-10PM) 55dB (10PM-7AM) Lmax*2 80dB

*1: Manual for noise measurement of general rail, Ministry of Environment, Japan (2010) and Rail Infrastructure Noise Guideline, Environmental Protection Agency in New South Wales (2013)
*2: Rail Infrastructure Noise Guideline, Environmental Protection Agency in New South Wales (2013)

4) Vibration

Measurement Period		Excess of national standards (Yes/No) If yes, please describe the outline of planned mitigation measures.
Measurement Method		
Measurement Points	Please attach map if necessary	

Measurement Point	Unit	Measured Value		National Standards*1
		Frequency Range (Hz)	Vibration in ppv (mm/sec)	
				0-10 Hz: 2.0 mm/sec 10-50 Hz: 4.0 mm/sec

Measurement Point	Unit	Measured Value		National Standards*1
		Frequency Range (Hz)	Vibration in ppv (mm/sec)	
				over 50Hz: 8.0 mm/sec

*1: Interim Standard for Vibration Levels by the CEA (Type 3 structures, made of lightweight materials)

5) Restoration program at Depot

Monitoring Item	Monitoring Results during Report Period
Status of restoration *Visual observation*	

Annex O

Leopold Matrix

LEOPOLD MATRIX FOR LIGHT RAIL TRANSIT PROJECT

SCORING CRITERIA — Construction Stage

Scoring Criteria	Structure demolition to clear trace bends	Excavation for foundations for LRT pillars	Utility diversion(Power lines, water supply, telecom cables)	Construction of light rail pillars	Traffic diversions(Human and vehicular)	Pilot Road construction with excavated material in low lying areas	Tree removal and tree branch pruning	Installation of construction rigs in Diyawanna Oya	Underwater concreting for pillars in streams ands lakes	Construction of elevated stations	Girder /Superstructure construction	Construction of the elevated depot on the low lying area	Installation of rolling stocks	Installation of the wastewater treatment plant for the depot site	Removal of the pilot road and construction waste disposal	Landscaping	Power supply installations	Total Score
Noise	-8/8/-64	-6/6/-36	-3/3/-9	-7/7/-49	-6/6/-36	-6/6/-36	-4/4/-16	-7/7/-49	-6/6/-36	-7/6/-42	-7/8/-56	-9/9/-81	-3/3/-9	0	-4/4/-16	0	-2/4/-8	-543
Road link capacity reduction	-7/7/-49	-8/8/-64	-8/8/-64	-8/8/-64	-8/9/-72	-2/5/-10	-3/3/-9	0	0	-6/6/-36	-7/9/-63	-3/5/-15	-9/6/-54	0	-4/5/-20	-1/2/-2	-2/2/-4	-526
Landscape/Aesthetic Degradation	-6/4/-24	-8/6/-48	-6/6/-36	-5/8/-40	-4/4/-16	-7/6/-42	-8/5/-40	-6/6/-36	-4/6/-24	-8/6/-48	-5/8/-40	-4/8/-32	-4/8/-32	-3/6/-18	-5/4/-20	0	-4/4/-16	-512
Community Health and Safety Degradation	-6/6/-36	-6/6/-36	-8/6/-48	-6/6/-36	-7/8/-56	-5/5/-25	-2/2/-4	-4/4/-16	-4/4/-16	-8/6/-48	-5/5/-25	-8/8/-64	-5/5/-25	0	-6/6/-36	-4/4/-16	-5/5/-25	-512
Occupational Health and Safety Degradation	-5/5/-25	-5/5/-25	-6/6/-36	-6/6/-36	-4/5/-20	-5/5/-25	-4/4/-16	-6/6/-36	-6/6/-36	-6/6/-36	-6/6/-36	-6/8/-48	-6/6/-36	-5/5/-25	-5/5/-25	-2/4/-8	-6/6/-36	-505
Vibration	-3/3/-9	-4/4/-16	-3/3/-9	-7/7/-49	-2/2/-4	-3/3/-9	-3/1/-3	-5/5/-25	-7/7/-49	-6/6/-36	-7/7/-49	-9/9/-81	-5/5/-25	0	0	0	0	-364
Distruption of livelihood and economic activities	-6/6/-36	-8/8/-64	-8/8/-64	0	-6/6/-36	0	0	0	0	-8/9/-72	0	-8/8/-64	0	-3/3/-9	0	0	0	-345
Fauna Flora Distrubance	0	-4/4/-16	0	0	-2/2/-4	-6/6/-36	-4/6/-24	-4/4/-16	-4/4/-16	-4/4/-16	0	-6/6/-36	0	-6/6/-36	-4/4/-16	0	-2/2/-4	-220
Wetland degradation	0	-2/2/-4	0	-2/2/-4	0	-8/8/-64	0	-6/6/-36	-4/6/-24	0	0	-8/8/-64	0	-4/3/-12	-3/3/-9	0	0	-217
Distruption to underground utiliies	-6/6/-36	-9/9/-81	-8/8/-64	0	0	-4/4/-16	0	0	0	0	0	-2/2/-4	0	0	0	0	0	-201
Land acquisition/Resettlement of People /Structures	-3/3/-9	0	-8/6/-48	0	0	-3/7/-21	0	0	0	-4/5/-20	0	-9/9/-81	0	-4/3/-12	0	0	0	-191
Neighbouring land users-Severence of light	0	0	0	-2/4/-8	0	0	0	0	0	-5/5/-25	-6/6/-36	-6/8/-48	-6/6/-36	0	0	-4/4/-16	0	-169
Erosion of excavated material	-2/2/-4	-7/7/-49	-4/5/-20	0	0	-6/5/-30	-4/3/-12	-2/2/-4	0	0	0	-2/2/-4	0	0	-4/4/-16	-4/4/-16	0	-155
Surface water quality degradation	0	0	0	0	0	0	0	-6/6/-36	-6/8/-48	0	0	-6/6/-36	0	0	0	0	0	-120
Distruptions to Bo trees and Shrines	0	0	0	-4/4/-16	0	0	-6/6/-36	0	0	-4/4/-16	-4/4/-16	0	-3/2/-6	0	0	0	0	-90
Construction Distruption at pocket floding locations	0	-4/4/-16	-4/4/-16	-4/4/-16	0	-4/6/-24	0	0	0	0	0	0	0	0		0	0	-72
Spillage and accidential leakage	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	-68
Distruption to overhead utilities	0	0	0	-6/6/-36	0	0	-4/4/-16	0	0	0	0	0	-4/4/-16	0	0	0	0	-68
Backwater at lake/stream crossings	0	0	0	-4/4/-16	0	0	0	-4/4/-16	-4/4/-16	0	0	0	0	0	0	0	0	-48
Wastewater from worker camps	-2/2/-4	-2/2/-4	-2/2/-4	0	0	0	0	-2/2/-4	0	-2/2/-4	-2/2/-4	-2/2/-4	-2/2/-4	0	-3/2/-6	0	-2/2/-4	-42
Backwater at flood plains	0	0	0	-4/2/-8	0	-4/4/-16	0	0	0	0	0	-6/8/-48	0	0	6/6/36	0	0	-36
Distruption to Archeological buildings	0	-3/3/-9	0	-4/4/-16	0	0	0	0	0	0	0	0	0	0	0	0	0	-25
Ground water quality degradation	0	0	0	-2/2/-4	0	0	-2/2/-4	-2/2/-4	0	0	0	0	0	0	0	0	0	-12
Air Quality degradation	-2/2/-4	0	0	-3/2/-6	0	0	0	0	0	0	0	0	0	0	0	0	0	-10
Air quality improvement	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Boost of Reigional Economic activities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disturbance to Protected areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Increased urbanisation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Socio-Economic benefits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solid waste generated from Depot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solid waste generation from Stations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unexpected Events-Structure Failure, equipment failure and flooding	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wastewater generated from Depot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wastewater generated from stations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Employment generation		9/9/81	9/9/81	9/9/81	0	6/6/36	6/3/18	4/4/16	4/4/16	6/6/36	5/5/25	9/9/81	6/6/36	4/4/16	4/4/16	6/6/36	5/5/25	600
Travel time saving	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Score	-304	-391	-341	-327	-248	-322	-166	-266	-253	-367	-304	-633	-211	-100	-116	-26	-76	-4451

