Environmental Impacts
of proposed **FLYOVER** on **Sankey Road**

Harini Nagendra, Seema Mundoli
Azim Premji University

Vijay Nishanth,
Vruksha Foundation

For specific queries you can reach out to:

Harini Nagendra: harini.nagendra@apu.edu.in
Seema Mundoli: seema.mundoli@apu.edu.in
Vijay Nishanth: vijay@vruksha.com

Date of publication: February 2023
Typesetting: Supriya Dutta

Acknowledgements
We acknowledge Mahathi Narayanswamy and Taanika Shankar for their help in data extraction and classification from citizen science sites.

Executive Summary

This report presents findings of a rapid environmental impact assessment conducted to determine the number of trees that will be cut or impacted, and other ecosystems affected, as a result of the proposed flyover on Sankey Road.

According to our census 55 trees of 23 species and 14 Families will be cut in the 600 m stretch where the flyover is being constructed. This included notable specimens such as a raintree (*Samanea saman*) with a girth of 500 cm, a mango tree (*Mangifera indica*) of 450 cm girth and a tamarind (*Tamarindus indica*) at 422 cm. There were also 16 flowering trees and 23 fruiting trees that would be cut. Another 400 sapling and trees of paper mulberry (*Broussonetia papyrifera*) growing on the tank bund would be cut; these are not accounted in the Detailed Project Report (DPR) as being marked for cutting.

In addition, we found that there are 27 trees of 11 species from eight Families that are likely to be impacted, among which were six Ficus. Ficus are keystone species providing a range of ecological benefits, and serve as a habitat for biodiversity ranging from small mammals to birds to insects. One of the most notable species we found in the survey was a massive Indian rubber fig (*Ficus elastica*)—with a girth of 1100 cm and height of 12 m. This stretch too had fruiting trees and flowering trees. While these trees are not marked as being cut for the project, the construction is bound to result in impacts even lopping of branches.

The Sankey Road flyover is being built on the Sankey Tank bund. The Sankey Tank is a lake of historical and ecological significance. The tank is also an important recreational space for people in the locality and from across Bengaluru—one of the spaces people can relax and unwind in the city. The tank that has a history dating back to the 1870s, is also today a habitat for biodiversity. There are 88 species of birds sighted at the tank including the spot-billed pelican (*Pelicanus phillippensis*), categorised as "near-threatened" in the IUCN Red List.

The tree felling will have multiple environmental impacts, that are irreversible. These include
1) decreasing green cover that inhibits carbon sequestration; 2) rising air pollution; 3) the discomfort and costs of increasingly unpredictable weather; 4) adverse impacts on urban biodiversity; and 5) compromising the lake ecosystem of Sankey Tank.

Development of Bengaluru is imperative. But should this development happen every time at a cost to the environment of the city that is critical for the well-being and health of its residents? Trees and lakes provide invaluable and irreplaceable ecosystems services, for free, to humans. Any plans to improve urban infrastructure, such as the Sankey Road flyover being proposed, should ensure that the social impacts are minimal, citizens voices are heard, and ecology is prioritised.

Introduction

Bengaluru's identity as a "Garden City" and "Pensioners Paradise" is today a thing of the past. The city located in a semi-arid climate was greened by planting trees from the time of Hyder Ali and Tipu Sultan, to the British, and continued post-Independence by officials, non-governmental organisations (NGOs) and citizens. The rise of the city as an IT-hub, especially in the 1990s, has come at an irreversible ecological cost. Infrastructure projects such as roads, flyovers, and metro continue to be prioritised in the name of development, even as Bengaluru had begun to grapple with the consequences of extreme weather events be it unprecedented and unseasonal rainfall, or extreme heat. While these weather changes may be the result of climate change, the impacts are exacerbated as a result of disregarding the role of local green and blue ecosystems, such as trees and lakes, in ensuring the sustainability of the city and well-being of its citizens.

Among the development deemed as necessary for an urbanising city like Bengaluru is improving the urban mobility infrastructure to address traffic congestion. Thus, building new flyovers, widening existing roads, creating elevated road corridors, and constructing peripheral roads have all been proposed as ways to decongest the city. Inevitably the first causality of these projects are the trees planted along the roads. While some of these trees are decades old, others are much older forming a part of the ecological heritage of Bengaluru that was once known as the "Garden City".

