



Clean Water and Sanitation

Water Usage and Care

Wastewater treatment:

(1) Sewage Treatment Plant

The sewage treatment plants available in Vel Tech Institutions are presented in Table 1.

Table1. Sewage Treatment Plants available in Vel Tech Institutions

| S.No. | STP Plant Capacity | Type of operation | Supplier | Location |
|-------|--------------------|-------------------|-------------------|----------------|
| 1 | 200KLD | Air Blower | Kubert, Chennai | Queens Hostel |
| 2 | 400KLD | Jet Aerator | RRR, Chennai | Queens Hostel |
| 3 | 400KLD | Jet Aerator | RRR, Chennai | B3 Hostel |
| 4 | 200KLD | Air Blower | ICON, Chennai | B3 Hostel |
| 5 | 400KLD | Jet Aerator | Sulaiman, Chennai | Prince Hostel |
| 6 | 400KLD | Jet Aerator | RRR, Chennai | Prince Hostel |
| 7 | 400KLD | Jet Aerator | RRR, Chennai | Leaders Hostel |

Table2. Treated Wastewater Characteristics from B3 Hostel (200 KLD)

| S.No. | Parameters | Analysis Value | TNPCB Values Maximum Permissible Limit |
|-------|--------------|----------------|--|
| 1. | pH | 7.3 | 5.5-9.0 |
| 2. | BOD | 26 mg/L | 100 mg/L |
| 3. | COD | 165 mg/L | 250 mg/L |
| 4. | TSS | NIL | 200 mg/L |
| 5. | TDS | 350 mg/L | 2100 mg/L |
| 6. | Oil & Grease | NIL | 10 mg/L |

The various treatment units are presented below.



Fig- 1. Pumping and Flow Control House

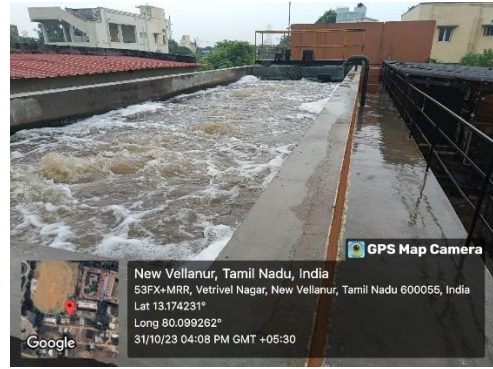


Fig- 2. Collection Tank



Fig- 3. Sand Filter and Activated Carbon

Filter



Fig- 4. Aeration Tank and Sedimentation

Tank

No 069265

PURCHASE ORDER

| | | |
|--|--|--|
| Invoice To Veluch Ranganjan Dr-Saemthala R&D Institute of Science and Technology 400 Feet Outer Ring Road, Avedi, Chennai - 600062 State Name : Tamil Nadu, Code : 33 | Voucher No. 1884/2018-19 | Dated 19-Jul-2018 |
| Supplier RRR ENVIRO SYSTEMS NO-7, 11TH CROSS STREET, DHANDEESHWARAM VELACHERY, CH-42 RRRESMD@GMAIL.COM RRRENVIROSYSTEMS.NET PIN NO-44 42020723, 9710035249 State Name : Tamil Nadu, Code : 33 | Supplier's Ref/Order No. 1884/POR-1527 | Mode/Terms of Payment 25% Rr. 388000 Other Reference(s) YOGANANDHAN |
| | Despatch through DOOR DELIVERY | Destination STP-PRINCE HOSTEL |
| | Terms of Delivery STP PLANT MATERIALS VTU PRINCE HOSTEL LED-G3.0.12 CC-PRINCE HOSTEL IMMEDIATE AFTER RECEIVING THE PO | |

| Sl No | Description of Goods and Services | VAT % | Quantity | Rate | per | Disc. % | Amount |
|-------|--|-------|-----------|-------------|-----|---------|-------------|
| 1 | BAR SCREEN MOC MS 500MMX500MM @20MM SPACE | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 2 | RAW WATER PUMP -SUBMERSIBLE FLOW 20000 LPH@3M HEAD HEAD GRINDING VERSION 2HP | NII | 2,000 NOS | 1,05,000.00 | NOS | | 2,10,000.00 |
| 3 | PIPELINE FOR RAW WATER PUMP-1 LENGTH | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 4 | BALL VALVE FOR RAW WATER PUMP | NII | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 5 | JET AERATOR MAKE -CNP HP 5HP | NII | 2,500 NOS | 1,25,000.00 | NOS | | 2,50,000.00 |
| 6 | RETURN SLUDGE PUMP MAKE:KIRLOSKAR HP-2 HPMODEL SPOM | NII | 2,000 NOS | 95,000.00 | NOS | | 1,90,000.00 |
| 7 | PIPELINE FOR RS PUMP -2LENGTH | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 8 | BUTTERFLY VALVE FOR RS PUMP | NII | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 9 | FILTER FEED PUMP HP3 HP MODEL SPOM | NII | 2,500 NOS | 1,25,000.00 | NOS | | 2,50,000.00 |
| 10 | PIPELINE FOR FF PUMP -2LENGTH | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 11 | BUTTERFLY VALVE FOR FF PUMP | NII | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 12 | PRESSURE SAND FILTER -MS VESSEL FLOW 20000 LPH | NII | 1,000 NOS | 65,000.00 | NOS | | 65,000.00 |
| 13 | MULTIPORT VALVE 2INCH | NII | 1,000 NOS | 4,500.00 | NOS | | 4,500.00 |
| 14 | FRONTAL PIPELINE -1LOT | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 15 | FILTER MEDIA - 1LOT | NII | 1,000 NOS | 1,50,000.00 | NOS | | 1,50,000.00 |
| 16 | CARBON FILTER -MS VESSEL -FLOW 20000 LPH | NII | 1,000 NOS | 68,000.00 | NOS | | 68,000.00 |
| 17 | MULTIPORT VALVE 2INCH | NII | 1,000 NOS | 6,343.00 | NOS | | 6,343.00 |
| 18 | FRONTAL PIPELINE -1LOT | NII | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 19 | FILTERING MEDIA-1 LOT | NII | 1,000 NOS | 1,50,000.00 | NOS | | 1,50,000.00 |
| 20 | CONTROL PANEL | NII | 1,000 NOS | 18,000.00 | NOS | | 18,000.00 |

continued ...

PRICE APPROVED
Sign :

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PURCHASE ORDER(Page 2)

| | | | |
|--|--|---|--|
| Invoice To Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology 400 Feet Outer Ring Road, Avadi, Chennai - 600062 State Name : Tamil Nadu, Code : 33 | | Voucher No. 1884/2018-19 | Dated 19-Jul-2018 |
| | | Mode/Terms of Payment 25% Rs.388000 | |
| | | Supplier's Ref./Order No. 1884/POR-1527 | Other Reference(s) YOGANANDHAN |
| Supplier RRR ENVIRO SYSTEMS NO-7,11TH CROSS STREET,DHANDEESHWARAM VELACHERY,CH-42 RRRESMD@GMAIL.COM RRRENVIROSYSTEMS.NET PH NO-44 42020723,9710035249 State Name : Tamil Nadu, Code : 33 | | Despatch through DOOR DELIVERY | Destination STP-PRINCE HOSTEL |
| | | Terms of Delivery STP PLANT MATERIALS VTU PRINCE HOSTEL LED:G3.0.12 CC:PRINCE HOSTEL IMMEDIATE AFTER RECEIVING THE PO | |

| Sl No. | Description of Goods and Services | VAT % | Quantity | Rate | per | Disc. % | Amount |
|--------------|--|-------|-------------------|----------|------|---------|-----------------------|
| 21 | HYPO DOSING SYSTEMS | Nil | 1.000 NOS | 8,205.00 | NOS | | 8,205.00 |
| | | | | | | | 14,01,248.00 |
| | | | | | 5 % | | 15,000.00 |
| | | | | | 12 % | | 1,24,944.60 |
| | | | | | 18 % | | 10,807.74 |
| | GST@5% GST @12% GST@18% ***** PLEASE DONT SUPPLY ANY MATERIALS TO VT WITHOUT PO & ADV ***** IF YOU DONT GET ANY PAYMENT IN 30 DAYS PLS CONT-7395986821 ***** 038505003605 ICICI BANK ICICI0000385 Less : ROUND OFF | | | | | | (-).0.34 |
| Total | | | 34.000 NOS | | | | ₹ 15,52,000.00 |