Operational Stage

Impact Themes	Driving Train(including test runs)	Passenger services in stations	Emergency action	Regular Maintenance	Brerakdown maintenance	waste disposal from depot and stations	Sludge disposal from depot	Wastewater disposal from depot from wash and clean process	
Occupational Health and Safety Degradation	-6/6/-36	-4/6/-24	-9/9/-81	-6/6/-36	-7/7/-49	-4/6/-24	-5/5/-25	-6/6/-36	-311
Noise	-8/8/-64	-4/6/-24	0	-5/5/-25	-4/4/-16	0	0	0	-129
Unexpected Events-Structure Failure, equipment failure and flooding	-4/4/-16	-4/4/-16	-6/6/-36	-4/4/-16	-4/4/-16	-2/4/-8	-2/4/-8	-2/4/-8	-124
Spillage and accidential leakage	0	0	0	-4/4/-16	-6/5/-30	-4/4/-16	-5/5/-25	-6/5/-30	-117
Wetland degradation	0	0	0	0	0	-6/6/-36	0	-9/9/-81	-117
Solid waste generated from Depot	0	0	0	0	0	-8/8/-64	-6/6/-36	0	-100
Wastewater generated from Depot	0	0	0	0	0	0	0	-9/9/-81	-81
Surface water quality degradation	-2/2/-4	0	0	0	0	-2/2/-4	-6/6/-36	-6/6/-36	-80
Vibration	-6/6/-36	0	-4/4/-16	-2/4/-8	-4/4/-16	0	0	0	-76
Wastewater generated from Stations	0	0	0	0	0	-8/8/-64	0		-64
Road link capacity reduction	-6/8/-48	0	0	0	0	0	0		-48
solid waste generation from station	0	-6/6/-36	0	0					-36
Ground water quality degradation	0	0	0	0	0	0	-4/4/-16	-3/3/-9	-25
Distruption of livelihood and economic activities	0	0	-4/4/-16	0	0	0	0	0	-16
Neighbouring land uses-Severance of Light	-4/4/-16	0	0	0	0	0	0	0	-16
Fauna flora disturbance	-2/2/-4	0	-2/2/-4	0	0	0	0	0	-8
Distruption to Bo trees ans shirnes	-2/2/-4	0	0	0	0	0	0	0	-4
Air Quality degradation	0	0	0	0	0	0	0	0	0
Backwater at lake crossings	0	0	0	0	0	0	0	0	0
Backwater at flood plains	0	0	0	0	0	0	0	0	0
Community health and safety degradation	0	0	0	0	0	0	0	0	0
Constrution distruption at pocket flooding locations	0	0	0	0	0	0	0	0	0
Distruption to overhead utilities	0	0	0	0	0	0	0	0	0
Distruption to underground utilities	0	0	0	0	0	0	0	0	0
Distruption to Archeological buildings	0	0	0	0	0	0	0	0	0
Disturbance to Protected areas	0	0	0	0	0	0	0	0	0
Erosion of excavated material	0	0	0	0	0	0	0	0	0
Land acquisition/Resettlement of People/Structures	0	0	0	0	0	0	0	0	0
Wastewater from worker camps	0	0	0	0	0	0	0	0	0
Landscpae/Aesthetic degradation	0	0	0	9/9/81	0	-2/4/-8	-2/4/-8	-2/4/-8	57
Air Quality Improvement	9/9/81	0	0	0	0	-2/2/-4	0	0	77
Increased urbanisation	9/9/81	0	0	0	0	0	0	0	81
Boost of reigional economic activities	9/9/81	6/6/36	0	4/4/16	0	0	0	0	133
Socio-Economic Benefits	9/9/81	9/9/81	0	0	0	0	0	0	162
Employment generation	4/5/20	9/9/81	4/4/16	9/9/81	8/8/64	6/6/36	4/4/16	4/4/16	330
Travel time saving	9/9/81	9/9/81	9/9/81	9/9/81	9/9/81	9/9/81	9/9/81	9/9/81	648
Total Score	197	179	-56	158	18	-111	-57	-192	136

