Attachment 2

# 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 2020- March 2020 |

## 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<br>Twice/month<br>During entire civil construction stage or even later, if directed by DMRC | 20 locations |
| Water | Groundwaterquality (IS 10500:1991) | Once/6months<br>During entire civil construction stage or even later, if directed by DMRC | 20 locations |
| Noise | Noise Level (Leq and Lmax) | 24hours<br>Once/week<br>During entire civil construction stage or even later, if directed by DMRC | 30 locations |
| Vibration | Vibration (RMS) | 24hours<br>Once/week<br>During entire civil construction stage or even later, if directed by DMRC | 10 locations |
| Soil | Heavy Metal | Once/6moths<br>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 by Delhi Government on behalf of DMRC, are planted | All the trees felled and newly planted trees |

**[Operation Phase]**

| Item | Parameter | Frequency and Duration | Locations |
|---|---|---|---|
| Air | $PM_{10}$ | 2×24hours<br>Once/month<br>For 3years | 10 locations |
| Water | Effluent | Once/4months<br>For 3years | 3 locations(Depot) |
| | Groundwater quality (IS 10500:1991) | Once/year<br>For 3years | 3 locations(Depot) |
| Noise | Noise Level (Leq) | 24hours<br>Once/year<br>For 3years | 15 locations (Sensitive Receptors along the elevated section) |
| Vibration | Vibration level VdB | 24hours<br>Once/year<br>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).<br>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: January 2020 Location :(Dwarka Sector-21 to 25) (UG)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | **Batching Plant** – 286.55<br>**Station Area** – 279.45<br>**Cut & Cover Area** – 288.2 | 351.7<br>342.4<br>337.5 | 100 (24hours) (CPCB) | - | 2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC |

Date: Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | | | 100 (24hours) (CPCB) | - | 2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC |

Date: January 2020 Location: Elevated stabling depot(Elevated)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | **Near S.P.-14**- 99.5<br>**Near office:**-267.5 | 202.3<br>192.2 | 100 (24hours) (CPCB) | - | 2×24hours Twice/month During entire civil construction stage or even later, if directed by DMRC |

Date:Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | - | | 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: December 2020 Location: Dwarka Sector-21 to 25 (UG)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Color,Hazenunits,Max | | <5 | | 5(25) | - | 20 locations Once/6 months<br><br>During entire civil construction stage or even later, if directed by DMRC |
| Odour | - | Agreeable | | Unobjectionable | - | |
| Taste | - | Agreeable | | Agreeable | - | |
| Turbidity,NTU, Max | - | <1.0 | | 5(10) | - | |
| pH Value | - | 7.34 | | 6.5-8.5 | - | |
| Total Hardness (as $CaCO_3$), Max | mg/l | 137 | | 300(600) | - | |
| Iron(as Fe) ,max | mg/l | 0.22 | | 0.3(1.0) | - | |
| Chloride(as Cl), Max | mg/l | 86 | | 250(1000) | - | |
| Residual free Chlorine, Min | mg/l | Nil | | 0.2 | - | |
| Fluoride(as F), Max | mg/l | 0.11 | | 1.0(1.5) | - | |
| Dissolved solids, Max | mg/l | 520.0 | | 500(2000) | - | |
| Calcium(as | mg/l | 28.0 | | 75(200) | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ca), Max | | | | | | |
| Magnesium(as Mg), Max | mg/l | 16 | | 30(100) | - | |
| Copper(as Cu), Max | mg/l | BDL | | 0.05(1.5) | - | |
| Manganese(as Mn), Max | mg/l | BDL | | 0.1(0.3) | - | |
| Sulphate(as $SO_4$), Max | mg/l | 73 | | 200(400) | - | |
| Nitrate(as $NO_2$), Max | mg/l | 3.21 | | 45(100) | - | |
| Phenolic compounds (as $C_6H_5OH$),Max | mg/l | BDL | | 0.001(0.002) | - | |
| Mercury(as Hg), Max | mg/l | BDL | | 0.001 | - | |
| Cadmium(as Cd), Max | mg/l | BDL | | 0.01 | - | |
| Selenium(as Se), Max | mg/l | - | | 0.01 | - | |
| Arsenic( as As), Max | mg/l | BDL | | 0.05 | - | |
| Cyanide(as CN), Max | mg/l | <0.05 | | 0.05 | - | |
| Lead(as Pb), Max | mg/l | BDL | | 0.05 | - | |
| Zinc(as Zn), Max | mg/l | BDL | | 5(15) | - | |
| Anionic Detergents (as MBAS),Max | mg/l | BDL | | 0.2(1.0) | - | |
| Chromium (as $Cr6^+$),Max | mg/l | BDL | | 0.05 | - | |
| Polynuclear aromatic hydrocarbons( as PAH),Max | mg/l | | | - | - | |
| Mineral Oil | mg/l | BDL | | 0.01 | - | |
| Pesticides, Max | mg/l | - | | Absent | - | |
| Radioactive Materials, Max a) Alpha emitters | Bq/l | - | | -(0.1) | - | |
| Radioactive Materials, Max | Pci/l | - | | -(1) | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| b) Beta emitters | | | | | | |
| Alkalinity, Max | mg/l | 396 | | 200(600) | - | |
| Aluminum(as Al), Max | mg/l | BDL | | 0.03(0.2) | - | |
| Boron,Max | mg/l | - | | 1(5) | - | |