E. & O.E

Amount Chargeable (in words)
INR Fifteen Lakh Fifty Two Thousand Only

PRICE APPROVED
 Sign : *[Signature]*

for Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology

Authorised Signatory

This is a Computer Generated Document

Prince
 19.7.18

[Signature]

Nº 06926

PURCHASE ORDER

| | | |
|--|---|---|
| Invoice To Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology 400 Feet Outer Ring Road, Avadi, Chennai - 600062 State Name : Tamil Nadu, Code : 33 | Voucher No. 1879/2018-19 | Dated 19-Jul-2018 |
| | Supplier's Ref./Order No. 1879/POR-1527 | Mode/Terms of Payment 25% Rs.388000 |
| Supplier RRR ENVIRO SYSTEMS NO-7,11TH CROSS STREET,DHANDEESHWARAM VELACHERY,CH-42 RRRESMD@GMAIL.COM RRRENVIROSYSTEMS.NET PH NO-44 42020723,9710035249 State Name : Tamil Nadu, Code : 33 | Despatch through DOOR DELIVERY | Other Reference(s) PRABHAKARAN |
| | Destination STP-LEADERS HOSTEL | |
| Terms of Delivery STP PLANT MATERIALS LEADERS HOSTEL REQ LED:G3.0.12 CC:LEADERS HOSTEL IMMEDIATE AFTER RECEIVING THE PO | | |

| Sl No. | Description of Goods and Services | VAT % | Quantity | Rate | per | Disc. % | Amount |
|--------|--|-------|-----------|-------------|-----|---------|-------------|
| 1 | BAR SCREEN MOC MS 500MMX500MM @20MM SPACE | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 2 | RAW WATER PUMP -SUBMERSIBLE FLOW 20000 LPH@3M HEAD HEAD GRINDING VERSION 2HP | Nil | 2,000 NOS | 1,05,000.00 | NOS | | 2,10,000.00 |
| 3 | PIPELINE FOR RAW WATER PUMP-1 LENGTH | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 4 | BALL VALVE FOR RAW WATER PUMP | Nil | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 5 | JET AERATOR MAKE -CNP HP 5HP | Nil | 2,000 NOS | 1,25,000.00 | NOS | | 2,50,000.00 |
| 6 | RETURN SLUDGE PUMP MAKE:KIRLOSKAR HP-2 HPMODEL SPOM | Nil | 2,000 NOS | 95,000.00 | NOS | | 1,90,000.00 |
| 7 | PIPELINE FOR RS PUMP -2LENGTH | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 8 | BUTTERFLY VALVE FOR RS PUMP | Nil | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 9 | FILTER FEED PUMP HP3 HP MODEL SPOM | Nil | 2,000 NOS | 1,25,000.00 | NOS | | 2,50,000.00 |
| 10 | PIPELINE FOR FF PUMP -2LENGTH | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 11 | BUTTERFLY VALVE FOR FF PUMP | Nil | 4,000 NOS | 600.00 | NOS | | 2,400.00 |
| 12 | PRESSURE SAND FILTER -MS VESSEL FLOW 20000 LPH | Nil | 1,000 NOS | 65,000.00 | NOS | | 65,000.00 |
| 13 | MULTIPORT VALVE 2INCH | Nil | 1,000 NOS | 4,500.00 | NOS | | 4,500.00 |
| 14 | FRONTAL PIPELINE -1LOT | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 15 | FILTER MEDIA - 1LOT | Nil | 1,000 NOS | 1,50,000.00 | NOS | | 1,50,000.00 |
| 16 | CARBON FILTER -MS VESSEL -FLOW 20000 LPH | Nil | 1,000 NOS | 68,000.00 | NOS | | 68,000.00 |
| 17 | MULTIPORT VALVE 2INCH | Nil | 1,000 NOS | 6,343.00 | NOS | | 6,343.00 |
| 18 | FRONTAL PIPELINE -1LOT | Nil | 1,000 NOS | 4,000.00 | NOS | | 4,000.00 |
| 19 | FILTERING MEDIA-1 LOT | Nil | 1,000 NOS | 1,50,000.00 | NOS | | 1,50,000.00 |
| 20 | CONTROL PANEL | Nil | 1,000 NOS | 18,000.00 | NOS | | 18,000.00 |

continued ...

P. Neelesh
19.7.18

PRICE APPROVED

Sign : *[Signature]*

PURCHASE ORDER(Page 2)

| | | |
|--|---|---|
| Invoice To Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology 400 Feet Outer Ring Road, Avadi, Chennai - 600062 State Name : Tamil Nadu, Code : 33 | Voucher No. 1879/2018-19 | Dated 19-Jul-2018 |
| | | Mode/Terms of Payment 25% Rs.398000 |
| | Supplier's Ref./Order No. 1879/POR-1527 | Other Reference(s) PRABHAKARAN |
| Supplier RRR ENVIRO SYSTEMS NO-7,11TH CROSS STREET,DHANDEESHWARAM VELACHERY,CH-42 RRRESMD@GMAIL.COM RRRENVIROSYSTEMS.NET PH NO-44 42020723,9710035249 State Name : Tamil Nadu, Code : 33 | Despatch through DOOR DELIVERY | Destination STP-LEADERS HOSTEL |
| | Terms of Delivery STP PLANT MATERIALS LEADERS HOSTEL REQ LED:G3.0.12 CC:LEADERS HOSTEL IMMEDIATE AFTER RECEIVING THE PO | |

| SI No. | Description of Goods and Services | VAT % | Quantity | Rate | per | Disc. % | Amount |
|--------|---|-------|-------------------|----------|------|---------|-----------------------|
| 21 | HYPO DOSING SYSTEMS | Nil | 1,000 NOS | 8,205.00 | NOS | | 8,205.00 |
| | | | | | | | 14,01,248.00 |
| | GST@5% | | | | 5 % | | 15,000.00 |
| | GST @12% | | | | 12 % | | 1,24,944.60 |
| | GST@18% | | | | 18 % | | 10,807.74 |
| | ***** PLEASE DONT SUPPLY ANY MATERIALS TO VT WITHOUT PO & ADV - IF YOU DONT GET ANY PAYMENT IN 30 DAYS PLS CONT-7395966821 ***** 038505003605 ICICI BANK ICICI0000385 Less : ROUND OFF | | | | | | |
| | | | | | | | (-)-0.34 |
| | Total | | 34,000 NOS | | | | ₹ 15,52,000.00 |

Amount Chargeable (in words) **INR Fifteen Lakh Fifty Two Thousand Only** E. & O.E

9 Feb 19/7/18
PRICE APPROVED
 Sign: *[Signature]*
 for Veltech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology
 Authorised Signatory

INVOICE

RRR ENVIRO SYSTEMS

No 7, 11 th Cross Road, Dhandeeshwaram, Velachery, Chennai- 600042.Tamilnadu India.

