

MONITORING FORM

If environmental reviews indicate the need of monitoring by JICA, JICA undertakes monitoring for necessary items that are decided by environmental reviews. JICA undertakes monitoring based on regular reports including measured data submitted by the project proponent. When necessary, the project proponent should refer to the following monitoring form for submitting reports.

When monitoring plans including monitoring items, frequencies and methods are decided, project phase or project life cycle (such as construction phase and operation phase) should be considered.

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring Item	Monitoring Results during Report Period
ex.) Responses/Actions to Comments and Guidance from Government Authorities	January 2016 – March 2016

2. Mitigation Measures

The summary of the Environmental Monitoring is shown below.

[Construction Phase]

Item	Parameter	Frequency and Duration	Locations(At least)
Air	PM ₁₀	2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC	20 locations
Water	Groundwater quality (IS 10500:1991)	Once/6months During entire civil construction stage or even later, if directed by DMRC	20 locations
Noise	Noise Level (Leq and Lmax)	24hours Once/week During entire civil construction stage or even later, if directed by DMRC	30 locations
Vibration	Vibration (RMS)	24hours Once/week During entire civil construction stage or even later, if directed by DMRC	10 locations
Soil	Heavy Metal	Once/6months During entire civil construction stage	In each Underground Construction Contract
Ecology	Felled and planted trees	Once a year till all trees that were to be planted	All the trees felled and newly planted trees

		by Delhi Government on behalf of DMRC, are planted	
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[Operation Phase]

Item	Parameter	Frequency and Duration	Locations
Air	PM ₁₀	2x24hours Once/month For 3years	10 locations
Water	Effluent	Once/4months For 3years	3 locations(Depot)
	Groundwater quality (IS 10500:1991)	Once/year For 3years	3 locations(Depot)
Noise	Noise Level (Leq)	24hours Once/year For 3years	15 locations (Sensitive Receptors along the elevated section)
Vibration	Vibration level VdB	24hours Once/year For 3years	15 locations (Sensitive Receptors along the elevated and underground section)
Ecology	Bird Strike	4times/year(If no bird hit is reported in this duration, then this monitoring may be discontinued, else it will continue). From the beginning, DMRC will instruct its train operator to compulsorily blow the horn while on the bridge across the Yamuna.	On the DMRC Yamuna bridge near Okhla Bird Sanctuary

2.1 During Construction

When a measured value exceeds the standards, the value is written in bold letters.

Air Quality (Ambient Air Quality)

Date: February 2016

Location: CC-24(Lajpat Nagar- Hazrat Nizamudin) (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
PM ₁₀	µg/m ³	Vinobapuri -188.5 Saraikalkhan- 193.5 Lajpat Nagar- 180.5 Ashram - 181 Nizamudin- 183.5	191 197 185 184 187	100 (24hours) (CPCB)	-	2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC

Date: January 2016

Location: CC-79R(Okhla Phase-III) (Elevated)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
PM ₁₀	µg/m ³	Okhla Phase-III- 279	216	100 (24hours) (CPCB)	-	2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC

Date: January 2016

Location: CC-32(Palam-IGD) (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
PM ₁₀	µg/m ³	Dwarka Sec-20- 173 IGD- 170.5 PAlam-171	179 173 177	100 (24hours) (CPCB)	-	2×24hours Twice/month During entire civil construction stage or even

						later, if directed by DMRC
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Date: February 2016

Location: CC-12 Krishna Nagar to Gokulpuri (Elevated)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
PM ₁₀	µg/m ³	Welcome-193.6 Azad Nagar-196 Krishna Nagar-188.7 Gokulpuri-186 Zafrabad-194.2	187.3 194.7 197.9 188.8 189.6 195.2	100 (24hours) (CPCB)	-	2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC

Ground Water Quality (Drinking Water Quality: IS 10500:1991)