Overall Cumulative Score -4315

Legend — Magnitude[M] X Significance[S]

Negative		Positive	
-	(-1) to (-27)	+	1 to 27
-	(-28) to (-55)	+	28 to 55
-	(-56) to (-81)	+	56 to 81

SCORING METHOD

+ Positive	- Negative
Magnitude[M]/Significance[S]	
"Blank"	Not relevant
1-3	Insignificant
4-6	Significant
7-9	Very significant

Annex P

Extended Cost and Benefit Analysis

Economic Costs and Benefits of the Project

Year LRT	Years of operation	Economic Cost				Economic Benefits					Net Benefit
		Investment		O & M Cost	Total Cost (LKR)	VOC	TTC	CO_2	Accident	Total Benefit	
		LRT Construction	Replacement								
2018		3.73	0.00	0.00	3.73	0.00	0.00	0.00	0.00	0.00	-3.73
2019		6.03	0.00	0.00	6.03	0.00	0.00	0.00	0.00	0.00	-6.03
2020		32.08	0.00	0.00	32.08	0.00	0.00	0.00	0.00	0.00	-32.08
2021		59.88	0.00	0.00	59.88	0.00	0.00	0.00	0.00	0.00	-59.88
2022		50.56	0.00	0.00	50.56	0.00	0.00	0.00	0.00	0.00	-50.56
2023		49.60	0.00	0.00	49.60	0.00	0.00	0.00	0.00	0.00	-49.60
2024		41.09	0.00	3.31	44.40	9.23	21.65	0.001	0.10	30.98	-13.42
2025	1	11.60	0.00	3.27	14.87	10.80	24.97	0.001	0.12	35.89	21.02
2026	2	1.21	0.00	3.34	4.55	12.64	28.80	0.001	0.14	41.58	37.03
2027	3	1.09	0.00	3.41	4.50	14.79	33.21	0.001	0.16	48.16	43.66
2028	4	0.00	0.00	3.48	3.48	17.30	38.31	0.001	0.18	55.79	52.31
2029	5	0.00	0.13	3.55	3.68	20.25	44.18	0.002	0.21	64.64	60.96
2030	6	0.00	0.00	3.62	3.62	23.69	50.96	0.002	0.25	74.90	71.28
2031	7	0.00	0.00	3.70	3.70	27.72	58.77	0.002	0.29	86.78	83.08
2032	8	0.00	0.00	3.77	3.77	32.43	67.79	0.003	0.33	100.55	96.78
2033	9	0.00	0.00	3.85	3.85	37.95	78.18	0.003	0.38	116.51	112.66
2034	10	0.00	6.15	3.93	10.08	44.41	90.18	0.003	0.45	135.04	124.96
2035	11	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2036	12	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2037	13	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2038	14	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2039	15	0.00	4.47	4.01	8.48	51.96	104.01	0.004	0.52	156.49	148.01
2040	16	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2041	17	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2042	18	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2043	19	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2044	20	0.00	12.43	4.01	16.44	51.96	104.01	0.004	0.52	156.49	140.05
2045	21	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2046	22	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2047	23	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2048	24	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2049	25	0.00	0.13	4.01	4.14	51.96	104.01	0.004	0.52	156.49	152.35
2050	26	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2051	27	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2052	28	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2053	29	0.00	0.00	4.01	4.01	51.96	104.01	0.004	0.52	156.49	152.48
2054	30	0.00	60.43	4.01	64.44	51.96	104.01	0.004	0.52	156.49	92.05
Total		256.87	83.74	119.43	460.0	1290.4	2617.2	0.113	13.01	3920.73	3460.69
ENVP		131.20	2.50	13.30	146.9	102.00	212.90	0.0097	1.00	315.90	169.00
EIRR											20.20%

Source: Feasibility Study Report

Carbon Dioxide Emission Factor by Vehicle Type

Vehicle Type	Emission Factor (tCO_2/passenger-km)
Car	0.0001026
Motorcycle	0.0001004
Three wheeler	0.0001067
Bus	0.0000257

Source: Feasibility Study Report

Socio-economic Impacts of the Project

Impact	Type	Quantity
Land Area (perch)	Agricultural	7913.8
	Residential	57
	Commercial	259.3
Structures (Sq. metres)	Type 1	8658.52
	Type 2	1111.67
	Type 3	2886.17
Structures (number)	Residential	1
	commercial	65
Self-relocation (Households)	Municipality area	28
	Urban council area	73
Loss of Income (No. of persons)	Business	100
	Loss of wage/ salary	455
Affected persons (No. of Persons)	Business owners	100
	Renters	73
	Workers	455

Source: RAP

Analysis Parameters of Emission Reductions (Construction Phase)

Parameter	Description		Value	Unit	Source
A	**land area of organic soils**		**14.8**	**ha**	**JICA team**
B_{AG}	**Aboveground biomass**	**Tropical moist & wet**	**6.2**	**t-dm/ha**	**Table 3.4.2, IPCC GPG-LULUCF**
R	**Root-to-shoot ratio**	**Tropical moist & wet**	**1.6**		**Table 3.4.3, IPCC GPG-LULUCF**
CF	**Carbon fraction of dry matter**	**Default value**	**0.5**	**t-C/t-dm**	**IPCC GPG-LULUCF**

Source: JICA Study Team

Analysis Parameters of Emission Reductions (Operation Phase – Year 2035)