Ph. +91 44 42020723,

GSTIN : 33DETPS6320P1ZO

| | |
|-----------------------------|-----------------------------|
| Invoice No. : RRR /19-20/89 | Transportation Mode : |
| Invoice Date : 02.10.2019 | Vehicle Number : |
| State : Tamilnadu | Date of Supply : 25.06.2019 |
| State Code : 33 | Place of supply : Chennai |

| | |
|---|---|
| Details of Receiver Billed to: | Details of Consignee Ship To |
| Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 |

Page No : 87

| S. No | Name of Product / Service | HNS ACS | QTY | Rate | Amount (Rs) | CGST | | SGST | | Total (Rs) |
|-------|---|---------|-------|----------|--------------|-----------|--------------|----------|--------------|-------------|
| | | | | | | Rate (%) | Amount (Rs) | Rate (%) | Amount (Rs) | |
| 1 | Bar Screen MOC MS 600 mm X 600 mm @20 mm | 8421 | 1 nos | 2,500 | 2,500 | 9% | 225 | 9% | 225 | 2950.00 |
| 2 | Raw water Pump Submersible Flow 20,000 LPH @3 M head - 2 HP | 8413 | 2 nos | 20,000 | 40,000 | 6% | 2400 | 6% | 2400 | 44,800.00 |
| 3 | Pipeline For Raw Water Pump - 1 length | 3917 | 1 nos | 4,000 | 4,000 | 9% | 360 | 9% | 360 | 4,720.00 |
| 4 | JET Aerator Make CNP HP - 5 HP | 8413 | 2 nos | 20,000 | 40,000 | 6% | 2400 | 6% | 2400 | 44800.00 |
| 5 | Ball Valve For Raw Water Pump | 8481 | 4 nos | 150 | 600 | 9% | 54 | 9% | 54 | 708.00 |
| 6 | Return Sludge Pump Make : Kirloskar HP -2 HP Model SPOM | 8413 | 2 nos | 20,000 | 40,000 | 6% | 2400 | 6% | 2400 | 44800.00 |
| 7 | Pipeline For RS Pump - 2 length | 3917 | 1 nos | 2,000 | 2,000 | 9% | 180 | 9% | 180 | 2360.00 |
| 8 | Butterfly valve for RS Pump | 8481 | 4 nos | 150 | 600 | 9% | 54 | 9% | 54 | 708.00 |
| 9 | Filter Feed Pump Make : Kirloskar HP -3 HP Model SPOM | 8413 | 2 nos | 20,000 | 40,000 | 6% | 2400 | 6% | 2400 | 44800.00 |
| 10 | Pipeline For FF Pump - 2 length | 3917 | 1 nos | 4,000 | 4,000 | 9% | 360 | 9% | 360 | 4720.00 |
| 11 | Butterfly valve for FF Pump | 8481 | 4 nos | 150 | 600 | 9% | 54 | 9% | 54 | 708.00 |
| 12 | Pressure Sand Filter - MS Vessel , flow 20000 LPH | 8413 | 1 nos | 35,000 | 35,000 | 6% | 2100 | 6% | 2100 | 39200.00 |
| 13 | Multiport Valve - 2 inch Frontal Pipeline -1 lot | 8421 | 1 nos | 4,000 | 4,000 | 9% | 360 | 9% | 360 | 4720.00 |
| 14 | Filter media - 1 lot | 3917 | 1 nos | 5,000 | 5,000 | 9% | 450 | 9% | 450 | 5900.00 |
| 15 | Carbon Filter - MS Vessel , flow 20000 LPH | 2517 | 1 nos | 5,50,000 | 550,000 | 2.5% | 13750 | 2.5% | 13750 | 8,77,500.00 |
| 16 | Multiport Valve - 2 inch Frontal Pipeline -1 lot | 8413 | 1 nos | 35,000 | 35,000 | 6% | 2100 | 6% | 2100 | 39200.00 |
| 17 | Multiport Valve - 2 inch Frontal Pipeline -1 lot | 8421 | 1 nos | 4,000 | 4,000 | 9% | 360 | 9% | 360 | 4720.00 |
| 18 | Filter media -1 lot | 3917 | 1 nos | 5,000 | 5,000 | 9% | 450 | 9% | 450 | 5900.00 |
| 19 | Control Panel | 2517 | 1 nos | 493,000 | 493,000 | 2.5% | 12325 | 2.5% | 12325 | 517650.00 |
| 20 | Hypo Dosing Systems | 8537 | 1 nos | 6,000 | 6,000 | 9% | 540 | 9% | 540 | 7080.00 |
| 21 | | 2517 | 1 nos | 1958 | 1958 | 2.5% | 48.95 | 6% | 48.95 | 2056.00 |
| | | | | | 34 nos | 13,13,258 | 43371 | 43371 | 14,00,000.00 | |

| | | |
|---|--------------------------------|--------------|
| Total Invoice Amount in Words: Indian rupee Fourteen lakhs Only | Total Amount Before Tax | 1313258.00 |
| | Add : CGST | 43371.00 |
| | Tax Amount : SGST | 43371.00 |
| | Total Amount After Tax | 14,00,000.00 |

| | | |
|---|---|--|
| Declaration Goods once sold will not be back or exchanged, subject to Chennai jurisdiction only. E. & O.E Name: <u>Dr. P. Sivaraman</u> Sign: <u>[Signature]</u> Date: <u>25/10/19</u> | Receiver Signature <u>[Signature]</u> Stock Book No: 087 | Certified that the particulars given above are true and correct For RRR ENVIRO SYSTEMS- (2019-20) Chennai - 42 Authorized Signatory |
|---|---|--|

STP Incharge

DELIVERY CHALLAN

STP Plant

| | | |
|---|---|---|
| RRR ENVIRO SYSTEMS No 7, 11 th Cross Road, Dhandeeshwaram, Velachery, Chennai- 600042 Tamilnadu India. Ph. +91 44 42020723, E-mail-rrrenvirosystem@gmail.com GSTIN : 33DETPS6320P1Z0 | Delivery challan No RRRES/GST-DC/84/2019-20 | Dated 25.06.2019 |
| | Delivery Note/ site Prince hostel | Mode/ terms of payment 25 % against delivery |
| | Supplier's Ref. 1884/POR-1527 | Other reference(s) Yoganandhan |
| | Details of Receiver Billed to: | |
| Details of Consignee Ship To | | |
| Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | | Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 |
| TERM OF DELIVERY - VTU PRINCE HOSTEL CC.PRINCE HOSTEL | | |

| SI | Description of Goods | Quantity | Amount |
|-------|--|-------------|--------------|
| 1 | Raw water Pump Submersible Flow 20,000 LPH @3 M head grinding version 2 HP | 2.000 NOS ✓ | 11,000,00.00 |
| 2 | JET Aerator Make CNP HP – 5 HP | 2.000 NOS ✓ | |
| 3 | Pipeline For Raw Water Pump - 1 length | 1.000 NOS ✓ | |
| 4 | Ball Valve For Raw Water Pump | 4.000 NOS ✓ | |
| 5 | Return Sludge Pump Make : Kirloskar HP -2 HP Model SPOM | 2.000 NOS ✓ | |
| 6 | Pipeline For RS Pump - 2 length | 1.000 NOS ✓ | |
| 7 | Butterfly valve for RS Pump | 4.000 NOS ✓ | |
| 8 | Filter Feed Pump Make : Kirloskar HP -3 HP Model SPOM | 2.000 NOS ✓ | |
| 9 | Pipeline For FF Pump - 2 length | 1.000 NOS ✓ | |
| 10 | Butterfly valve for FF Pump | 4.000 NOS ✓ | |
| 11 | Frontal Pipeline -1 lot | 1.000 NOS ✓ | |
| 12 | Frontal Pipeline -1 lot | 1.000 NOS ✓ | |
| 13 | Control Panel | 1.000 NOS ✓ | |
| 14 | Hypo Dosing Systems | 1.00 NOS ✓ | |
| Total | | 27.000 Nos | 11,000,00.00 |