Date: January 2016

Location: Bikhaji Cama Place , CC-23 (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Color, Hazen units, Max			<5.0	5(25)	-	20 locations Once/6 months
Odour	-		Agreeable	Unobjectionable	-	
Taste	-		Saline	Agreeable	-	During entire civil construction stage or even later, if directed by DMRC
Turbidity, NTU, Max	-		<1.0	5(10)	-	
pH Value	-		7.68	6.5-8.5	-	
Total Hardness (as CaCO ₃), Max	mg/l		406	300(600)	-	
Iron(as Fe), max	mg/l		0.19	0.3(1.0)	-	
Chloride(as Cl), Max	mg/l		220.6	250(1000)	-	
Residual free Chlorine, Min	mg/l		<0.2	0.2	-	
Fluoride(as F), Max	mg/l		<1.0	1.0(1.5)	-	

Dissolved solids, Max	mg/l		1102	500(2000)	-
Calcium(as Ca), Max	mg/l		80.2	75(200)	-
Magnesium(as Mg), Max	mg/l		50.1	30(100)	-
Copper(as Cu), Max	mg/l		<0.01	0.05(1.5)	-
Manganese(as Mn), Max	mg/l		<0.1	0.1(0.3)	-
Sulphate(as SO ₄), Max	mg/l		139.2	200(400)	-
Nitrate(as NO ₂), Max	mg/l		14.7	45(100)	-
Phenolic compounds (as C ₆ H ₅ OH), Max	mg/l		<0.001	0.001(0.002)	-
Mercury(as Hg), Max	mg/l		<0.001	0.001	-
Cadmium(as Cd), Max	mg/l		<0.001	0.01	-
Selenium(as Se), Max	mg/l		<0.005	0.01	-
Arsenic(as As), Max	mg/l		<0.005	0.05	-
Cyanide(as CN), Max	mg/l		<0.05	0.05	-
Lead(as Pb), Max	mg/l		<0.005	0.05	-
Zinc(as Zn), Max	mg/l		0.38	5(15)	-
Anionic Detergents (as MBAS), Max	mg/l		<0.05	0.2(1.0)	-
Chromium (as Cr ⁶⁺), Max	mg/l			0.05	-
Polynuclear aromatic hydrocarbons(mg/l		<0.001	-	-

as PAH), Max					
Mineral Oil	mg/l		<0.01	0.01	-
Pesticides, Max	mg/l			Absent	-
Radioactive Materials, Max a) Alpha emitters	Bq/l			-(0.1)	-
Radioactive Materials, Max b) Beta emitters	Pci/l			-(1)	-
Alkalinity, Max	mg/l		452	200(600)	-
Aluminum(as Al), Max	mg/l		<0.01	0.03(0.2)	-
Boron, Max	mg/l		<0.25	1(5)	-

Date: January 2016

Location: Greater Kailash CC-23 (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Color, Hazen units, Max			<1.0	5(25)	-	20 locations Once/6 months
Odour	-		Agreeable	Unobjectionable	-	
Taste	-		Saline	Agreeable	-	
Turbidity, NTU, Max	-		<1.0	5(10)	-	During entire civil construction stage or even later, if directed by DMRC
pH Value	-		7.21	6.5-8.5	-	
Total Hardness (as CaCO ₃), Max	mg/l		216	300(600)	-	
Iron(as Fe), max	mg/l		0.13	0.3(1.0)	-	
Chloride(as Cl), Max	mg/l		72.7	250(1000)	-	
Residual free Chlorine, Min	mg/l		<0.2	0.2	-	
Fluoride(as F), Max	mg/l		<1.0	1.0(1.5)	-	
Dissolved solids, Max	mg/l		686	500(2000)	-	
Calcium(as	mg/l		64.8	75(200)	-	