Parameter	Description		Value	Unit	Source
P_y	Number of passenger of the project activity in year y		246,818,475	passenger/year	= 676,215 passenger/day * 365 JICA team
$BPKM_y$	Passenger transportation volume/activity by the project in year y		1,332,819,765	passenger-km/y	JICA team
		Car	773,035,464	passenger-km/y	JICA team
		Motorcycle	199,922,965	passenger-km/y	
		3 Wheeler	133,281,977	passenger-km/y	
		Bus	226,579,360	passenger-km/y	
$EF_{PKM,i}$	CO2 emission factor per passenger kilometer for transport mode i	Car	0.0001026	tCO2/passenger-km	JICA team
		Motorcycle	0.0001004	tCO2/passenger-km	
		3 Wheeler	0.0001067	tCO2/passenger-km	
		Bus	0.0000257	tCO2/passenger-km	
$BTDP_y$	Average trip distance of the passenger of the project activity in year y		5.4	km	JICA team
$MS_{i,y}$	Share of passengers by transport mode in the baseline scenario in year y	Car	58	%	JICA team
		Motorcycle	15	%	
		3 Wheeler	10	%	
		Bus	17	%	
$EC_{PJ,y}$	Annual electricity consumption associated with the operation of the project activity in year y		45,512	MWh/year	JICA team
EF_{elec}	CO2 emission factor of the grid electricity		0.9274	tCO2/MWh	In year 2015, Build Margin, from SLSEA website

Source: JICA Study Team

Unit Vehicle Operating Cost (VOC)

Velocity (km/h)	Motorcycle	3 Wheeler	Car & Van	Medium & Large Bus	Medium & Large 2 Axle Lorry	Large 3 Axle Lorry
10	17.20	45.03	64.70	144.88	120.46	174.60
15	15.01	37.05	54.44	110.39	93.10	140.60
20	13.97	33.16	49.50	93.01	79.33	123.50
25	13.40	30.78	46.65	82.65	71.06	113.24
30	13.02	29.17	44.75	75.81	65.65	106.50
35	12.83	28.12	43.42	70.97	61.94	101.75
40	12.64	27.27	42.56	67.45	59.19	98.33
45	12.45	26.60	41.90	64.89	57.19	95.86
50	12.54	26.32	41.71	62.99	55.77	94.05
55	12.64	26.13	41.52	61.47	54.63	92.82
60	12.64	25.94	41.52	60.52	53.96	91.87
65	12.73	25.84	41.52	59.76	53.39	91.39
70	12.83	25.75	41.52	59.28	53.20	91.20
75	12.92	25.65	41.61	59.09	53.11	91.30
80	12.92	25.65	41.71	59.19	53.30	91.68
85	13.02	25.65	41.80	59.38	53.68	92.34
90	13.11	25.65	41.99	59.85	54.25	93.29
95	13.21	25.65	42.18	60.52	55.01	0.00
100	13.30	25.65	42.37	61.37	55.86	0.00

Source: JICA Study Team

Accident Loss Savings

Item	Value	Unit
Accident Cost (1)	0.396	LKR/vehicle-km in 1999 values
Accident Cost	1.46015	LKR/vehicle-km in 2017 values
Annual decline in accident rate (1)	4%	
Accident rate deduction in '35	48%	'35/'17
Accident Cost in 2035	0.7003	LKR/vehicle-km in 2017 values

Source: JICA Study Team

Annex Q

Environmental Management and Monitoring Plan

Table 1 Environmental Management Plan (Pre and Construction Phase)

IMPACT THEME	POTENTIAL IMPACT	PROPOSED MANAGEMENT MEASURE	RESPONSIBLE ENTITY	COST(Rs)
NOISE	Increased noise levels in the vicinity of the construction site	<u>Mitigation measures for general construction site (LRT route)</u> • Fitting of exhaust baffles, maintaining vehicles and machinery in a high operable condition, • Use the, low-noise type machine and/or vehicles, • Construction site is separated with corrugated sheets or other suitable material especially at locations near noise sensitive receptors, particularly at National Hospital and school zone. • Scheduling of construction work that cause high noise and vibration to ensure least inconvenience to the public, • Avoid construction work on Poya days and days of other religious and/ or cultural importance, • Avoid high noise construction activities during the night time. • Establishing a complaint mechanism • Advance notification to the surrounding community <u>Mitigation Measures at Depot</u> • Conduct a test piling activity and check the noise level generated from the piling activity at Depot area. • Consider changing the height of hammer drop or weight of hammer to be used, depending on the result of test piling • Install a noise reduction equipment with piling hammer	Contractor/ MMWD (PMU	Tentative cost: Lump sum Rs. 5,000,000 Included in Contractor's service fee
VIBRATION	Increased vibration levels in the vicinity of the construction site	• Identification of type of building structure (Type 3 and Type 4). For Type 4 structure, the consultation with Department of Archaeology is required. • Carry out a property condition survey (crack survey) of nearby structures and record the present condition of the structure, to accurately assess any damage to these structures during the construction stage.	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 5,000,000 Included in Contractor's service fee