> **Bengaluru hottest in 150 years, at 33.4 degree Celsius: IMD**
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> **"The Pensioners Paradise, as Bengaluru had been known for its salubrious weather, is becoming hot as the city recorded 33.4 degree Celsius on Thursday, highest in the last 150 years ever since the Indian Meteorological Department IMD) started recording the temperature."** (Times of India, 2020)
>
> **Why 2022 has been Bengaluru's wettest year so far?**
>
> **"Rain-battered Bengaluru surpassed a record this week. Rainfall during 2022 stood at 1,709 mm as of October 20, making it the highest ever annual rainfall figure recorded in 121 years by the city's meteorological centre."**(Sukumaran, 2022)

One such project that has been proposed is the construction of a flyover on Sankey Road. The project comprises building a flyover, as well as ramps on Sankey Road between Malleshwaram 18th Cross and Cauvery Junction on Bellary Road. According to the Detailed Project Report (DPR), the length of the flyover will be 600 m and there will be 470 m length ramps (Infra Support Engineering Consultants Pvt Ltd, no date (a)).

In order to assess the impact of this project on the green cover, we conducted an independent rapid environmental impact assessment on 21st January 2023. In this assessment we undertook a census of the trees that would be cut and impacted because of the project. In addition to the impact on trees, we also assessed the impact of the proposed flyover on other ecosystems in the vicinity especially the historical Sankey Tank.

Assessment
of tree cover on Sankey Road and lake ecosystem of Sankey Tank

Figure 1: Stretches with trees on Sankey Road that will be cut and impacted

Census of trees that will be cut and impacted on Sankey Road

For the tree census we walked the length of Sankey Road from the underpass on Bellary Road (Cauvery Theatre junction) to the Malleswaram 18th Cross-Sankey Tank gate intersection—a distance of about 1.5 km. The DPR for the Sankey Road flyover mentions that the length of the flyover will be 600 m, will have a span of 160 m, and have two ramps of 275 m and 195 m on the Malleswaram 18th Cross-Sankey Tank gate end.

We have included in the census the trees that will be cut in the stretch of the flyover and surveyed the trees on the stretch that may be impacted owing to the construction. To conduct the tree census, we divided the road into three stretches (Figure 1):
Stretch 1: Trees that will be cut on Sankey Road from Indian Institute for Human Settlements (IIHS) to Malleswaram 18th Cross-Sankey Tank gate (via Bashyam Circle)
Stretch 2: Trees along Sankey Tank bund
Stretch 3: Trees that will be impacted on Sankey Road from Cauvery Junction underpass to IIHS

For the census we noted the tree species, height, and girth or DBH (diameter at breast height). We estimated the height of the trees through visual observation of individual trees. To measure the girth, for some trees, especially the ones with a wider girth we used a measuring tape; and in the case of others, we noted approximate girth through observation.

Stretch 1: Trees that will be cut on Sankey Road from IIHS to Malleswaram 18th Cross-Sankey Tank gate (via Bashyam Circle)

Figure 2: Measuring the girth of trees using a measuring tape (Pic: Vijay Nishanth)

As per the DPR, the number of trees that would be cut is 39 in this stretch (Infra Support Engineering Consultants Pvt Ltd, no date (b)).

However, we counted a total of 55 trees of 23 species and 14 Families that will be cut in the 600 m stretch where the flyover is being constructed (Annexure 1). The tree with the largest girth, at 500 cm was a raintree (*Samanea saman*). The next largest in terms of girth was a mango (*Mangifera indica*) at 450 cm and a tamarind (*Tamarindus indica*) at 422 cm. Atleast four trees—two raintrees and two java plum (*Syzygium cumini*)—were 15 m in height.

Among the flowering trees the most in number were the copperpod (*Peltophorum pterocarpum*) (wrongly mentioned in the DPR as Acacia) followed by African tulip (*Spathodea campanulata*), Indian beech (*Millettia pinnata*) and Indian cork (*Millingtonia hortensis*). There were seven copperpod, one which had a girth 300 cm, and six African tulip the tallest of which was 12 m. The Indian beech numbered two, one with a girth of 194 cm and height of 12 m, and one Indian cork. The fruit trees that would be cut in addition to six mango, included three each of jackfruit (*Artocarpus heterophyllus*) and butterfruit (*Persea americana*), two each of coconut (*Cocos nucifera*), cucumber trees (*Averrhoa bilimbi*), silver oak (*Grevillea robusta*) and java plum, and one each of pond apple (*Annona glabra*), star gooseberry (*Phyllanthus acidus*), and sapodilla (*Manilkara zapota*). We also recorded two tamarind trees. Among the Ficus species were one cluster fig (*Ficus racemosa*) and one banyan (*Ficus benghalensis*). In addition, we recorded two Malabar neem (*Melia dubia*), and one each of eucalyptus (*Eucalyptus sp.*) and teak (*Tectona grandis*). All these trees of varying heights and girth together formed a green canopy on the road.