Ca), Max					
Magnesium(as Mg), Max	mg/l		13.6	30(100)	-
Copper(as Cu), Max	mg/l		<0.01	0.05(1.5)	-
Manganese(as Mn), Max	mg/l		<0.1	0.1(0.3)	-
Sulphate(as SO ₄), Max	mg/l		103.5	200(400)	-
Nitrate(as NO ₂), Max	mg/l		5.62	45(100)	-
Phenolic compounds (as C ₆ H ₅ OH),Max	mg/l		<.001	0.001(0.002)	-
Mercury(as Hg), Max	mg/l		<.001	0.001	-
Cadmium(as Cd), Max	mg/l		<.001	0.01	-
Selenium(as Se), Max	mg/l		<.005	0.01	-
Arsenic(as As), Max	mg/l		<.005	0.05	-
Cyanide(as CN), Max	mg/l		<.05	0.05	-
Lead(as Pb), Max	mg/l		<0.005	0.05	-
Zinc(as Zn), Max	mg/l		<0.05	5(15)	-
Anionic Detergents (as MBAS),Max	mg/l		<0.05	0.2(1.0)	-
Chromium (as Cr ⁶⁺),Max	mg/l		-	0.05	-
Polynuclear aromatic hydrocarbons(as PAH),Max	mg/l		ND	-	-
Mineral Oil	mg/l		<0.01	0.01	-
Pesticides, Max	mg/l		ND	Absent	-

Radioactive Materials, Max c) Alpha emitters	Bq/l			-(0.1)	-
Radioactive Materials, Max d) Beta emitters	Pci/l			-(1)	-
Alkalinity, Max	mg/l		296	200(600)	-
Aluminum(as Al), Max	mg/l		ND	0.03(0.2)	-
Boron, Max	mg/l		ND	1(5)	-

Date: January 2016

Location: ESI Hospital CC-28(Elevated)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Color, Hazen units, Max			<5.0	5(25)	-	20 locations Once/6 months
Odour	-		Agreeable	Unobjectionable	-	
Taste	-		Saline	Agreeable	-	During entire civil construction stage or even later, if directed by DMRC
Turbidity, NTU, Max	-		<1.0	5(10)	-	
pH Value	-		7.78	6.5-8.5	-	
Total Hardness (as CaCO ₃), Max	mg/l		124	300(600)	-	
Iron(as Fe), max	mg/l		0.13	0.3(1.0)	-	
Chloride(as Cl), Max	mg/l		132.8	250(1000)	-	
Residual free Chlorine, Min	mg/l		<0.2	0.2	-	
Fluoride(as F), Max	mg/l		<0.01	1.0(1.5)	-	
Dissolved solids, Max	mg/l		484.0	500(2000)	-	
Calcium(as Ca), Max	mg/l		32.6	75(200)	-	
Magnesium(as Mg), Max	mg/l		10.7	30(100)	-	

Copper(as Cu), Max	mg/l		<0.01	0.05(1.5)	-
Manganese(as Mn), Max	mg/l		<0.1	0.1(0.3)	-
Sulphate(as SO ₄), Max	mg/l		82.6	200(400)	-
Nitrate(as NO ₂), Max	mg/l		3.46	45(100)	-
Phenolic compounds (as C ₆ H ₅ OH),Max	mg/l		<0.001	0.001(0.002)	-
Mercury(as Hg), Max	mg/l		<0.001	0.001	-
Cadmium(as Cd), Max	mg/l		ND	0.01	-
Selenium(as Se), Max	mg/l		<0.005	0.01	-
Arsenic(as As), Max	mg/l		<0.005	0.05	-
Cyanide(as CN), Max	mg/l		<0.05	0.05	-
Lead(as Pb), Max	mg/l		<0.005	0.05	-
Zinc(as Zn), Max	mg/l		<0.05	5(15)	-
Anionic Detergents (as MBAS),Max	mg/l		<0.05	0.2(1.0)	-
Chromium (as Cr ⁶⁺),Max	mg/l		-	0.05	-
Polynuclear aromatic hydrocarbons(as PAH),Max	mg/l		-	-	-
Mineral Oil	mg/l		-	0.01	-
Pesticides, Max	mg/l		-	Absent	-
Radioactive Materials, Max e) Alpha emitters	Bq/l		-	-(0.1)	-

Radioactive Materials, Max f) Beta emitters	Pci/l	-	-	-	-
Alkalinity, Max	mg/l	94	200(600)	-	-
Aluminum(as Al), Max	mg/l	<0.01	0.03(0.2)	-	-
Boron,Max	mg/l	<0.25	1(5)	-	-