Amount Chargeable (in Words) E. & O.E.
 INR eleven lakhs Only

| | | | |
|---|-----------------|--------------------|------------------------|
| Company's GSTIN | 33DETPS6320P1Z0 | Receiver Signature | For RRR ENVIRO SYSTEMS |
| Buyer's GSTIN | Trust - NA | | |
| Declaration Goods once sold will not be back or exchanged subject to Chennai Jurisdiction only E. & O.E. | | | |

Name: Dr. S. Suresh : ngi2
 Sign: [Signature] : Date
 Date: 25/06/19
 STP Incharge

4881
 4875149
 1884/POR-1527


DELIVERY CHALLAN

| RRR ENVIRO SYSTEMS No 7, 11 th Cross Road, Dhandeeswaram, Velachery, Chennai- 600042 Tamilnadu India. Ph. +91 44 42020723, E-mail- rrenvirosystem@gmail.com GSTIN : 33DETPS6320P1ZO | | Delivery challan No RRRES/GST-DC/85/2019-20 Dated 16.08.2019 Delivery Note/ site Prince hostel Mode/ terms of payment 25 % against delivery Supplier's Ref. 1884/POR-1527 Other reference(s) Yoganandhan | |
|--|--|---|--|
| Details of Receiver Billed to: | | Details of Consignee Ship To | |
| Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | | Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | |
| TERM OF DELIVERY - VTU PRINCE HOSTEL CC.PRINCE HOSTEL | | | |
| SI | Description of Goods | Quantity | Amount |
| 1 2 3 4 | Filter media - 1 LOT Filter media - 1 LOT LIST OF MEDIA Pebbles 1 1/2" X 1" - 30 bag ✓ Pebbles 1" X 3/4" - 30 bag ✓ Pebbles 3/4" X 1/2" - 30 bag ✓ Gravels - 30 bag ✓ Coarse sand - 35 bag ✓ Fine sand - 20 bag ✓ Activated carbon - 500 kg ✓ Multiport valve 2 inch Multiport valve 2 inch | 1,000 NOS 1,000 NOS 1,000 NOS 1,000 NOS | 2,10,000.00 (approximately) Total 4,000 Nos 2,10,000.00 |
| Amount Chargeable (in Words) | | | E. & O.E. |
| INR Two lakhs ten thousand Only | | | |
| Company's GSTIN | 33DETPS6320P1ZO | Receiver Signature | For RRR ENVIRO SYSTEMS |
| Buyer's GSTIN | Trust - NA |  Authorized signatory | |
| Declaration Goods once sold will not be back or exchanged. subject to Chennai Jurisdiction only E. & O.E | | | |

Name: Dr. D. Divakaran
 Sign: [Signature]
 Date: 25/10/19
 STP Incharge

1884/POR-1527
 16.08.2019
 Prince Hostel
 Vel Tech Rangarajan Dr. Sagunthala R&D Institute
 of Science and Technology
 Chennai - 600062

DELIVERY CHALLAN

| | | | |
|--|--|--|---|
| RRR ENVIRO SYSTEMS No 7, 11 th Cross Road, Dhandeeswaram, Velachery, Chennai- 600042 Tamilnadu India. Ph. +91 44 42020723, E-mail- rrrenvirosystem@gmail.com GSTIN : 33DETPS6320P1ZO | | Delivery challan No RRRES/GST-DC/86/2019-20 Dated 31.08.2019 | |
| Delivery Note/ site Prince hostel | | Mode/ terms of payment 25 % against delivery | |
| Supplier's Ref. 1884/POR-1527 | | Other reference(s) Yoganandhan | |
| Details of Receiver Billed to: | | Details of Consignee Ship To | |
| Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | | Name : Vel tech rangarajan dr.sagunthala r&d institute of science and technology 400 feet , outer Ring road Avadi, Chennai -600062 Chennai -600 062 GSTIN : NA State : Tamilnadu PO No : 1884/2018-19 date : 19-JUL-2018 | |
| TERM OF DELIVERY - VTU PRINCE HOSTEL CC.PRINCE HOSTEL | | | |
| SI | Description of Goods | Quantity | Amount |
| 1 | Bar screen MOC MS 500 mm x 500 mm @25 mm space | 1.000 NOS | 90,000.00 (approximately) |
| 2 | Pressure sand filter – MS VESSEL – FLOW 20000 LPH | 1.000 NOS | |
| 3 | Activated carbon filter – MS VESSEL – FLOW 20000 LPH | 1.000 NOS | |
| Total | | 3 .000 Nos | 90,000.00 |
| Amount Chargeable (in Words) INR ninety thousand Only | | | E. & O.E. |
| Company's GSTIN 33DETPS6320P1ZO | | Receiver Signature | For RRR ENVIRO SYSTEMS  Authorized Signatory |
| Buyer's GSTIN Trust – NA | | | |
| Declaration Goods once sold will not be back or exchanged. subject to Chennai Jurisdiction only E. & O.E | | | |

89

Vel Tech

Name: Dr. D. Sivakumar

Sign: [Signature]

Date: 25/10/19

Vel Tech

Name: [Signature]

Sign: [Signature]

Date: [Signature]

STP Incharge

Date: 25/10/19

Signature: [Signature]

Name: [Signature]

Sign: [Signature]

Date: [Signature]

REPORT ON SEWAGE TREATMENT PLANT

INTRODUCTION

Rivers constitute a major source of water in most countries of the world for both domestic and industrial purposes. After use, the water eventually returns to the river or is discharged to sea; typical dry weather flow can be as high as 500 litres per person per day. In large populated areas, discharges occur at many different locations along the length of a river, affecting the condition of the subsequent water abstracted downstream. Although the natural biological action of aquatic micro-organisms tends to decompose chemical pollutants discharged into rivers, the current demand on the limited supplies and the time available is often insufficient. Therefore, some method of purifying the effluent is required. Sewage discharged out to sea is eventually treated by similar natural biological action, but greater dilution and tidal flows normally quickly disperse the polluting effects. Generally, a plant treating water after an industrial process is termed an Industrial Effluent Plant. A Sewage Treatment Plant (or Municipal Waste Water Treatment Plant) may treat some industrial effluent, but their main function is the treatment of domestic effluent (sewage). Responsibility for sewage treatment is generally undertaken by the Local Authority or Water Company. Local legislation exists in most parts of the world to oblige operators of these treatment plants to conform to local legislation on final sewage discharge quality; others may be governed by those standards recommended by the World Health Organization (WHO) guidelines.

All new sewage treatment plants incorporate automatic chemical monitoring and control instrumentation. Many existing plants are being improved or extended and will be similarly equipped. This Technical Note provides background information on the processes involved in sewage treatment before final discharge and outlines the analytical instrumentation employed.

GENERAL

As already stated, the sewage treatment plant receives raw domestic sewage and some industrial effluent containing many toxic chemicals. The most common is ammonia (NH₃), usually in very high concentrations. The levels of toxic substances are significantly increased by the anaerobic conditions (covered later) in the network of pipes transporting the raw sewage to the plant. The plant carries out the necessary treatment process to produce water safe for direct discharge into the river or sea – see Fig 1.

The basis of sewage treatment in most treatment plants is enhanced natural biological action and,

rarely, chemical treatment. By providing optimum conditions, raw sewage is broken down into non-toxic substances by microorganisms. Chemical

Treatment is expensive and impractical for most applications due to the large volumes and relativity of large dilutions involved. Normally, it is only considered when dealing with industrial effluents in high concentrations.