Figure 3: The shady canopy of trees on Sankey Road (Pic: Vijay Nishanth)

Figure 4: Bilimbi with fruit and flower (Pic: Vijay Nishanth)

Figure 5: Butterfruit and jackfruit marked to be cut (Pic: Seema Mundoli)

Stretch 2: Trees along Sankey Tank bund

Figure 6: Star gooseberry marked for being cut (Pic: Vijay Nishanth)

In addition to the trees on Stretch 1, there are around 400 sapling and trees primarily of one species, paper mulberry (*Broussonetia papyrifera*) growing on the tank bund. These trees and saplings were growing on a strip of land between 20 and 40 feet wide at different points, and extended from the Malleshwaram 18th Cross end till a few metres before the Bashyam Circle. The height of these paper mulberry ranged from sapling of 1 foot to trees of more than 3 m. The growth of this dense clump of paper mulberry has probably been the result of seed dispersion by birds. Evidence of crows (*Corvus sp.*) eating and dispersing the seeds was seen during the survey.

This patch of paper mulberry trees has not been accounted for in the DPR that lists the trees that will be cut or impacted.

Figure 7: The stretch of paper mulberry on Sankey Tank bund not included in trees that will be cut (Pic: Vijay Nishanth)

Stretch 3: Trees that will be impacted on Sankey Road from Cauvery Junction underpass to IIHS.

Figure 8: Fruiting paper mulberry: A food source for birds and other biodiversity (Pic: Vijay Nishanth)

This stretch extends from the Cauvery Junction underpass on Bellary Road to the IIHS campus, and includes trees on both sides of the road. The trees on this stretch are not mentioned as expected to be cut, but during our survey we found trees marked with a red cross. The construction of the flyover may have impacts on these trees, including lopping of the canopy.

We found that there are 27 trees of 11 species from eight Families that are likely to be impacted (Annexure 2). A notable feature of this stretch are the Ficus species—four banyan and two Indian rubber fig (*Ficus elastica*). Ficus are keystone species providing a range of ecological benefits, and serve as a habitat for biodiversity ranging from small mammals to birds to insects. One of the most notable species we found in the survey was a massive Indian rubber fig—with a girth of 1100 cm and height of 12 m. The canopy of this single tree extended across the width of the road. The other Ficus too were huge—two of banyan had a girth of 600 cm and the other Indian rubber fig had a girth of 500 cm.

The one mango tree on this stretch that we measured had a girth of 470 cm and a height of 10 m. In addition, the flowering species on this stretch were African tulip, copperpod, gulmohar (*Delonix regia*) and portia tree (*Thespesia populnea*). There were five African tulip with girths ranging between 220 cm and 350 cm, five copperpods with girths between 150 cm and 250 cm, while the tallest copperpod had a height of 12 m. There were two gulmohar with their spreading buttress roots, of which one was 350 cm in girth. A single tree of Indian almond (*Terminalia catappa*) with its broad leaves had a girth of 110 cm and height of around 5 m. A paper mulberry tree with a girth of 123 cm and height of 10 m on this stretch, and a Devils tree (*Alstonia scholaris*) were the other species. There were also four large leaved mahogany (*Swietenia macrophylla*) with girths between 170 cm and 234 cm and heights between 7 m and 9 m.

In addition, there are also trees located on the walkway inside Sankey Tank. This includes species of raintree and jamun—one

Figure 9: The girth of the raintree at Sankey Tank gate (Pic: Seema Mundoli)

of these trees is a massive raintree with a girth of 744 cm and height of around 12 m. While these trees, may not be cut, the flyover will necessitate the lopping of the canopy, especially of raintree species, that extends across the road.