Date: January 2016

Location: Rajouri Garden CC-28 (Elevated)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Color,Hazen units,Max			<5.0	5(25)	-	20 locations Once/6 months
Odour	-		Agreeable	Unobjectionable	-	
Taste	-		Saline	Agreeable	-	During entire civil construction stage or even later, if directed by DMRC
Turbidity,NTU, Max	-		<1.0	5(10)	-	
pH Value	-		7.27	6.5-8.5	-	
Total Hardness (as CaCO ₃), Max	mg/l		352	300(600)	-	
Iron(as Fe) ,max	mg/l		0.21	0.3(1.0)	-	
Chloride(as Cl), Max	mg/l		126.4	250(1000)	-	
Residual free Chlorine, Min	mg/l		<0.2	0.2	-	
Fluoride(as F), Max	mg/l		<1.0	1.0(1.5)	-	
Dissolved solids, Max	mg/l		1634	500(2000)	-	
Calcium(as Ca), Max	mg/l		54.6	75(200)	-	
Magnesium(as Mg), Max	mg/l		52.5	30(100)	-	
Copper(as Cu), Max	mg/l		<0.01	0.05(1.5)	-	
Manganese(as Mn),	mg/l		<0.1	0.1(0.3)	-	

Max					
Sulphate (as SO ₄), Max	mg/l		272.8	200(400)	-
Nitrate(as NO ₃), Max	mg/l		29.6	45(100)	-
Phenolic compounds (as C ₆ H ₅ OH), Max	mg/l		<0.001	0.001(0.002)	-
Mercury(as Hg), Max	mg/l		<0.001	0.001	-
Cadmium(as Cd), Max	mg/l		<0.001	0.01	-
Selenium(as Se), Max	mg/l		<0.005	0.01	-
Arsenic(as As), Max	mg/l		<0.005	0.05	-
Cyanide(as CN), Max	mg/l		<0.05	0.05	-
Lead(as Pb), Max	mg/l		<0.005	0.05	-
Zinc(as Zn), Max	mg/l		0.43	5(15)	-
Anionic Detergents (as MBAS), Max	mg/l		<0.05	0.2(1.0)	-
Chromium (as Cr ⁶⁺), Max	mg/l		<0.01	0.05	-
Polynuclear aromatic hydrocarbons(as PAH), Max	mg/l		--	-	-
Mineral Oil	mg/l		--	0.01	-
Pesticides, Max	mg/l		--	Absent	-
Radioactive Materials, Max g) Alpha emitters	Bq/l		--	-(0.1)	-
Radioactive Materials, Max h) Beta emitters	Pci/l		--	-(1)	-

Alkalinity, Max	mg/l		612	200(600)	-	
Aluminum(as Al), Max	mg/l		<0.01	0.03(0.2)	-	
Boron,Max	mg/l		<0.25	1(5)	-	

Noise / Vibration

Date: February 2016

Location: CC-12 (Krishna Nagar to Gokulpuri) (Elev.)

Item	Unit	Measured Value (L _{eq})	Measured Value (L _{Max})	Country's Standards (Environmental Management Manual by DMRC)	Occupancy	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level (Leq) and Lmax	dB(A)	Gokulpuri Leq(Day)-68.5 Leq(night)-54.5 Lmin- 43.4	74.5	<u>National Standards</u> Area Leq(d) Leq(n) Resi 55 45 Comm 65 55 Indstl 75 70 Silence 50 40 <u>DMRC Env Manual</u> (when pre construction levels are not known) Resi Lmax Daytime: 75 Nighttime: 65 Comm & and Indstl At all time: 85	Commercial / residence	30locations 24hours/time Once/week During entire civil construction stage or even later, if directed by DMRC
		Welcome Leq(Day)-67.4 Leq(night)-47.9 Lmin- 40.9	75.4			
		Azad Nagar Leq(Day)-62.3 Leq(night)-46.5 Lmin- 43.3	67.1			
		Krishna Nagar Leq(Day)-66.2 Leq(night)-49.7 Lmin-44.1	72.6			
		Zafrabad Leq(Day)-68.1 Leq(night)-53.9 Lmin-44.4	75.2			
Vibration level	RMS (mm/s)			Structures in good condition:25 in fair condition:12 in poor condition:5 Water supply Structures:5	-	10locations 24hours/time Once/week