However, some industries have their effluent treatment plant based on biological processes. Sewage treatment plants tend to conform to the same basic treatment processes. However, they can differ depending on the nature of the effluent (i.e. floating material, suspended and dissolved solids), concentrations of **various** chemicals, the relatively dry and wet weather flows, and the legislation governing the treated sewage discharges.

Sewage Treatment Process

There are four main stages of treatment in a typical sewage treatment plant, but the design or layout can vary from site to site. These plants are categorised into one of three types based on the method of secondary treatment, i.e. Biological Filter, Activated Sludge, and Pasveer Ditch.

1. Primary Treatment

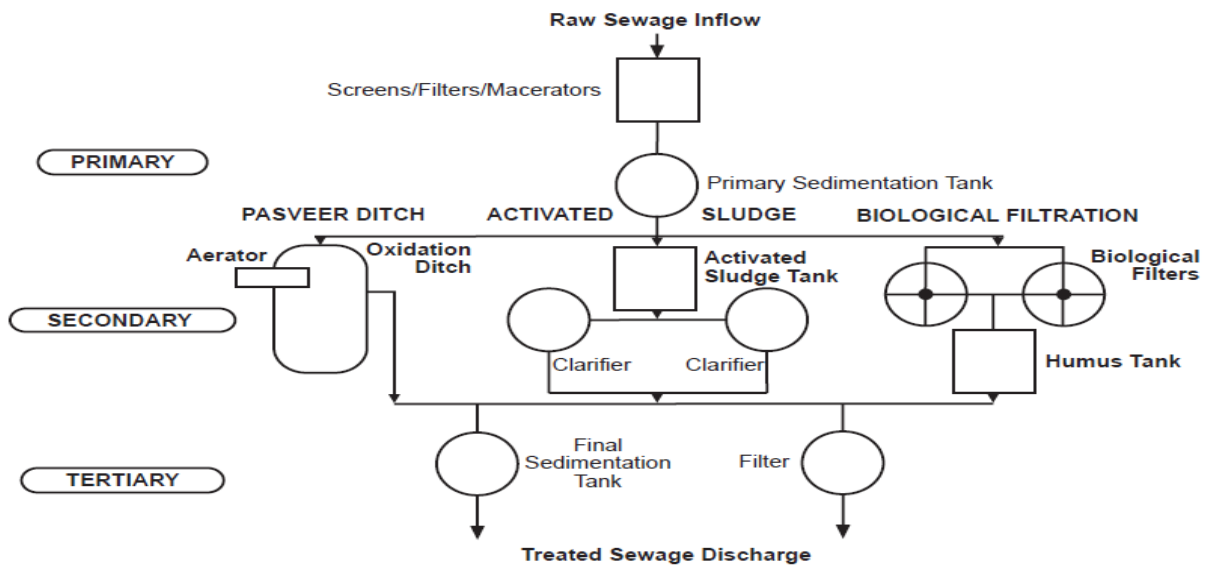
It is essential to remove large solids, e.g. road grit and silt, from the raw sewage to prevent mechanical damage or blockages to pumps, valves, channels, and orifices. The initial stage of the Primary Treatment includes a settling channel or tank, known as Grit Removal, followed by screening to remove floating and large organic material. Coarse screens, generally bars with 6mm spacing, are followed by fine screens and drum filters. Screening may be combined with maceration, which involves shredding the raw sewage and crushing the solids into tiny particles.

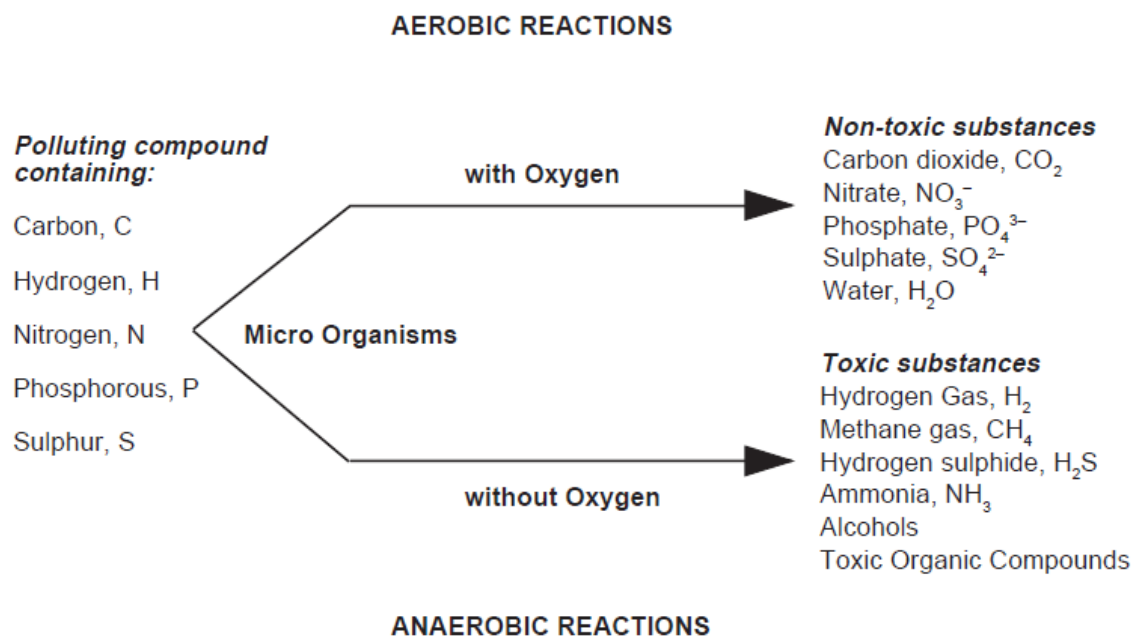
The screened sewage is then passed to a further tank called Sedimentation to settle the bulk of the suspended matter. Colloidal and dissolved solids are not removed and require further treatment at the Secondary Treatment stage.

2. Secondary Treatment

Biological Reactions

The sewage consists of toxic chemicals, both organic and inorganic. Organic waste, containing carbon, combined with other chemical elements, is broken down by biological processes. This involves developing a culture of bacteria and other micro-organisms, which multiply and feed on the chemical substances in the sewage in the presence of sufficient oxygen. Oxidation of the ammonia, for example, results in the conversion to nitrogen compounds, such as nitrite (NO_2^-), and with further oxidation, to nitrate (NO_3^-). This reaction is termed nitrification. Inorganic chemicals can also be treated, to a lesser extent, by biological action, but they may require some chemical treatment. If the process is carried out correctly, the net result is treated sewage with a shallow toxicity level suitable for final discharge. The growth of the population of microorganisms is determined by the availability of nutrients (provided by the raw sewage), temperature, pH, and (most importantly) dissolved oxygen. Optimum conditions vary according to the species but are approximately 25 to 32°C, 5.5 to 9.5pH, and 2mg/l, respectively.





Typical biochemical reactions produced by the action of micro-organisms on sewage are shown in Fig. 3. Both the Biological filter and the Pasveer Ditch systems tend to be used on smaller, rural treatment plants. However, activated sludge treatment is employed in most modern plants throughout the world.

Biological Filtration

This consists of a large circular tank or series of tanks containing stone or plastic pieces, sprayed with the screened sewage by a mechanical rotating arm moving over the bed's surface. The medium is sufficiently loose to allow the liquid to permeate it and provide free air access. A thin film of microorganisms is then supported on the bed, which provides biological decomposition of the sewage. The nature of the medium is critical to ensure an adequate retention time for maximum efficiency. The liquid leaving the bed passes to further settling or humus tanks, where residual solids collect and are withdrawn periodically for sludge disposal. Although this system has been in common use since the early 1900s, the disadvantage of the biological filter is mainly due to difficulties in control with variation in flow and concentration of the sewage and its unsuitability for large-scale treatment.