		• Vibration monitoring at selected area around the construction activities. • Regularly communicate with surrounding communities to inform the construction schedule. • Use of lower vibration generating device/machinery. • Scheduling of construction work that cause high vibration must be within authorized construction embodiment times, • Minimisation of piling energy (e.g. reduced hammer drop distance) as necessary depending on receptor distance. • Establishing a complaint mechanism and implementing a procedure to effectively deal with any issue raised by the community.		
TRAFFIC IMPACT	Road link capacity reduction	• Preparation of traffic management plan for each construction stage such as diversion, lane control, safety measures. The traffic management plan will also take into consideration mobility and safety of vulnerable groups (e.g. school children, elderly). • Carry out traffic simulation for above traffic management plan • Road Intersection wise traffic analysis for the key road intersections affected by the study (See Section 1.4 of the Traffic Impact Assessment Report in Annex C for the affected intersections) • A stakeholder committee with the participation of project consultants, Colombo Municipal Council and the other relevant local government bodies, Road Development Authority and Traffic Police, will be appointed to give guidance on the developed traffic management plan • Monitoring of traffic flow during construction stage • Ensuring the safety during the construction period using standard safety measures. • Adherence to the workzone management guidelines formulated by RDA. • Provide minimum 3m lane width for bus routes • Maintain walkable paths for pedestrian movement especially where high density pedestrian traffic flows	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 5,000,000 Included in Contractor's service fee

		exist (e.g. Malabe, Rajagiriya Road, Olcott Mawatha, Justice Akbar Mawatha and Malay Street, access roads in depot area) • Retain access roads in depot area (slightly diverted) and ensure that design and construction of depot civil structures will not hamper movement of people and vehicles in the area.		
LANDSCAPE	Impact on special values associated with aesthetics (e.g. nature, views of heritage structures)	• The major sensitive areas will be thoroughly studied in terms of landscape impact during detailed design stage through the consultation with concerned agencies. After detailed assessment of landscape impact, if it is found that alternative route is suitable, it will be a subject for supplementary EIA. • Micro level detailing, structures, colours, lighting, planting, trains designs and colours, stations, interactions will be part of the overall design depending on each section. • In order to realise the overall objectives, in the design team in addition to the design and structural engineers it will include; Tow Planners, Urban Designers, Architects, Landscape Architects, and Lighting Experts.	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 2,000,000 Included in the Project Cost
HEALTH AND SAFETY	Impact on occupational health and safety	• Submission of an Occupational Health and Safety Management Plan (Construction Stage) prior to commencement of work. • Adoption of standard worker safety methods • Provision of personal protective equipment (PPE) • Provision of trainings and awareness programs to employees	Contractor/ MMWD (PMU)	Included in the Project Cost
	Impact on community health and safety • Increase of stress levels for affected residents and commuters • Risk to respiratory diseases due to dust Hazards of communicable and infectious diseases	• The project site will be fenced and access points will not be available for the public. • Appropriate sanitary facilities will be provided at all construction sites. • Environmental pollution control measures, including watering proper maintenance of machinery shall be implemented. • Arrange construction activity and schedule to minimize the impact on surrounding community (e.g. prohibit high noise generating activity on night time)		Tentative cost: Lump sum Rs. 5,000,000 Included in the Contractor's service fee

SOCIO-ECONOMIC IMPACTS	Impact on livelihood and economic activities	• Provision of compensation to the Project Affected Parties (PAPs) using the compensation package decided for LRT Project based on LARC stipulations on assessing the financial and other losses of PAPs. • Provision of alternative access to their premises as far as possible outside the construction sites to carry out their usual business activities and other domestic or related employment activities. • Develop a Livelihood Restoration Plan • Continual liaising with the Project Affected Parties (PAPs) will be undertaken to decide on the site-specific mitigation measures. • Consultation with people whose livelihood depend on modes of transportation that may be affected by the Project (e.g. 3-wheelers and bus operators). They will be included in the development of the traffic management plan.	MMWD (PMU)	Included in Project Cost (GoSL fund)
BIOLOGICAL ENVIRONMENT	Disturbance to Protected areas	• Monitoring of bird species will be conducted.	MMWD (PMU)	Included in monitoring cost
	Fauna and Flora (removal and trimming of some trees)	• Offset trees of 10 times of that is cut down by the project • Enhancement of biodiversity through creation of various type of habitat such as wetland, forest zone and open area. • Use the native species which will enhance the value of ecosystem in the area • Creation of green buffer zone around the Depot by selection of tree species which grows high to mitigate the landscape impact	MMWD (PMU)	20million Rs (approximately 1 ha)
	Wetland Degradation	• Minimize removal or pruning of trees • Introduce a wastewater treatment plant and • Collect scheduled waste for the “Ecocycle” process.	MMWD (PMU)	Management cost
IMPACT ON UTILITIES	Underground Utilities: electricity cables, telecommunication lines, sewerage pipes, storm water conduits, water supply lines	• Close coordination with and provision of support to utility agencies, including CEB and NWSDB. • Adopt schedules for the shifting and temporary termination of infrastructure service supply • Make the public aware of schedules in advance to	Contractor/ MMWD (PMU)	To be finalized during the detailed design stage.

	Overhead utilities: electricity lines, telecommunication lines.	prevent ad hoc activities • Make timely payments as agreed • Assist in shifting of facilities • Obtain information from other on-going projects		
LAND ACQUISITION & RESETTLEMENT	Impact on private properties (land and built structures)	• Develop and implement a Resettlement Action Plan (RAP) and Livelihood Restoration Plan • Carry out consultations with project affected persons (PAPs)	MMWD (PMU)	Included in Project Cost (GoSL fund)
	Impact on government institutions and properties: • RDA • UDA • SLR	• Consult relevant agencies (e.g. RDA, UDA, SLR) • Provide necessary assistance, such as relocation of affected properties.	MMWD (PMU)	Management cost
SOLID WASTE	Erosion of excavated materials, spoil and other waste construction materials etc.	• Prevent stocking of loose earth by the road side • Cover temporary stockpile with polythene sheet and place weights • Manage sand stockpiles by compaction/haunching. • Provide temporary drainage around the sand stockpiles.	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 2,000,000 Included in Contractor's service fee
	Nuisance to pedestrians and other road users caused by construction wastes Impact on the aesthetics of the city (temporary)	• Careful planning of temporary storage and disposal • Segregate wastes properly. Recyclable materials will be handed to registered recyclers. • Scheduled wastes (e.g. oil) will be collected and carefully stored. Treatment and disposal of these wastes will be contracted out to a registered industrial waste company.	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 5,000,000 Included in Contractor's service fee
SURFACE WATER & GROUNDWATER	Impact on water quality of Diyawanna Lake	• Monitor water quality in the lake during construction period	MMWD (PMU)	Management cost
	Impact on groundwater quality due to construction of foundation structures	• Monitor groundwater quality	MMWD (PMU)	Management cost
CULTURAL HERITAGE	Impact on Bo trees	• Consult relevant stakeholders • Carry out religious rituals and communicate with relevant stakeholders (Monks and devotee) before the commencement of construction activities.	MMWD (PMU)	Management cost
	Hindrance access to religious and culturally important sites	• A traffic management plan will be developed considering alternative access roads to religious and culturally important sites.	MMWD (PMU)	Management cost
WASTEWATER	Activities of workers	• Provide cylindrical septic tank or portable toilets at the construction areas; • Adequate facility such as sanitary latrines will be provided for temporal accommodation at Depot site.	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 5,000,000