Heritage trees Indian rubber fig on Sankey Road

Figure 10: The India rubber fig, a heritage tree, with its large girth and canopy extending across the road (Pic: Vijay Nishanth)

A tree can be classified as a "heritage tree" if it meets a range of criteria—it is of a particular size, shape, form, age, or has a notable physical feature, or is of cultural value, or associated with an important place or event. The largest tree on Sankey Road we measured was an Indian rubber fig with a girth of 1100 cm and height of 12 m. While this tree is not marked to be cut for the project, there could be adverse impacts because of the construction of the proposed flyover. Heritage trees across cities in India are threatened by development projects. Recognising their importance, the Uttar Pradesh and Chandigarh governments have issued orders to protect heritage trees. For its heritage and ecological value, as well as the value it holds for the local citizens, the India rubber fig on Sankey Road qualifies as a heritage tree requiring protection, along with other trees on the road.

History and ecology
of Sankey Tank and the environs

Figure 11: Trees in Sankey Tank as a nesting site for birds (Pic: Hita Unnikrishnan)

Bengaluru was also once known as the "City of Lakes". The region where the city stands today was dotted with several interconnected lakes, that were constructed by rulers of the Ganga, Chola, Hoysala and Rashtrakuta dynasties between the sixth and sixteenth century CE. These lakes enabled settlements in the region, without a perennial water source such as a river, to flourish and were consolidated into the town of Bengaluru during British times. One of the last lakes to be built was Sankey Tank. The tank was built by Colonel Sankey, a Britisher, in the 1870s to supply water to two other water bodies—Millers Tank and Dharmambudhi lake, which in turn supplied water to the Cantonment and the municipality. Neither Millers Tank nor Dharmambudhi exist today. But Sankey Tank does—as an oasis of blue and green in an otherwise concretising city.

Figure 12: An ashy prinia in the foliage of Sankey Tank (Pic: Hita Unnikrishnan)

Sankey Tank extends across an area of around 15 ha. It is an important open space for the local residents as well as visitors from other parts of the city. The walkway around the tank is used by walkers and joggers of the neighbourhood daily for exercise. The tank sees an increased footfall during weekends with families visiting to spend time walking

around the lake and in the garden area. There is also space for exercise, yoga, and a children's play area. The *kalyani* (small pond) constructed in a corner of the tank is used for idol immersion during the festival of Ganesh Chaturthi and Durga Pooja. Sankey Tank is thus a water body of historical and social significance even today.

In addition, the tank is also ecologically important as it serves as a habitat for biodiversity. The citizen science portal e-Bird lists 88 species of birds sighted at the tank (Annexure 3). For a small water body, in the middle of a bustling metropolitan city, this is a significant number of avian life. The birds included the spot-billed pelican (*Pelicanus phillippensis*), categorised as "near-threatened" in the IUCN Red List as there has been a decline in these species in recent years (BirdLife International, 2017).

Further, in Sankey Tank, and a radius of about a kilometre around the proposed flyover, can be found a range of insect and mammalian species that are listed on another citizen science portal—the iNaturalist. The mammalian species include the Indian flying fox (*Pteropus giganteus*) and bonnet macaque (*Macaca radiata*). There were also several species of spiders, moths and butterflies, many of whom depend on the green foliage as a habitat and for their food (Annexure 4).

Figure 13: A bonnet macaque in the vicinity of the Sankey Tank (Pic: Hita Unnikrishnan)

Environmental impacts
of proposed Sankey Road flyover

Decreasing green cover that inhibits carbon sequestration

Vehicle emissions are a major contributor to air pollution especially in developing countries like India. Emissions from vehicles also include greenhouse gases such as carbon dioxide. These greenhouse gases result in global warming that is a global concern with serious local impacts.

Carbon sequestering is an important function performed by trees that help in reducing the impacts of global warming. Trees absorb carbon dioxide and store carbon as biomass in different parts both above and below the ground. While young trees absorb carbon to grow, older trees too fix large amounts of carbon. Together the trees that will be cut stored 54,490 kg or around 54 metric tonnes of carbon. Another 66,847 kg or around 67 metric tonnes of carbon is stored by the trees that will be impacted by the project. In all, around 121 metric tonnes of carbon is sequestered by the trees in this stretch. And this does not include the patch of around 400 paper mulberry trees and saplings growing on the Sankey Tank bund that will be cut for the flyover.

A typical passenger vehicle emits 4.6 metric tonnes of carbon dioxide per year (EPA, no date). The trees that store 121 metric tonnes of carbon, and also absorb carbon throughout the year provide an invaluable, and free, service of reducing greenhouse gas emissions and contributing to reducing the impacts of global warming.