Activated Sludge

The activated sludge method, first instigated in 1914, involves developing a culture of bacteria and other organisms in a large tank and on lanes containing the settled sewage. Oxygen in the form of air or pure oxygen is forced into the sewage by mechanical means to sustain the oxidation process. More sludge is made every day than is needed to continue the process, so the surplus is pumped to the Sludge Treatment stage. The oxygen required for efficient oxidation is provided by one of two methods:

Mechanical Aeration.

Agitators are used on the surface of the tanks; the rate of aeration can be controlled by varying the speed or depth of immersion of the agitator, see Fig 4. In practice, many parallel lanes are often used with one or more agitators in each lane.



ii. Air / Oxygen Diffusion. Oxidation is achieved using perforated pipes or domes called diffusers positioned in the base of the tanks. Air or pure oxygen from compressors is pumped through these diffusers, producing small bubbles in the sewage, providing very efficient oxidation – see Fig 5. The oxidation rate is then controlled by varying the speed of the compressors.

Pasveer Ditch

This system was developed only in 1953 and is more widely employed in main land Europe than in the UK and the rest of the world. It consists of an oval-shaped

channel, approximately 2 to 3 metres deep, into which sewage is passed after primary treatment. Based on the same biological processes as in activated sludge, the sewage is aerated and circulated around the ditch by means of one or more rotors mounted at different points around the ditch. The depth of immersion and speed of rotation are adjusted to suit the oxygen demand of the sewage. The effluent is recirculated until adequate aeration is achieved before being passed to the settling tank for tertiary treatment. One variation of the oval Pasveer Ditch design is an arrangement where the ditch is constructed as one long channel, often in a zigzag layout, to save space. Rotors are used the same way to aerate and propel the sewage along the ditch as the biological process occurs.

Aeration/Oxidation control

In the case of the Activated Sludge and Pasveer Ditch, the volume of air or oxygen required to treat sewage is large. By measuring the dissolved oxygen in the aeration/ oxidation lanes, careful control is kept of the volumes produced, limiting the value to around 2mg/l in the sewage sludge. This is sufficient for the degree of treatment required and ensures that complete nitrification of the ammonia is achieved – see Fig 6.



3. Tertiary Treatment

Treated sewage from the secondary treatment is passed for final clarification or filtration before discharge to the river or sea. The clarifier is a settling tank similar to that used for primary treatment and may be followed by a polishing filter.

4. Sludge Treatment

The total recovered solids from the grit traps, screens, filters, surplus-activated sludge, and settling tanks are passed periodically to the Sludge Treatment Plant. The sludge on older plants may be passed to large lakes or lagoons, from which the water is run off or evaporated slowly. The remaining solids are buried, burned, or sold as fertilizer. Current practice involves dewatering the sludge with filters before being passed on to digesters. Here, anaerobic microorganisms flourish in warm conditions, breaking sludge into inorganic solids and methane gas. This gas can provide power for electricity generation to use on the site.

Phosphate and Nitrate Reduction

More complex activated sludge plants precede the aeration/oxidation stage with phosphate and nitrate reduction stages. All three stages are normally carried out in long partitioned lanes. The sewage flows over or under these partition walls from one stage to the next – see Fig 7. Phosphate reduction is carried out to reduce phosphate levels in the final sewage-treated effluent. It is achieved by adding Ferric Sulphate – $\text{Fe}_2(\text{SO}_4)_3$ to the sewage, causing the phosphate to coagulate with the ferric. This forms a sludge that can be quickly settled and passed on to the Sludge Treatment stage. To better control the aeration stage of the treatment process, some plants (pioneered in Germany) employ an anaerobic pretreatment stage. One effect of a pretreatment stage is reducing the nitrate levels found in the raw sewage. The reduction of nitrate provides a means of measuring the anaerobic process, resulting in effective control. The anaerobic conditions consume the oxygen bound up in the ions (NO_3^-), releasing nitrogen gas into the atmosphere. Methanol is added to the process as a nutrient to increase bacteria activity. Some treatment plants may reduce nitrate after the aeration/oxidation stage to reduce the nitrate levels in the final treated sewage.



Instrumentation

Instrumentation on sewage plants depends on the plant size and the type of control required. Automatic monitoring and control instrumentation must be used to ensure that the optimum process conditions are maintained, and its use becomes essential with introducing more stringent controls on discharge into water courses –see Table 1. As well as improving the control and the final sewage effluent quality from the plant, operating costs can also be significantly reduced. As already stated, Dissolved Oxygen monitors are essential to provide optimum control of the aeration/oxidation stage of the treatment process. By incorporating careful control, substantial savings in electricity costs can be achieved. Even on small treatment plants, significant savings can be achieved by careful control.

Ammonia monitors are installed on the final effluent stream to ensure the discharge limits have been met and indicate the process efficiency. However, if phosphate or nitrate reduction is employed, this again requires process monitoring and control. Suspended Solids monitors are invaluable throughout the plant to indicate load, efficiency and correct operation of each process stage. pH is often used to monitor the raw sewage to guard against acidic or alkaline effluent entering the plant, which could upset or, in severe circumstances, kill the microorganisms used to carry out biological reactions. pH and conductivity systems could also be employed to monitor particular treatment processes. Biological Oxygen Demand (BOD), which gives an indication of the amount of organic matter entering the

plant, is normally measured in the laboratory, but online analyzers are becoming more common.

Table 2: Typical Measurement Points

| Stage in the plant | Measurement | Purpose |
|--------------------|---|---|
| Primary | pH & Conductivity. Suspended solids | To protect the process from unacceptable industrial discharges |
| | Ammonia & suspended solids. | To monitor plant loading. |
| | Suspended solids | To monitor discharge from settling tanks |
| Secondary | Dissolved Oxygen & Ammonia | To control aeration/oxidation |
| | Phosphate & Nitrate | To monitor removal process, if these stages are incorporated into the design of the plant |
| Tertiary | Suspended solids | To monitor discharge from sedimentation tanks and filtration. |
| | Ammonia, Nitrate, Phosphate & Suspended solids, BOD | To monitor the performance of the plant and the final treated sewage quality |

Other Treatment Options

New pollution problems have placed additional burdens on wastewater treatment systems. Today’s pollutants, such as heavy metals, chemical compounds, and toxic substances, are more difficult to remove from water. Rising demands on the water supply only aggravate the problem. The increasing need to reuse water calls for better wastewater treatment. These challenges are being met through better methods of removing pollutants at treatment plants or preventing pollution at the source. Pretreatment of industrial waste, for example, removes many troublesome pollutants at the beginning, not the end, of the pipeline. New methods for removing pollutants are being developed to return more usable water to

receiving lakes and streams. Advanced waste treatment techniques in use or under development range from biological treatment capable of removing nitrogen and phosphorus to physical-chemical separation techniques such as filtration, carbon adsorption, distillation, and reverse osmosis. These wastewater treatment processes, alone or in combination, can achieve almost any degree of pollution control desired; Waste effluents purified by such treatment can be used for industrial, agricultural, or recreational purposes or even drinking water supplies.

Therefore, sewage treatment is usually confined to secondary treatment only. Well, various physical, chemical and biological processes are available for treatment, depending upon the particular requirements. The choice of treatment methods depends on several factors, including the disposal facilities available. Actually, the disinfection between primary, secondary and tertiary treatment is rather arbitrary since many modern treatment methods incorporate physical, chemical and biological processes in the same operation.