				Included in Contractor's service fee
	Spillage, leak and accidental discharge of oil from construction vehicles	• Proper use and maintenance of construction machines and heavy vehicles • Install Oil and grease traps in the drainage system • Establish and implement emergency and contingency plan in case of spills	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 2,000,000 Included in Contractor's service fee
WATER COURSE	Lake crossing	• Use a two-dimensional flood model with a possible tentative blocking arrangement for construction rigs within the Diyawanna. • Conduct lake blocking part by part. • Limit construction of the foundation of LRT structure within the lake during dry season; avoid critical monsoon periods such as April- June and September to November. • Carry out temporary blocking of the lake section according to the instructions of SLLRDC; Re-run the model depending on the site-specific construction arrangements. • Prepare a suitable pumping arrangement in case of flood • If in the opinion of the Engineer that flooding is aggravated because of temporary construction blocks such blocks will be temporarily removed until the flood subsides.	Contractor/ MMWD (PMU)	Included in Contractor's service fee
	Pocket flooding	• Opening of drainage paths over the road • Creation of temporary drainage path from the construction sites to the nearest drain, as necessary. • Removal of construction equipment from site if inundation occurs.	Contractor/ MMWD (PMU)	Included in Contractor's service fee
	Backwater on flood plain	<u>Depot Area</u> • Provide a 3m wide canal right round the fill area • Conduct of construction works in parts. • Control of height of fill; Allow water overtopping over the fill • Propose to improve the existing drainage canals in the low-lying paddy by desilting them. • Establish direct drainage connection between these canals and main canal. • Open culvert gates, in case of flood • Avoid blocking of existing drainages • Refining of the flood modeling; Lower part of the sub catchment will be made as a hydro dynamic model to	Contractor/ MMWD (PMU)	Included in Contractor's service fee

		represent the existing drainages and internal road culverts. • Breach fillings at strategic locations in case of flood <u>Pilot Road in the Low-Lying Areas Adjacent to Chandrika Bandaranayaka Kumaranathunga Mawatha</u> • Minimize height and width of the pilot road to a height of 0.6m. • Provide temporary culverts to all drainage paths and at places of the flood plain crossing the pilot road. • Breach filling at strategic locations in case of flood • Test pilot road using the flood model of SLLRDC		
AIR QUALITY	• Generation of dust • Emissions from construction machineries and vehicles	• Wetting and water spraying • Covering of transport vehicles • Careful stockpiling of construction materials • Monitoring of dust levels • Proper maintenance of construction machineries and vehicles • Careful selection of location of construction yard • Limiting of vehicle speed • Proper planning and siting of construction activities • Set up dust barriers	Contractor/ MMWD (PMU)	Tentative cost: Lump sum Rs. 5,000,000 Included in Contractor's service fee
UNUSUAL EVENTS	Impacts of unexpected events such as accidents and natural hazards	• Develop an Emergency Response Plan • Compliance with applicable performance specification, design standards and codes, health and safety regulations • Provision of firefighting system	Contractor/ MMWD (PMU)	Included in Contractor's service fee

Table 2 Environmental Management Plan (Operation Phase)

IMPACT	POTENTIAL IMPACT	PROPOSED MANAGEMENT MEASURE	RESPONSIBLE ENTITY	COST(Rs)
NOISE	Noise impact from the operation of LRT	• Consider noise mitigation measures (e.g. noise barrier), especially for sensitive areas. • Carry out noise monitoring along LRT route • Standard maintenance of trains, structure and tracks • Establish a grievance mechanism	O&M Company	To be included in the project cost and finalized during the detailed design stage
VIBRATION	Vibration impact from the operation of LRT	• Conduct monitoring of vibration at selected points along the route • Standard maintenance of trains, structure and tracks • Establish a grievance mechanism • Proper maintenance of train structure, tracks and rolling stocks	O&M Company	To be included in the project and budget of the proponent.
HEALTH AND SAFETY	Impact on occupational health and safety	• Develop Health and Safety Management Plan for operational stage • Provide of PPE • Deploy security guards • Develop an Emergency Response Plan • Adoption of standard worker safety methods, • Develop and implement an Occupational Health and Safety Management Plan (Operation Stage) • Putting up of warning signs, • Training of employees,	O&M Company	Tentative cost: Rs. 200,000 per month To be included in the project and budget of the proponent.
SOCIO-ECONOMIC IMPACTS	Impact on livelihood and economic activities	• Monitoring of the Livelihood Restoration Plan for the affected PAPs • Consultation with relevant stakeholders to seek optimum solutions for transport operators (e.g. buses, 3-wheelers) • Provisions to make new bus routes and shuttle services to connect stations to main towns • Propose developing terminals for 3-wheelers close to the train stations.	MMWD (PMU)	Included in Project Cost (GoSL fund)
SOLID WASTE	Waste from depot	• Segregate wastes. • Recyclable materials will be handed to registered recyclers. • Non-hazardous wastes will be disposed in accordance with relevant local regulations. • Regular collection and disposal of wastes • Scheduled wastes (e.g. oil) will be collected and carefully stored. Treatment and disposal of these wastes will be contracted out to a registered industrial waste company	O&M Company	Tentative cost: Rs. 300,000 per month To be included in the project and budget of the proponent.