Rising air pollution: A health emergency

Rising levels of air pollution in Indian cities has been a cause for concern owing to the impacts on health, especially of children and elderly. Recognising the urgency and the social, economic and health impacts of poor air quality, the Ministry of Environment, Forests and Climate Change (MoEFCC) launched the National Clean Air Programme (NACP) in 2019. Bengaluru was one of the 122 "non-attainment" cities; that is one that violates the national ambient air quality standards (CSTEP, 2022). The urbanisation of the city with the increasing vehicular traffic and construction work have been contributors to the poor air quality of the city. But even four years after the NACP was launched the air pollution levels in Bengaluru has only been rising (Kulkarni, 2023).

The components of air pollution include suspended particulate matter (SPM) and toxic gases, and trees play an important in reducing these harmful components in the air. Trees do this by absorbing polluting gases such as carbon monoxide, carbon dioxide, sulphur dioxide and nitrogen dioxide. Trees also settle dust and reduce the quantity of SPM in the air that would otherwise be breathed in by us. Our research in the past comparing air pollution in road segments with and without trees has been very revealing. Road segments with trees had SPM in significantly lower levels when compared to segments without trees (Vailshery et al., 2013).

The destruction of the trees and the canopy on the road where the flyover is proposed will only exacerbate the impacts of dust and vehicular pollution.

Figure 14: Trees provide shade and mitigate the UHI effect (Pic: Seema Mundoli)

The discomfort and costs of increasingly unpredictable weather

Urban heat island (UHI) effect and urban flooding are increasingly being witnessed in Indian cities. In 2022 Bengaluru too witnessed unpredictable weather—extreme heat even before the summers and unprecedented rainfall. Geeta Agnihotri, scientist, and head of IMD Bengaluru speaking to Times of India had said:

> "It is mainly local factors ranging from change in landscape to loss of green area that are influencing the rainfall pattern in Bengaluru. World over this has been the trend in several developed cities due to the rampant change in the land use pattern and creation of heat islands." (Kaggere, 2022)

Both heavy rain and extreme heat, the result of changes to micro-climate owing to loss of green cover and increase in built area, have come with economic and social costs. In the extreme heat in April 2022, doctors advised people to stay home, especially the elderly and children.

What helps keep areas cool in cities? Tree cover. Our research in the past comparing segments of roads in Bengaluru city with and without trees has shown that segments with trees had much lower ambient and road surface temperature than those without.

In the case of road surface temperature the segments with trees had temperatures ranging between 23 degrees C and 56 degree C while those without trees had a higher minimum and maximum temperatures at 27 degrees C and 62 degrees C (Vailshery et al., 2013). Trees along roads make it bearable for pedestrians and cyclists to travel during the hot afternoons. Widening roads by cutting trees exacerbates the effect of UHI that cities are in the grip of. Loss of green cover also creates a vicious cycle—less trees, more heat, more air-conditioners and air conditioned cars—that in turn again contributes to rising city temperatures.

Adverse impacts on urban biodiversity

Cities contrary to what we may think are not devoid of biodiversity. Even a few trees or a small water body provides a habitat for different species. A connected canopy of trees is especially important for urban biodiversity to thrive. In our survey we found black kites (*Milvus migrans*) perching on trees of African tulip, crows feasting on paper mulberry fruit and dispersing seeds, and evidence of nesting by birds on trees. As refuges for biodiversity, some species, such as those of *Ficus* are especially important. *Ficus* are keystone

Figure 15: Figs of banyan on Sankey Road: Source of food for urban biodiversity (Pic: Vijay Nishanth)

species that provide habitat and food for birds, insects and small mammals.

The greenery surrounding Sankey Tank provides roosting and nesting spaces for birds, while the water itself is a source of food and habitat for waterbirds. The tank ecosystem also harbour the harder to spot species of amphibians and reptiles. The tank is also a habitat for insects—important for their role as pollinators.
The construction of the flyover, the noise, dust and light, would undoubtedly disturb the biodiversity in the area. But the long-term impacts of the flyover and the loss of tree cover would result in an irreversible loss of biodiversity.

Compromising the lake ecosystem of Sankey Tank

In recent years, concerned by the degradation and conversion of lakes, citizens, and NGOs aided by courts have come together to protect the lakes in the city. In a ruling on 4th May 2016, the National Green Tribunal had specified a 75 m buffer zone around lakes in the city (NGT,2016), to protect lake ecosystems from being impacted by land use changes. However, in 2019 an order of the Supreme Court reduced this to a buffer zone of 30 m (Akshatha, 2019). The proposed flyover is being constructed on the lake bund and is therefore in violation of the Supreme Courts orders.