Sewage Treatment Plant Details

| S.No. | Plant Capacity | Location | Quantity of Water Usage KLD* |
|--------------|----------------|----------------|------------------------------|
| 1 | 200KLD–Plant1 | B-3Hostel | 170 |
| 2 | 400KLD–Plant2 | B-3Hostel | 370 |
| 3 | 200KLD–Plant1 | Ladies Hostel | 170 |
| 4 | 400KLD–Plant2 | Ladies Hostel | 380 |
| 5 | 400KLD–Plant1 | Prince Hostel | 380 |
| 6 | 400KLD–Plant2 | Prince Hostel | 390 |
| 7 | 400KLD–Plant1 | Leaders Hostel | 370 |
| Total | | | 2500 KLD |

* Quantity varies as per season; these values are the utmost outcome.

The water consumed is 250 KLD (10 % of wastewater generation).The total Water Used is 2500 KLD.

The Flow Chart of Treatment System

A typical flow chart of wastewater treatment systems for all plants is presented in the figure below.

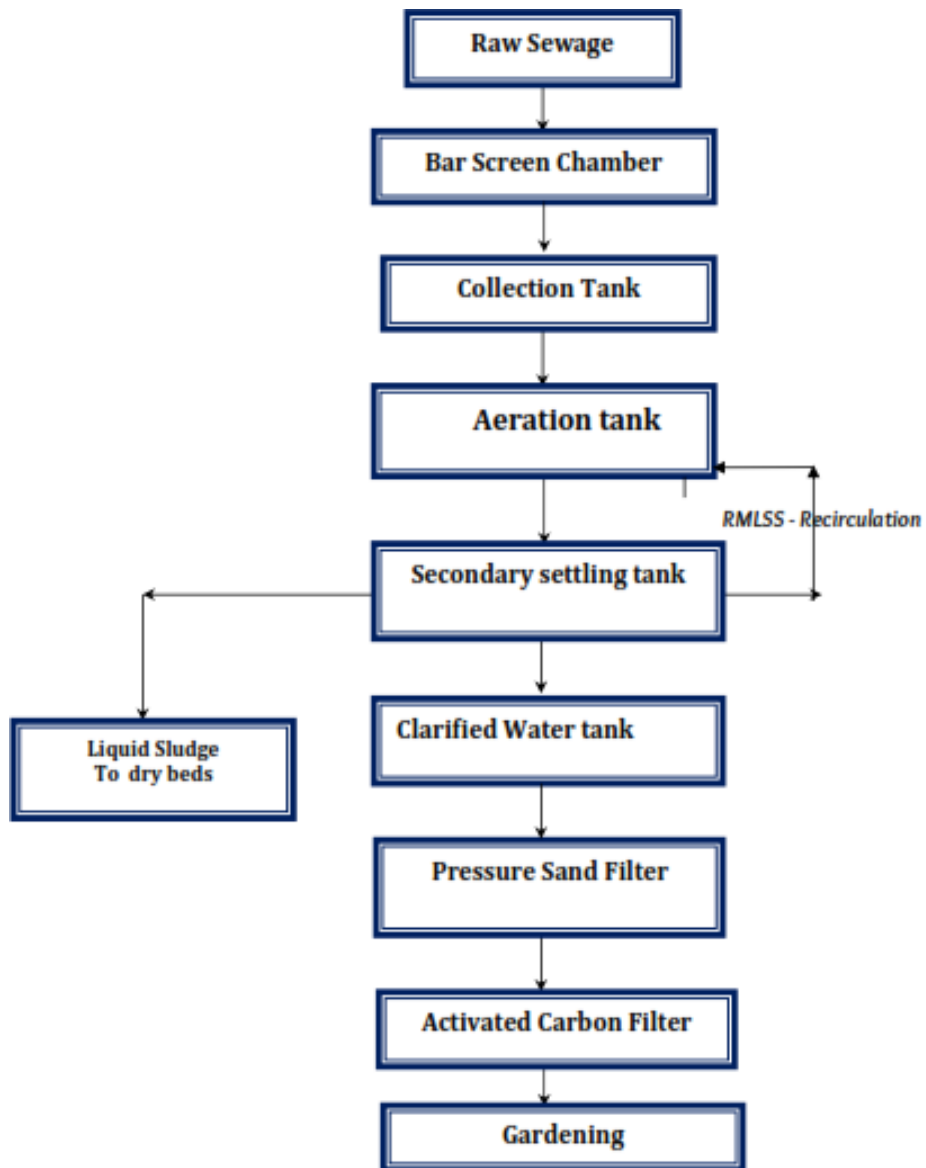


Fig- 5. A typical flow chart of a wastewater treatment system

Equipment Details

The equipment specifications and quantity available are presented in the following Tables.

Table: The equipment specifications and available quantity for 200 KLD of B-3 Hostel and Ladies Hostel

| S. No. | Specification | Quantity |
|--------|--|----------|
| 1 | Bar Screen | 1 |
| 2 | Raw Water Pump | 1 |
| 3 | Pipeline for Raw Water Pump | 1 |
| 4 | Ball Valve for Raw Water Pump | 4 |
| 5 | Aerator | 2 |
| 6 | Return Sludge Pump | 2 |
| 7 | Blower | 2 |
| 8 | Filter Feed Pump | 2 |
| 9 | Pressure Sand Filter-MS Vessel, flow 10000 LPH | 1 |
| 10 | Filtering Media-1lot | 1 |
| 11 | Carbon Filter-MS Vessel, flow 20000 LPH | 1 |
| 12 | Control Panel | 1 |
| 13 | Hypo Dosing Systems | 1 |

Table: The equipment specifications and available quantity for 400 KLD of B3 Hostel, Ladies Hostel, Prince Hostel and Leaders Hostel

| S.No. | Specification | Quantity |
|-------|--|----------|
| 1 | Bar Screen-MOC: MS 500mm x 500MM @ 20mm Space | 1 |
| 2 | Raw Water Pump– Submersible Flow 20,000 LPH @ 3m head Grinding Version-2HP | 1 |
| 3 | Pipeline for Raw Water Pump-1length | 1 |
| 4 | Ball Valve for Raw Water Pump | 4 |
| 5 | Jet Aerator Make: CNPHP5HP | 2 |
| 6 | Return Sludge Pump Make: Kirloskar HP -2HP Model SPOM | 2 |

| S.No. | Specification | Quantity |
|--------------|--|-----------------|
| 7 | Pipeline for RS Pump-2length | 1 |
| 8 | Butterfly Valve for RS Pump | 4 |
| 9 | FilterFeedPumpMake:KirloskarHP-3HPModel | 2 |
| 10 | SPOM | |
| 11 | Pipeline for FF Pump -2 length | 1 |
| 12 | Butterfly Valve for FF Pump | 4 |
| 13 | Pressure Sand Filter-MS Vessel, flow20000 LPH | 1 |
| 14 | Multiport Valve-2inch | 1 |
| 15 | Frontal Pipeline-1lot | 1 |
| 16 | Filtering Media-1lot | 1 |
| 17 | Carbon Filter-MS Vessel, flow 20000 LPH | 1 |
| 18 | Multiport Valve-2inch | 1 |
| 19 | Frontal Pipeline-1 lot | 1 |
| 20 | Filtering Media-1 lot | 1 |
| 21 | Control Panel | 1 |
| 22 | Hypo Dosing Systems | 1 |

Raw Wastewater Characteristics

Table: Raw Wastewater Characteristics from B3 Hostel and Ladies Hostel(200KLD)

| S.No. | Parameter | Analysis Value B3 Hostel | Analysis Value Ladies Hostel |
|-------|------------|--------------------------|------------------------------|
| 1 | pH | 8.0 | 8.1 |
| 2 | Alkalinity | 287mg/l | 345mg/l |
| 3 | Hardness | 394mg/l | 368mg/l |
| 4 | Chloride | 425mg/l | 416mg/l |
| 5 | BOD | 765mg/l | 858mg/l |
| 6 | COD | 680mg/l | 740mg/l |
| 7 | TDS | 1450mg/l | 1390mg/l |
| 8 | Ammonia | 2.4mg/l | 1.85mg/l |
| 9 | Nitrite | 2.4mg/l | 3.25mg/l |
| 10 | Nitrate | 62mg/l | 58mg/l |
| 11 | Phosphate | 2.4mg/l | 1.9mg/l |