Date: Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Color,Hazenunits,Max | | – | | 5(25) | - | 20 locations Once/6 months<br><br>During entire civil construction stage or even later, if directed by DMRC |
| Odour | - | | | Unobjectionable | - | |
| Taste | - | | | Agreeable | - | |
| Turbidity,NTU, Max | - | | | 5(10) | - | |
| pH Value | - | | | 6.5-8.5 | - | |
| Total Hardness (as $CaCO_3$), Max | mg/l | | | 300(600) | - | |
| Iron(as Fe) ,max | mg/l | | | 0.3(1.0) | - | |
| Chloride(as Cl), Max | mg/l | | | 250(1000) | - | |
| Residual free Chlorine, Min | mg/l | | | 0.2 | - | |
| Fluoride(as F), Max | mg/l | | | 1.0(1.5) | - | |
| Dissolved solids, Max | mg/l | | | 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 $NO_2$), | mg/l | | | 45(100) | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Max | | | | | | |
| Phenolic compounds (as $C_6H_5OH$),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), Max | mg/l | | | 5(15) | - | |
| 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 c) Alpha emitters | Bq/l | | | -(0.1) | - | |
| Radioactive Materials, Max d) Beta emitters | Pci/l | | | -(1) | - | |
| Alkalinity, Max | mg/l | | | 200(600) | - | |
| Aluminum(as Al), Max | mg/l | | | 0.03(0.2) | - | |
| Boron,Max | mg/l | | | 1(5) | - | |

Attachment 2

Date:Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Color,Hazenunits,Max | | | | 5(25) | - | 20 locations Once/6 months<br><br>During entire civil construction stage or even later, if directed by DMRC |
| Odour | - | | | Unobjectionable | - | |
| Taste | - | | | Agreeable | - | |
| Turbidity,NTU, Max | - | | | 5(10) | - | |
| pH Value | - | | | 6.5-8.5 | - | |
| Total Hardness (as $CaCO_3$), Max | mg/l | | | 300(600) | - | |
| Iron(as Fe) ,max | mg/l | | | 0.3(1.0) | - | |
| Chloride(as Cl), Max | mg/l | | | 250(1000) | - | |
| Residual free Chlorine, Min | mg/l | | | 0.2 | - | |
| Fluoride(as F), Max | mg/l | | | 1.0(1.5) | - | |
| Dissolved solids, Max | mg/l | | | 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 $C_6H_5OH$),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), Max | mg/l | | | 5(15) | - | |
| 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 e) Alpha emitters | Bq/l | | | -(0.1) | - | |
| Radioactive Materials, Max f) Beta emitters | Pci/l | | | -(1) | - | |
| Alkalinity, Max | mg/l | | | 200(600) | - | |
| Aluminum(as Al), Max | mg/l | | | 0.03(0.2) | - | |
| Boron,Max | mg/l | | | 1(5) | - | |