Conclusion and recommendations

Trees along roads are always the first casualty of any development projects in urban India. The usual argument provided are the need to address increasing congestion in cities, as is the case with the proposed Sankey Road flyover. The remedy to tree cutting is planting saplings—multiple saplings for every single tree cut has been the promise in almost all cases.

But any number of saplings cannot provide the ecological benefits that a full-grown tree can provide in terms of shade, supporting biodiversity and mitigating pollution. Saplings take years, if not decades, to grow, and the species planted as compensation for the trees cut are also not as diverse.

The many ecological services that the trees provide such as sequestering carbon thereby reducing global warming, mitigating the impacts of air pollution, providing a habitat for biodiversity, reducing the impact of UHI, and maintaining an equitable micro-climate are irreplaceable—they are also free of cost. Both high temperatures and increased air pollution that Bengaluru has been witnessing have serious consequences for the health of its residents.

Trees along roads help to reduce the temperature of concrete and asphalt¬ed surfaces by 20 degrees C and ambient air temperature by at least 3-5 degrees C. They settled dust and absorb gases that would otherwise go into our lungs.

Bengaluru city's core has seen rapid increase in built-area and consequent decrease in green cover over the last few decades (Nagendra et al., 2012). The trees planted with care from British times to more recently in the 1990s have been decimated for road widening, construction of flyovers, and development of the metro (Nagendra 2016). At the same time Bengaluru has witnessed the most unpredictable weather in recent years—be it unseasonal rains or excess heat—both of which have come at a high social and economical cost. We can no longer indiscriminately cut trees, claiming that trees lost can be replaced or saying that a small stretch of trees such as on the Sankey Road flyover will not have any impacts on the overall green cover of the city. This piecemeal approach of looking at urban green cover, with no evidence of trees planted as compensation, has what has resulted in the reduced greenery in the city. What we need is a protecting existing tree cover, and thoughtful planting of trees across the city. The apex court in the country, the Supreme Court, has also expressed its concern with the cutting of trees for infrastructure projects and the environmental impacts (Kumar, 2020). Similarly, Article 21 of the Indian Constitution emphasizes that the fundamental right to life includes the right to a healthy environment. The cutting of trees on Sankey Road flyover is in violation of the rights of each one of us citizens, and hence it is imperative that the project be stopped, no trees cut, and any projects proposed in future are carried out without further loss to tree cover in Bengaluru.

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Annexures

Annexure 1: Details of trees that will be cut in Stretch 1

Common name	Scientific name	Family name	Girth (in cm)	Height (in m)
African tulip	*Spathodea campanulata*	Bignoniaceae	240	6
			370	8
			300	7
			320	7
			315	7
			250	12
Banyan	*Ficus benghalensis*	Moraceae	50	4
Butterfruit	*Persea americana*	Lauraceae	93	6
			80	2
			40	2
Cluster fig	*Ficus racemosa*	Moraceae	120	5
Coconut	*Cocos nucifera*	Arecaceae	70	7
			70	7
Copperpod	*Peltophorum pterocarpum*	Fabaceae	300	8
			190	12
			210	12
			200	12
			120	10
			200	10
			250	11
Cucumber tree	*Averrhoa bilimbi*	Oxalidaceae	55	7
			70	6
Eucalyptus	*Eucalyptus sp*	Myrtaceae	300	12
Indian beech	*Millettia pinnata*	Fabaceae	194	12
			54	6
Indian cork tree	*Millingtonia hortensis*	Bignoniaceae	200	9
Indian mast tree	*Polyalthia longifolia*	Annonaceae	100	6
Jackfruit	*Artocarpus heterophyllus*	Moraceae	128	9
			150	14
			120	9
Java plum	*Syzygium cumini*	Myrtaceae	200	15
			200	15

Large leaved mahogany	*Swietenia macrophylla*	Meliaceae	83	4
			250	14
Malabar neem	*Melia dubia*	Meliaceae	118	8
			120	8
Mango	*Mangifera indica*	Anacardia-ceae	264	8
			450	13
			90	10
			78	3
			150	10
			60	3
Pond apple	*Annona glabra*	Annonaceae	60	5
Raintree	*Samanea saman*	Fabaceae	375	15
			190	10
			500	12
			300	12
			225	15
Sapodilla	*Manilkara zapota*	Sapotaceae	36	4
Silver oak	*Grevillea robusta*	Proteaceae	91	9
			110	10
Star gooseberry	*Phyllanthus acidus*	Phyllantha-ceae	34	5
Tamarind	*Tamarindus indica*	Fabaceae	422	10
			250	12
Teak	*Tectona grandis*	Verbenaceae	110	6