				Heritage structure/ Bridge structures:5		During entire civil constructi on stage or even later, if directed by DMRC
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Date: January 2016

Location: CC-32 (Palam-IGD) (UG)

Item	Unit	Measured Value (L _{eq})	Measured Value (L _{Max})	Country's Standards (Environmental Management Manual by DMRC)	Occupancy	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level (Leq) and Lmax	dB(A)	IGD Airport Leq(day)- 65.8 Leq(night)- 54.4 Lmin- 46.4 Dwarka Sec-20 Leq(day)- 64.9 Leq(night)- 52.8 Lmin- 41.7 Palam Leq(day)- 67.5 Leq(night)- 54.6 Lmin- 48.5	77.8 73.8 81.4	<u>National Standards</u> <u>Area</u> <u>Leq(d)</u> <u>Leq(n)</u> Resi 55 Comm 65 55 Indstl 75 70 Silence 50 40 <u>DMRC Env Manual</u> (when pre construction levels are not known) Resi Lmax Daytime: 75 Nighttime: 65 Comm & and Indstl At all time: 85	Commercial / residence	30location s 24hours/ti me Once/wee k During entire civil constructio n stage or even later, if directed by DMRC
Vibration level	RMS (mm/s)			Structures in good condition:25 in fair condition:12 in poor condition:5 Water supply		10location s 24hours/ti me Once/wee k

				Structures:5 Heritage structure/ Bridge structures:5		During entire civil constructio n stage or even later, if directed by DMRC
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Date: February, 2016

Location: CC-24 (Lajpat nagar- Hazrat Nizamudin) (UG)

Item	Unit	Measured Value (L _{eq})	Measured Value (L _{Max})	Country's Standards (Environmental Management Manual by DMRC)	Occupancy	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level (Leq) and Lmax	dB(A)	Vinobapuri Leq (day)- 64.0 Leq(night)-55.8 Lmin- 43.3	79.3	<u>National Standards</u> <u>Area</u> <u>Leq(d)</u> <u>Leq(n)</u> Resi 55 45 Comm 65 55 Indstl 75 70 Silence 50 40	Commercial / residence	30locations 24hours/time Once/week During entire civil construction stage or even later, if directed by DMRC
		Ashram Leq(day)- 63.8 Leq(night)- 55.9 Lmin- 38.5	80.4	DMRC Env <u>Manual</u> (when pre construction levels are not known) Resi Lmax Daytime: 75 Nighttime: 65 Comm & and Indstl At all time: 85		
		Lajpat nagar Leq(day)- Leq(night)- 52.2 Lmin – 40.8	77.2			
		Nizamudin Leq(day)- 73.0 Leq(night)- 67.6 Lmin – 43.9	85.9			
		Sarai kale Khan Leq(day)- 72.8 Leq(night)-63.4 Lmin – 44.5	89.2			
Vibration level	RMS (mm/s)			Structures in good condition:25 in fair		10locations 24hours/time Once/week

				condition:12 in poor condition:5 Water supply Structures:5 Heritage structure/ Bridge structures:5		During entire civil construction stage or even later, if directed by DMRC
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Date: January 2016

Location: CC-79R Okhla Ph-III (Elevated)