Date: Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Color,Hazenunits,Max | | | | 5(25) | - | 20 locations Once/6 months<br><br>During entire civil |
| Odour | - | | | Unobjectionable | - | |
| Taste | - | | | Agreeable | - | |
| Turbidity,NTU, | - | | | 5(10) | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Max | | | | | | construction stage or even later, if directed by DMRC |
| pH Value | - | | | 6.5-8.5 | - | |
| Total Hardness (as $CaCO_3$), Max | mg/l | | | 300(600) | - | |
| Iron(as Fe) ,max | mg/l | | | 0.3(1.0) | - | |
| Chloride(as Cl), Max | mg/l | | | 250(1000) | - | |
| Residual free Chlorine, Min | mg/l | | | 0.2 | - | |
| Fluoride(as F), Max | mg/l | | | 1.0(1.5) | - | |
| Dissolved solids, Max | mg/l | | | 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 $C_6H_5OH$),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), Max | mg/l | | | 5(15) | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 g) Alpha emitters | Bq/l | | | -(0.1) | - | |
| Radioactive Materials, Max h) Beta emitters | Pci/l | | | -(1) | - | |
| Alkalinity, Max | mg/l | | | 200(600) | - | |
| Aluminum(as Al), Max | mg/l | | | 0.03(0.2) | - | |
| Boron,Max | mg/l | | | 1(5) | - | |

**Noise / Vibration**

Date: January 2020 Location: Stabling Line at Noida (Elevated)

| **Item** | **Unit** | **Measured Value ($L_{eq}$)** | **Measured Value ($L_{Max}$)** | **Country's Standards (Environmental Management Manual by DMRC)** | **Occupancy** | **Remarks (Measure-ment Point, Frequency, Method, etc.)** |
|---|---|---|---|---|---|---|
| Noise level (Leq) and Lmax | dB(A) | **Near S.P.-14**<br>Leq (d)-66.2<br>Leq (n)- 59.7<br>Lmin- 42.2<br><br>**Near Casting Yard**<br>Leq (d)-66.4<br>Leq (n)- 61.5<br>Lmin- 41.4 | 75.4<br><br>76.4 | National Standards<br>AreaLeq(d)Leq(n)<br>Resi 55 45<br>Comm 65 55<br>Indstl 75 70<br>Silence 50 40<br><br>DMRC Env Manual (when pre construction levels are not known)<br>ResiLmax Daytime: 75<br>Nighttime: | Commercial /residence | 30locations 24hours/time Once/week<br><br>During entire civil construction stage or even later, if directed by DMRC |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 65<br>Comm & and Indstl<br>At all time:<br>85 | | |
| Vibration level | RMS (mm/s) | | | Structures<br>in good condition:25<br>in fair condition:12<br>in poor condition:5<br>Water supply Structures:5<br>Heritage structure/ Bridge structures:5 | - | 10locations<br>24hours/time<br>Once/week<br>During entire civil construction stage or even later, if directed by DMRC |

Date: January 2020

Location: Dwarka Sec-25 (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) | **Batching Plant**<br>Leq(d) – 65.7<br>Leq(n) – 58.3<br>Lmin – 41.4<br><br>**Station Area**<br>Leq(d) – 63.6<br>Leq(n) – 60.5<br>Lmin – 38.6<br><br>**Cut & Cover Area**<br>Leq(d) – 63.6<br>Leq(n) – 59.6<br>Lmin –40.5 | 81.2<br><br>82.7<br><br>80.9 | National Standards<br>AreaLeq(d)Leq(n)<br>Resi 55 45<br>Comm 65 55<br>Indstl 75 70<br>Silence 50 40<br><br>DMRC Env Manual<br>(when pre construction levels are not known)<br>ResiLmax Daytime:<br>75<br>Nighttime:<br>65<br>Comm & and Indstl<br>At all time:<br>85 | Commercial / residence | 30locations<br>24hours/time<br>Once/week<br><br>During entire civil construction stage or even later, if directed by DMRC |
| Vibration level | RMS (mm/s) | | | Structures<br>in good condition:25<br>in fair condition:12<br>in poor condition:5 | - | 10locations<br>24hours/time<br>Once/week |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Water supply Structures:5<br>Heritage structure/ Bridge structures:5 | | During entire civil constructio n stage or even later, if directed by DMRC |