Annexure 2: Details of trees that may be impacted in Stretch 3

Common name	**Scientific name**	**Family name**	**Girth (in cm)**	**Height (in m)**
African tulip	*Spathodea campanulata*	Bignoniaceae	350	9
			250	7
			220	9
			277	9
			229	9
Banyan	*Ficus benghalensis*	Moraceae	450	7
			400	6
			600	10
			600	10
Copperpod	*Peltophorum pterocarpum*	Fabaceae	150	10
			250	11

			200	8
			180	12
			238	10
Devils tree	*Alstonia scholaris*	Apocynaceae	50	6
Gulmohar	*Delonix regia*	Fabaceae	150	7
			350	5
Indian almond	*Terminalia catappa*	Combretaceae	110	5
Indian rubber fig	*Ficus elastica*	Moraceae	500	10
			1100	12
Large leaved mahogany	*Swietenia macrophylla*	Meliaceae	203	7
			232	9
			234	9
			170	8
Mango	*Mangifera indica*	Anacardiaceae	470	10
Paper mulberry	*Broussonetia papyrifera*	Moraceae	123	10
Portia tree	*Thespesia populnea*	Malvaceae	50	4

Annexure 3: Bird species of Sankey Tank

Common name	**Scientific name**
Ashy drongo	*Dicrurus leucophaeus*
Ashy prinia	*Prinia socialis*
Asian green bee-eater	*Merops orientalis*
Asian koel	*Eudynamys scolopceus*
Asian palm swift	*Cypsiurus balasiensis*
Barn swallow	*Hirundo rustica*
Black drongo	*Dicrurus macrocercus*
Black kite	*Milvus migrans*
Black-crowned night heron	*Nycticorax nycticorax*
Black-winged kite	*Elanus caeruleus*
Blyth's reed warbler	*Acrocephalus dumetorum*
Bonelli's eagle	*Aquila fasciata*
Booted eagle	*Hieraaetus pennatus*
Booted warbler	*Iduna caligata*
Brahminy kite	*Haliastur indus*
Cattle egret	*Bubulcus ibis*
Chestnut-tailed starling	*Sturnia malabarica*
Cinereous tit	*Parus cinereus*
Clamorous reed warbler	*Acrocephalus stentoreus*
Common hawk-cuckoo	*Hierococcyx varius*

Common iora	*Aegithina tiphia*
Common kingfisher	*Alcedo atthis*
Common myna	*Acridotheres tristis*
Common sandpiper	*Actitis hypoleucos*
Common tailorbird	*Orthotomus sutorius*
Coppersmith barbet	*Megalaima haemacephala*
Eurasian collared dove	*Streptopelia decaocto*
Eurasian coot	*Fulica atra*
Eurasian hoopoe	*Upupa epops*
Eurasian moorhen	*Gallinula chloropus*
Gray heron	*Ardea cinerea*
Gray wagtail	*Motacilla cinerea*
Great cormorant	*Phalacrocorax carbo*
Great egret	*Ardea alba*
Greater coucal	*Centropus sinensis*
Green sandpiper	*Tringa ochropus*
Green warbler	*Phylloscopus trochiloides*
House crow	*Corvus splendens*
Indian cormorant	*Phalacrocorax fuscicollis*
Indian golden oriole	*Oriolus kundoo*
Indian paradise-flycatcher	*Terpsiphone paradisi*
Indian pond-heron	*Ardeola grayii*
Indian silverbill	*Euodice malabarica*
Indian spot-billed duck	*Anas poecilorhyncha*
Indian white-eye	*Zosterops palpebrosus*
Intermediate egret	*Ardea intermedia*
Jungle myna	*Acridotheres fuscus*
Large-billed crow	*Corvus macrorhynchos*
Lesser whistling duck	*Dendrocygna javanica*
Little cormorant	*Microcarbo niger*
Little egret	*Egretta garzetta*
Little grebe	*Tachybaptus ruficollis*
Little swift	*Appus affinis*
Loten’s sunbird	*Cinnyris lotenius*
Mallard	*Anas platyrhynchos*
Muscovy duck	*Cairina moschata*
Northern shoveler	*Spatula clypeata*
Oriental darter	*Anhinga melanogaster*
Oriental magpie-robin	*Copsychus saularis*
Pale-billed flowerpecker	*Dicaeum erythrorhynchos*
Pied kingfisher	*Ceryle rudis*
Plain prinia	*Prinia inornata*