IMPACT	POTENTIAL IMPACT	PROPOSED MANAGEMENT MEASURE	RESPONSIBLE ENTITY	COST(Rs)
	Waste from stations	• Waste generated from stations will be collected according to the type of waste by registered waste contractor and treated through a registered waste disposal facility	O&M Company	Tentative cost: Rs. 300,000 per month To be included in the project and budget of the proponent.
WASTEWATER	Spillage, leakage, and accidental discharge	• Secondary containers will be placed in storage areas for hazardous substances(e.g. oil) • Spill kits will be provided • Provide drainage from chemical storage areas to oil separator (depot area)	O&M Company	To be included in the project and budget of the proponent.
	Wastewater from depot	• Wastewater treatment system with sufficient treatment capacity will be installed in the depot area. Wastewater will be discharged to the public sewage system. • Periodical maintenance of Wastewater treatment system will be conducted.	O&M Company	Construction cost of installation of WTS (about Rs70,000,000) will be included in the project cost and finalized during detailed design stage.
	Wastewater from stations	• Sewage will be sent to public sewage system • Periodical maintenance of sewage system at station will be conducted.	O&M Company	To be included in the project and budget of the proponent.
BIOLOGICAL ENVIRONMENT (FLORA & FAUNA)	Disturbance to Protected areas	• Monitoring of bird species will be conducted.	MMWD (PMU)	Included in monitoring cost
	Loss of greenery area (agricultural land)	• Maintenance of restored zone under restoration program	O&M Company	Tentative cost: Rs. 100,000 per month To be confirmed at later stage
URBANISATION	Conversion of green areas and paddy fields for the development/ expansion of train stations	• Coordinate with relevant agencies regarding possible alternatives	MMWD (PMU)	Management cost
UNUSUAL EVENTS	• Impacts of unexpected events such as accidents and natural hazards	• Develop an Emergency Response Plan	O&M Company	Included in O&M Company's management cost

Note: An O&M Company will be established for the operation and maintenance of the LRT.

Table3 Environmental Monitoring Plan (Pre and Construction Phase)

Key Aspect	Parameter	Method	Frequency	Location	Responsible Agency/Person	Independent Monitoring Agency	Cost(Rs)
Noise	Noise level (dB) • L_{Aeq}	Noise monitoring using noise level meter	Quarterly • Immediately after complaints	7 locations mentioned in the table 3.3 in EIA Report	Contractor/ MMWD (PMU) in consultation with third party reputed Agency	CEA (during routine inspection)	10,000/sample 120,000/year
Vibration	Vibration level Frequency Range (Hz) Vibration in ppv (mm/sec)	Vibration monitoring using vibration level meter	Quarterly • Immediately after complaints	6 locations mentioned in the Table 3-5 and Figure 3.4 in EIA Report Additional location will be added based on complaint	Contractor/ MMWD (PMU) in consultation with third party reputed Agency	CEA (during routine inspection)	To be decided by Environmental office of PMU
Traffic Impact	Flow of vehicles	Check traffic condition using online traffic density applications	• Depending on the progress of the Project	Critical roads and/or junctions	Contractor/ MMWD (PMU)	RDA	Tentative cost: Rs. 100,000 per month Included in Contractor's service fee
Community and Occupational Health and Safety	No. of incidents/accidents No. of complaints	Check compliance to occupational H&S management plan	• Weekly; • Immediately after receipt of complaint	NA	Contractor/ MMWD (PMU)	-	Included in Contractor's service fee
Livelihood Restoration	Livelihood restoration program	Consultation meeting and survey with PAPs	• Semi-annually until the end of livelihood restoration program	Displacement of residents and commercial establishments affected by the project	MMWD (PMU)	External monitoring committee appointed for the implementation of RAP	Included in project cost from a separate fund
Land Acquisition and Involuntary	Compensation for affected PAPs	Consultation meeting and survey with PAPs	• Monthly until ROW is fully acquired	Displacement of residents and commercial	MMWD (PMU)	External monitoring committee appointed for	Included in project cost

Key Aspect	Parameter	Method	Frequency	Location	Responsible Agency/Person	Independent Monitoring Agency	Cost(Rs)
Resettlement of PAPs				establishments affected by the project		the implementation of RAP	
Impacts on terrestrial and aquatic habitats	Number and type of species observed	Sampling survey	• quarterly	Depot area, Thalangama EPA, Bird Sanctuary	Contractor/ MMWD (PMU)	-	Included in project cost
Removal and trimming of trees	Number and type of species to be cut/to be trimmed	Visual observation and record	• Before and after the tree cutting/trimming	Earmarked Bo Trees along the trace and other tree species identified to remove (Annexure F and H in the EIA Report)	Contractor/MMWD (PMU)	CEA (during routine inspection in consultation with RDA, and relevant Local Authorities	Management cost
Waste Management	Amounts and items of waste		• Monthly	Construction Site, workers camps	Contractor/ MMWD (PMU) in consultation with relevant Local Authority	CEA (during routine inspection)	Management cost
Water Quality- spill and leakage	Oil and Grease	Visual inspection	• Daily	Detection of spills/ leakages at all construction site	Contractor/ MMWD (PMU)	-	Management cost
Surface Water quality	pH, temperature, DO, turbidity, BOD_3, Oil&grease, total suspended solid	Water sampling and analysis as per applicable standard	• Quarterly • Immediately after receipt of complaint	Locations mentioned in the table 3.6 in EIA Report	Contractor/ MMWD (PMU) in consultation with third party reputed Agency)	CEA (during routine inspection)	10,000/sample 120,000/year
Ground Water quality	pH,temperature,BOD,Electrical Conductivuty, Total Coloform	Water sampling and analysis as per applicable standard	• Quarterly • Immediately after receipt of complaint	Locations mentioned in the table 3.9 in EIA Report	Contractor/ MMWD (PMU) in consultation with third party reputed Agency	CEA (during routine inspection)	10,000/sample 120,000/year
Ground Water level	From ground level in meters	Using a tape	• Quarterly • Immediately after receipt of complaint	Locations mentioned in the table 3.9 in EIA Report	Contractor/ MMWD (PMU)	CEA (during routine inspection in line with Water	Management cost