Item	Unit	Measured Value (L _{eq})	Measured Value (L _{Max})	Country's Standards (Environmental Management Manual by DMRC)	Occupancy	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level (Leq) and Lmax	dB(A)	Okhla Ph-III Leq(day) – 73.5 Leq(night)- 67.4 Lmin – 49.9	85.5	<u>National Standards</u> Area <u>Leq(d)</u> <u>Leq(n)</u> Resi 55 45 Comm 65 55 Indstl 75 70 Silence 50 40 <u>DMRC Env Manual</u> (when pre construction levels are not known) Resi Lmax Daytime: 75 Nighttime: 65 Comm & and Indstl At all time: 85	Commercial / residence	30locations 24hours/time Once/week During entire civil construction stage or even later, if directed by DMRC
Vibration level	RMS (mm/s)			Structures in good condition:25 in fair condition:12 in poor condition:5 Water supply Structures:5 Heritage structure/		10locations 24hours/time Once/week During entire civil constructio

				Bridge structures:5		n stage or even later, if directed by DMRC
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Excavated soil (Leaching test)

Date: January 2016

Location: Greater Kailash CC-23 (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Mercury(as Hg)	mg/l		ND	-	0.0005	In each Underground Construction Contract Once/6months During entire civil construction stage Samples should be taken from the underground lowest point.
Cadmium(as Cd)	mg/l		<0.005	-	0.01	
Arsenic(as As)	mg/l		<0.01	-	0.01	
Cyanide(as CN)	mg/l		<0.05	-	Not detected	
Lead(as Pb)	mg/l		<0.01	-	0.01	
Chromium(as Cr6 ⁺)	mg/l		<0.05	-	0.05	

Date: January 2016

Location: Nehru Enclave CC-23 (UG)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Mercury(as Hg)	mg/l		<0.001	-	0.0005	In each Underground Construction Contract Once/6months During entire civil construction stage Samples should be taken from the underground
Cadmium(as Cd)	mg/l		<0.005	-	0.01	
Arsenic(as As)	mg/l		<0.01	-	0.01	
Cyanide(as CN)	mg/l		<0.05	-	Not detected	
Lead(as Pb)	mg/l		<0.01	-	0.01	
Chromium(as Cr6 ⁺)	mg/l		<0.05	-	0.05	

						lowest point.
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Excavated soil (Amount)

Date: January, 2016 - March, 2016

Line	Excavated Amount Approx.(m ³)	Name of Disposed Site	Disposed Amount Approx.(m ³)
Line-1	9571.097	Koyal Enclave, Nursery in Ghaziabad	8900
Line-2	2700	Depot area	2700
Line-3	8340	Barua Village, Noida	5000
Line-6	64273.93	Mukundpur, DDA Dhirpur, Shastri Park	64273.93
Line-7	117642.1*	Vinod Nagar, Koyla Village, Alipur, Okhla	113740.1*
Line-8	73226.65*	Dwarka DDA Site, Rajpura Dumping Site,	71554.65*

*Data Collection is in process.

Ecological Monitoring (Flora Monitoring)

Date: January, 2016 - March, 2016

CPM	Permis sion to fell trees	No. of trees actually felled	No of trees planted	No of trees transpla nted	Remarks	Location of plantation
CPM-1	895		11	25		-
CPM-2*	-	-	-	-		-
CPM-3*	-	-	-	-		-
CPM-4	3575	288	-	-		-
CPM-5*	-	-	-	-		-
CPM-6	Nil	Nil	Nil	Nil		-
CPM-7*	-	-	-	-		-
CPM-8	Nil	Nil	151	Nil		-
CPM-9*	-	-	-	-		-
CPM-10	513	27	Nil	04		-

*Data Collection is in process.

2.2 During Operation

When a measured value exceeds the standards, the value is written in bold letters.

Air Quality (Ambient Air Quality)

Date February, 2016

Location: PeeraGarhi Metro Station

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
PM ₁₀	µg/m ³	310	316	100 (24hours) (CPCB)	IS 5182 (Part 23)	48hours/time Once/month For 3 years

Effluent at Depot

Date: March 2016

Location: Sarita Vihar Depot

Item	Unit	Measured Value (Mean)		Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
		Inlet	Outlet				
pH	-	7.92	7.89	-	5.5-9.0	-	(Depot) Once/4 months For 3 years
TSS	mg/l	32	9.0	-	100	-	
BOD	mg/l	35	3.0	-	30	-	
COD	mg/l	100.4	8.3	-	250	-	
Oil/Grease	mg/l	2.0	<2.0	-	10	-	