Purple heron	*Ardea purpurea*
Purple sunbird	*Cinnyris asiaticus*
Purple-rumped sunbird	*Leptocoma zeylonica*
Red-vented bulbul	*Pycnonotus cafer*
Red-whiskered bulbul	*Pycnonotus jocosus*
Rock pigeon	*Columba livia*
Rose-ringed parakeet	*Psittacula krameri*
Rosy starling	*Pastor roseus*
Shikra	*Accipiter badius*
Skye's warbler	*Iduna rama*
Spot-billed pelican	*Pelicanus philippensis*
Spotted dove	*Spilopelia chinensis*
Streak-throated swallow	*Petrochelidon fluvicola*
Striated heron	*Butorides striata*
Tickell's blue flycatcher	*Cyornis tickelliae*
Western yellow wagtail	*Motacilla flava*
Western/eastern yellow wagtail	*Motacilla tschutschensis (eastern)*
Whiskered tern	*Chlidonias hybrida*
White-breasted waterhen	*Amourornis phoenicurus*
White-throated kingfisher	*Halcyon smyrnensis*
White-browed bulbul	*Pycnonotus luteolus*
White-browed wagtail	*Motacilla maderaspatensis*
White-cheeked barbet	*Megalaima viridis*
White-naped woodpecker	*Chrysocolaptes festivus*
Wood sandpiper	*Tringa glareola*
Yellow-billed babbler	*Turdoides affinis*
Extracted from e-Bird on 25th January 2023	

Annexure 4: Spider diversity in the vicinity of the proposed Sankey Road flyover

Common name	**Scientific name**
Asian spiny-backed orb weaver	*Thelacantha brevispina*
Cellar spiders	*Pholcus sp.*
Decorative silver orb spider	*Leucauge decorata*
Garden orb-weavers	*Argiope sp.*
Garden tent-web spider	*Cyrtophora cicatrosa*
Huntsman spiders	*Gnathopalystes sp.*
Jumping spiders	*Rhene sp.*
Lynx spider	*Oxyopes javanus*
Oriental spiny orb-weaver	*Gasteracantha geminata*

Pear-shaped opadometa	*Leucauge fastigata*
Red weaver ant-mimicking spider	*Myrmaplata plataleoides*
Stretch spiders	*Tetragnatha sp.*
Trashline orb weavers	*Cyclosa sp.*
Two-striped telamonia	*Telamonia dimididata*
Two-tailed spiders	*Hersilia sp.*
Wall-jumping spider	*Menemerus sp.*
Extracted from iNaturalist on 29th January 2023	

Annexure 5: Other biodiversity in in the vicinity of the proposed Sankey Road flyover

Common name	**Scientific name**
Antlered crane fly	*Pselliophora laeta*
Arboreal bicolored slender ant	*Tetraponera rufonigra*
Banyan tussock moth	*Perina nuda*
Bathroom moth fly	*Clogmia albipunctata*
Beet webworm moth	*Spoladea recurvalis*
Blue ground skimmer	*Diplacodes trivialis*
Blue tiger	*Tirumala limniace*
Chestnut bob	*Iambrix salsala*
Chocolate pansy	*Junonia iphita*
Common castor butterfly	*Ariadne merione*
Common evening brown	*Melanitis leda*
Common four-ring	*Ypthima huebneri*
Common leopard	*Phalanta phalantha*
Common sailer	*Neptis hylas*
Danaid eggfly	*Hypolimnas misippus*
Ditch jewel	*Brachythemis contaminata*
Footman moth	*Nepita conferta*
Indian cotton stainer	*Dysdercus cingulatus*
Lemon pansy	*Junonia lemonias*
Longhorn crazy ant	*Paratrechina longicornis*
Marbled white moth	*Nyctemera coleta*
Pea blue	*Lampides boeticus*
Pellucid hawkmoth	*Cephonodes hylas*
plains cupid	*Luthrodes pandava*
Psyche	*Leptosia nina*
Tailed palmfly	*Elymnias caudata*

Yellow featherlegs	*Copera marginipes*
Yellow Pansy	*Junonia hierta*
	Chiasmia emersaria
	Traminda mundissima
Extracted from iNaturalist on 29th January 2023	