Key Aspect	Parameter	Method	Frequency	Location	Responsible Agency/Person	Independent Monitoring Agency	Cost(Rs)
						Resource Board	
Flood	Flood level Kelani River	Communication with Irrigation Department and meteorological department	• In the event of heavy rain	Kelani River	O&M Company	-	Management cost

Table 4 Environmental Monitoring Plan (Operation Phase)

Key Aspect	Parameter	Method	Frequency	Location	Responsible Agency/Person	Independent Mon Agency	Cost(Rs)
Noise	Laeq 24hr Noise level (Day and Night) Peak noise level (Lmax)	Noise monitoring using noise level meter as per applicable standard	Quarterly for first 2 years immediately on receipt of complains	7 locations mentioned in the table 3.3 in EIA Report. Additional location will be added based on complain 12.5m from center of LRT system and 1.2m from ground level	O&M Company through an accredited laboratory	CEA (during routine inspection)	10,000/sample 280,000/year
Vibration	Frequency Range (Hz) Vibration in ppv (mm/sec)	Vibration monitoring using noise level meter as per applicable standard	Quarterly for first 2 years immediately on receipt of complains	6 locations mentioned in the table 3-5 and figure 3.4 in EIA Report. Additional location will be added based on complain	O&M Company through an accredited laboratory	CEA (during routine inspection)	10,000/sample 240,000/year
Livelihood Restoration	Livelihood restoration program	Consultation meeting and survey with PAPs	To be decided during finalization of RAP	Displacement of residents and commercial establishments affected by the project	MMWD (PMU)	External monitoring committee appointed for the implementation of RAP	To be determined through the implementation of RAP
Land Acquisition and Involuntary Resettlement of PAPs	Compensation for affected PAPs	Consultation meeting and survey with PAPs	To be decided during finalization of RAP	Displacement of residents and commercial establishments affected by the project	MMWD (PMU)	External monitoring committee appointed for the implementation of RAP	To be determined through the implementation of RAP
Impacts on ecosystem	Number and type of bird species observed	Visual observation and recording	Annually	Observation points at boundary of Talangama EPA and Sri Jayawardanapura bird sanctuary close to the LRT route	O&M Company	CEA (during routine inspection)	200,000/year

Key Aspect	Parameter	Method	Frequency	Location	Responsible Agency/Person	Independent Mon Agency	Cost(Rs)
Development at Depot	Status of restoration	Visual observation	Quarterly	Restoration area	O&M Company	UDA	200,000/year
Waste Management	Amount and items of waste	Record the type and amount of waste generated.	Monthly	Construction site	O&M Company, Relevant Local Authorities, Ecocycle INSEE	CEA (during routine inspection)	Management cost
Wastewater from Depot	Quality of effluent Parameters stipulated in CEA standard (Tolerance limits for the discharge of industrial waste into inland surface waters – Schedule I of the National Environmental Protection and Quality Regulations No. 1 of 2008)	Effluent sampling and analysis as per applicable standard	Monthly	Outlet of the WWTP at Depot	O&M Company through an accredited laboratory	CEA (during routine inspection)	10,000/sample 120,000/year
Flood	Flood level Kelani River	Communication with Irrigation Department and meteorological department	In the event of heavy rain	Kelani River	O&M Company	-	Management cost

List of Prepares

Name	Position	Signature
Mr. D A J Ranwala	Team Leader / Hydrologist	
Dr. Dewaka Weerakon	Ecologist	
Dr. H R Pasindu	Traffic Expert	
Mr. Hemantha Jayasundara	Landscape Expert	
Mr.M A W R Fernando	Construction Engineer	
Mr. Yohei Suzuki	JICA Study Team	
Dr. Athula Senarathna	Economist	
Ms. Hasara Kalubowila	Sociologist	

Work Allocation/Contribution

Name	Position	Work Allocation/Contribution
Mr. D A J Ranwala	Team Leader / Hydrologist	• Studying environmental impacts including hydrological impacts during construction and operation phases of LRT Project (Flood Modelling was done by SLLRDC) • Formulating mitigation measures and alternative analysis • Preparing Environmental Monitoring Plan(EMOP) and Environmental Management Plan (EMP)
Dr. Dewaka Weerakon	Ecologist	• Studying ecological impacts (Flora and Fauna) during construction and operation phases of LRT Project • Formulating necessary mitigation measures
Dr. H R Pasindu	Traffic Expert	• Studying traffic impacts during construction and operation phases of LRT Project • Formulating necessary mitigation measures and Traffic Management Plan
Mr. Hemantha Jayasundara	Landscape Expert	• Studying landscape impacts during construction and operation phases of LRT Project • Formulating mitigation measures and alternative analysis
Mr. M A W R Fernando	Construction Engineer	• Studying Construction/ Structural impacts during construction and operation phases of LRT Project • Formulating necessary mitigation measures
Mr. Yohei Suzuki	JICA Study Team	• Review of Previous Studies • Carrying out field investigations and surveys related to existing environment • Alternative analysis • Studying environmental impacts (Noise, Vibration, Health and Safety impacts and impacts due to solid waste and waste water) during construction and operational stages of LRT Project (Noise modelling was done by ITI) • Formulating mitigation measures and alternative analysis
Dr. Athula Senarathna	Economist	• Carrying out Extended Cost Benefit analysis for LRT Project
Ms. Hasara Kalubowila	Sociologist	• Conduct baseline socio-economic surveys • Studying socio-economic impacts during construction and operational stages of LRT Project • Formulating mitigation measures