Date: Location:

| Item | Unit | Measured Value ($L_{eq}$) | Meas ured Value( $L_{Max}$) | Country's Standards (Environmental Management Manual by DMRC) | Occupancy | Remarks (Measure-ment Point, Frequency , Method, etc.) |
|---|---|---|---|---|---|---|
| Noise level (Leq) and Lmax | dB(A) | | | National Standards<br>AreaLeq(d)Leq(n)<br>Resi 55 45<br>Comm 65 55<br>Indstl 75 70<br>Silence 50 40<br><br>DMRC Env Manual<br>(when pre construction levels are not known)<br>ResiLmax<br>Daytime:<br>75<br>Nighttime:<br>65<br>Comm & and Indstl<br>At all time:<br>85 | Commerci al / residence | 30locations 24hours/tim e Once/week<br><br>During entire civil constructio n stage or even later, if directed by DMRC |
| Vibration level | RMS (mm/s) | | | Structures<br>in good condition:25<br>in fair condition:12<br>in poor condition:5<br>Water supply Structures:5<br>Heritage structure/ Bridge structures:5 | | 10locations 24hours/tim e Once/week<br><br>During entire civil constructio n stage or even later, if directed by DMRC |

Date:Location:

| Item | Unit | Measured Value ($L_{eq}$) | Measured Value ($L_{Max}$) | Country's Standards (Environmental Management Manual by DMRC) | Occupancy | Remarks (Measure-ment Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Noise level (Leq) and Lmax | dB(A) | | | National Standards<br>AreaLeq(d)Leq(n)<br>Resi 55 45<br>Comm 65 55<br>Indstl 75 70<br>Silence 50 40<br><br>DMRC Env Manual<br>(when pre construction levels are not known)<br>ResiLmax<br>Daytime:<br>75<br>Nighttime:<br>65<br>Comm & and Indstl<br>At all time:<br>85 | Commercial / residence | 30locations<br>24hours/time<br>Once/week<br><br>During entire civil construction stage or even later, if directed by DMRC |
| Vibration level | RMS (mm/s) | | | Structures<br>in good condition:25<br>in fair condition:12<br>in poor condition:5<br>Water supply<br>Structures:5<br>Heritage structure/<br>Bridge<br>structures:5 | - | 10locations<br>24hours/time<br>Once/week<br><br>During entire civil construction stage or even later, if directed by DMRC |

**Excavated soil (Leaching test)**

Date: December 2020 Location:(Dwarka Sector-21 to 25) (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 |
| Cadmium(as Cd) | mg/l | ND | | - | 0.01 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Arsenic( as As) | mg/l | ND | | - | 0.01 | Once/6months<br>During entire civil construction stage<br>Samples should be taken from the underground lowest point. |
| Cyanide(as CN) | mg/l | ND | | - | Not detected | |
| Lead(as Pb) | mg/l | ND | | - | 0.01 | |
| Chromium(as $Cr6^{+}$) | mg/l | ND | | - | 0.05 | |

Date: Location:

| 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 | | | - | 0.0005 | In each Underground Construction Contract<br>Once/6months<br>During entire civil construction stage<br>Samples should be taken from the underground lowest point. |
| Cadmium(as Cd) | mg/l | | | - | 0.01 | |
| Arsenic( as As) | mg/l | | | - | 0.01 | |
| Cyanide(as CN) | mg/l | | | - | Not detected | |
| Lead(as Pb) | mg/l | | | - | 0.01 | |
| Chromium(as $Cr6^{+}$) | mg/l | | | - | 0.05 | |