Ground Water Quality (Drinking Water Quality: IS 10500:1991)

Date: March 2016

Location: Sarita Vihar Depot

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Color, Hazen units, Max	-	<5.0	-	5(25)	-	(Depot) Once/year
Odour	-	Agreeable	-	Unobjectionable	-	

Taste	-	Disagreeable	-	Agreeable	-	For 3years
Turbidity,NTU,Max	-	<1.0	-	-	-	
pH Value	-	7.12	-	6.5-8.5	-	
Total Hardness (as CaCO ₃), Max	mg/l	490	-	300(600)	-	
Iron(as Fe) ,max	mg/l	0.32	-	0.3(1.0)	-	
Chloride(as Cl), Max	mg/l	294.10	-	250(1000)	-	
Residual free Chlorine, Min	mg/l	Nil	-	0.2	-	
Fluoride(as F), Max	mg/l	0.50	-	1.0(1.5)	-	
Dissolved solids, Max	mg/l	960	-	500(2000)	-	
Calcium(as Ca), Max	mg/l	-	-	75(200)	-	
Magnesium(as Mg), Max	mg/l	-	-	30(100)	-	
Copper(as Cu), Max	mg/l	-	-	0.05(1.5)	-	
Manganese(as Mn), Max	mg/l	-	-	0.1(0.3)	-	
Sulphate(as SO ₄), Max	mg/l	-	-	200(400)	-	
Nitrate(as NO ₂), Max	mg/l	-	-	45(100)	-	
Phenolic compounds (as C ₆ H ₅ OH),Max	mg/l	-	-	0.001(0.002)	-	
Mercury(as Hg), Max	mg/l	-	-	0.001	-	
Cadmium(as Cd), Max	mg/l	-	-	0.01	-	
Selenium(as Se), Max	mg/l	-	-	0.01	-	
Arsenic(as As), Max	mg/l	-	-	0.05	-	
Cyanide(as CN), Max	mg/l	-	-	0.05	-	
Lead(as Pb), Max	mg/l	-	-	0.05	-	
Zinc(as Zn),	mg/l	-	-	5(15)	-	

Max					
Anionic Detergents (as MBAS), Max	mg/l	-	-	0.2(1.0)	-
Chromium (as Cr6+), Max	mg/l	-	-	0.05	-
Polynuclear aromatic hydrocarbons (as PAH), Max	mg/l	-	-	-	-
Mineral Oil	mg/l	-	-	0.01	-
Pesticides, Max	mg/l	-	-	Absent	-
Radioactive Materials, Max i) Alpha emitters	Bq/l	-	-	-(0.1)	-
Radioactive Materials, Max j) Beta emitters	Pci/l	-	-	-	-
Alkalinity, Max	mg/l	-	-	200(600)	-
Aluminum (as Al), Max	mg/l	-	-	0.03(0.2)	-
Boron, Max	mg/l	-	-	1(5)	-
TSS	mg/l	-	-	600	-
BOD	mg/l	-	-	350	-
COD	mg/l	-	-	-	-
Oil/Grease	mg/l	-	-	20	-

Noise / Vibration

Date:

Location:

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)

Noise level	dB				[Railway Noise] Daytime- 60 Night time- 55	15 Location 24 hours Once in a year at sensitive receptors along the elevated section from train operation..
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Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Vibration level	mm/s				FTA standard	As and when compliant arises.

Ecological Monitoring (Bird Strike near Okhla Bird Sanctuary)

Date:

Location:

Duration: From / / to / /

Item	Number of Interviews with Train Operators who reported the accident during monitoring period	Number of Accidents Reported during the monitoring period	Name of Species lost in the accident	Remarks (Place of accident, frequency, Method, etc.)
Train Accidents involving bird fatality				4times/year For 2years Visual observation (If no bird hit is reported in this duration, then this monitoring may be discontinued, else it will continue). From the beginning, DMRC will instruct its train operator to compulsorily blow the horn while on the bridge across the Yamuna.