**Excavated soil (Amount)**

| Line | Excavated Amou Approx.('000 $m^3$) | Name of Disposed Site | Disposed Amount Approx.('000 m3) |
|---|---|---|---|
| Line-2* | - | - | - |
| Line-6 | - | - | - |
| Line-7* | - | - | - |
| Line-8 | - | - | - |

**Ecological Monitoring(Flora Monitoring)**

| CPM | Permission to fell trees | No. of trees actually felled | No of trees planted | No of trees transplanted | Location of plantation |
|---|---|---|---|---|---|
| CPM-1* | - | - | - | - | |

| | | | | | |
|---|---|---|---|---|---|
| CPM-2* | - | - | - | - | |
| CPM-3* | - | - | - | - | |
| CPM-4* | - | - | - | - | |
| CPM-5* | - | - | - | - | |
| CPM-6 | - | - | - | - | |
| CPM-7* | - | - | - | - | |
| CPM-8 | - | - | - | - | |
| CPM-9* | - | - | - | - | |
| CPM-10* | - | - | - | - | |
| ED/Civil | - | - | - | - | |

*Data under 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 2020 Location :Shaheed Sthal (Line-1)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 169.33 | 180.09 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**

Date: February 2020 Location: Karkarduma (Line-7)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 294.88 | 336.81 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**

Date: February 2020 Location: Ghevra (Line-5)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 329.30 | 457.86 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**

Date: February 2020 Location: Nangli (Line-9)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 440.97 | 525.74 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020

Location: Hauz Khas (Line-8)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 318.07 | 446.73 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020

Location: Okhla NSIC (Line-8)

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 253.515 | 262.53 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020

Location: ESI Basai Hospital

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 262.32 | 380.38 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020

Location: Badli Mor

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 527.24 | 541.78 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020

Location: Noida Sector-34

Attachment 2

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 283.79 | 397.85 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Air Quality (Ambient Air Quality)**
Date: February 2020 Location: NHPC Chowk

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| $PM_{10}$ | $\mu g/m^3$ | 234.63 | 346.82 | 100 (24hours) (CPCB) | IS 5182 (Part 23) | 48hours/time Once/month For 3 years |

**Effluentat Depot**
Date: Location:

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

**Effluent at Depot**
Date: Location:

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

**Effluent at Depot**

Date: Location:

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

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

Date: Location:

| Item | Unit | Measured Value (Mean) | Measured Value (Max.) | Country's Standards | Referred International Standards | Remarks (Measurement Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Color,Hazenunits,Max | - | | - | 5(25) | - | (Depot) Once/year For 3years |
| Odour | - | | - | Unobjectionable | - | |
| Taste | - | | - | Agreeable | - | |
| Turbidity,NTU,Max | - | | - | 5(10) | - | |
| pH Value | - | | - | 6.5-8.5 | - | |
| Total Hardness (as $CaCO_3$), Max | mg/l | | - | 300(600) | - | |
| Iron(as Fe) ,max | mg/l | | - | 0.3(1.0) | - | |
| Chloride(as Cl), Max | mg/l | | - | 250(1000) | - | |
| Residual free Chlorine, Min | mg/l | | - | 0.2 | - | |
| Fluoride(as F), Max | mg/l | | - | 1.0(1.5) | - | |
| Dissolved solids, Max | mg/l | | - | 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 $C_6H_5OH$),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), Max | mg/l | | - | 5(15) | - | |
| 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 RMS Value (Mean) | MeasuredRMS Value (Max.) | Country's Standards Max. PPV mm/s | Referred International Standards | Remarks (Measure-ment Point, Frequency, Method, etc.) |
|---|---|---|---|---|---|---|
| Vibration level | mm/s | | | Structures in:- Good condition = 25 Fair condition = 12 Poor condition = 5 Water supply structures = 5 Heritage structures = 5 | Federal Transmission Administration (FTA), US | As and when complaint arises at the ground floor of building above the tunnel. |

**Ecological Monitoring**

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. |