Table: Raw Wastewater Characteristics from B3 Hostel, Ladies Hostel,Prince Hostel and Leaders Hostel (400KLD)

| S.No. | Parameter | Analysis Value B3 Hostel | Analysis Value Ladies Hostel | Analysis Value Prince Hostel | Analysis Value Leaders Hostel |
|-------|------------|--------------------------|------------------------------|------------------------------|-------------------------------|
| 1 | pH | 7.8 | 7.9 | 8.0 | 7.8 |
| 2 | Alkalinity | 355mg/l | 317mg/l | 436mg/l | 275mg/l |
| 3 | Hardness | 430mg/l | 468mg/l | 530mg/l | 412mg/l |
| 4 | Chloride | 400mg/l | 356mg/l | 430mg/l | 350mg/l |
| 5 | BOD | 1220mg/l | 980mg/l | 1350mg/l | 720mg/l |
| 6 | COD | 550mg/l | 640mg/l | 750mg/l | 350mg/l |
| 7 | TDS | 1650mg/l | 1490mg/l | 1830mg/l | 1150mg/l |
| 8 | Ammonia | 1.8mg/l | 1.65mg/l | 1.85mg/l | 1.1mg/l |
| 9 | Nitrite | 3.6mg/l | 3.15mg/l | 3.9mg/l | 2.3mg/l |
| 10 | Nitrate | 53mg/l | 48mg/l | 58mg/l | 46mg/l |
| 11 | Phosphate | 2.3mg/l | 1.8mg/l | 2.1mg/l | 1.65mg/l |

The various treatment units are presented below.



Fig- 6. Sand Filter and Activated Carbon Filter



Fig- 7. Chlorine Contact Tank

Fig- 8. Clarifier



Fig- 9. Aeration Tank



Fig- 10. Settling Tank



Fig- 11. Screening



Fig- 12. Blower and Filter

Treated Water Characteristics from B3 Hostel and Ladies Hostel (200KLD)

| S. No. | Parameter | Analysis value | | Standard Value BIS and EPA* |
|--------|------------|----------------|---------------|--------------------------------|
| | | B3 Hostel | Ladies Hostel | |
| 1 | pH | 7.8 | 7.6 | 5.5-9.0 |
| 2 | Alkalinity | 28 | 35 | 200 |
| 3 | Hardness | 208 | 235 | 600 |
| 4 | Chloride | 315 | 205 | 1000 |
| 5 | BOD | 6 | 4 | 30 |
| 6 | COD | 48 | 42 | 250 |
| 7 | TDS | 635 | 493 | 2100 |
| 8 | Ammonia | 4 | 8 | 50 |
| 9 | Nitrite | NIL | NIL | 1* |
| 10 | Nitrate | | 2 | 10 |
| 11 | Phosphate | 1 | 0.5 | 5 |

பற்றுச்சீட்டுப் படிவம்
(மூலப்படி)

நாள் 10/12/21 20 21

எண்: 0398053 Vel Tech, No: 42, Avadi, Chennai -
இதழ்: 600 062.

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தொகை பெறப்பட்ட தற்கால காரணம் Analysis fees

த.நா.க.ப. 102-ஆதி.அ. செலம் 2005.

ஒப்பம்

பதவி

CHIEF WATER ANALYST
KING INSTITUTE CAMPUS
GUINDY, CHENNAI - 600 32

TREATED WASTEWATER QUALITY REPORT- 2021-22

Telephone: 044-2999 7572.
E-mail id: ewadph.chn@gmail.com

DEPARTMENT OF PUBLIC HEALTH AND PREVENTIVE MEDICINE
CHIEF WATER ANALYSIS LABORATORY, KING INSTITUTE CAMPUS,
GUINDY, CHENNAI-32

FROM: Tmt.L.Sujatha, M.Sc., MA., B.Ed.,
Chief Water Analyst,
Chief Water Analysis Laboratory,
King Institute Campus,
Guindy, Chennai-32

TO: The Registrar,
Vel Tech Rangarajan Dr.Sagunthala
R&D Institute of Science and Technology,
No.42, Avadi Vel Tech Road, Vel, Nagar,
Avadi, Chennai - 600 062

R.No.3005/C/2021 Dated: 30.12.2021

Sir,

Sub: Analysis of STP treated outlet water - Results furnished - Reg.

Ref: Your Lr. Ref.No. VT/R/L/Sewage Plant/21-22/029 Dt: 16.11.2021

Four samples of STP treated outlet water stated to have been collected on 10.12.2021 from the STP outlet at (1) Prince Hostel, (2) Queens Hostel (3) B3 Hostel and (4) Leaders Hostel located in the premises of Vel Tech No.42 Avadi, Vel Tech Road, Vel Nagar, Avadi, Chennai - 600 062 were received in this laboratory on the same day from the addressee to analysis of specific parameters.

The results of the analysis are furnished overleaf.

Chief Water Analysis Laboratory,
Guindy, Chennai-32

Copy to: File & Lab.



CHIEF WATER ANALYSIS LABORATORY, KING INSTITUTE CAMPUS,
GUINDY, CHENNAI-32


RESULTS OF ANALYSIS OF SEWAGE SAMPLES : Lab. No. S-39,40,41 &42

From
The Registrar,
Vel Tech Rangarajan Dr.Sagunthala
R&D Institute of Science and Tech.
No.42 Avadi Vel Tech Road, Vel Nagar, Avadi, Chennai – 600 062

Date of collection : 10.12.2021
Date of receipt : 10.12.2021
Collected by : Thiru.C.Viswanathan, Maintenance

Sample particulars : STP outlet - Vel Tech No.42 Avadi Vel Tech Road,
Vel Nagar, Avadi, Chennai – 600 062

| Sl. No. | PARAMETERS | | RESULTS | | | |
|---------|--|----------------|--|--------------------------------|---------------------------|--------------------------------|
| | | | Vel Tech, No.42 Avadi Vel Tech Road, Vel Nagar, Avadi, Chennai – 600 062 | | | |
| | | | STP Prince Hostel Lab No.S.39 | STP-Queens Hostel Lab. No.S.40 | STP-B3 Hostel Lab.No.S.41 | STP-Leaders Hostel Lab.No.S.42 |
| 01 | Colour and appearance | | Sl. Whitish and Turbid | Sl. Whitish and Turbid | Sl. Whitish and Turbid | Sl. Whitish and Turbid |
| 02 | Total Suspended Solids | mg/l | 10 | 10 | 10 | 10 |
| 03 | Total Dissolved Solids | mg/l | 520 | 520 | 520 | 520 |
| 04 | pH Value | | 7.9 | 7.6 | 7.9 | 7.9 |
| 05 | Oxygen consumed from N/8KMnO4 | 3 minutes mg/l | 0.8 | 2.4 | 1.6 | 1.6 |
| | | 4Hours mg/l | 2.4 | 6 | 4.8 | 4.8 |
| 06 | Bio-Chemical Oxygen Demand (5 th day at 20 C) | mg/l | 6.0 | 14.0 | 12.0 | 12.0 |
| 07 | Chemical Oxygen Demand | mg/l | 37 | 59 | 52 | 52 |
| 08 | Chlorides as Cl. | mg/l | 86 | 90 | 90 | 90 |
| 09 | Oil & Grease | mg/l | Nil | Nil | Nil | Nil |


Chief Water Analyst,
Chief Water Analysis Laboratory,
Guindy, Chennai-32


4/11

Report on the Flushing System Adopted in Prince Hostel

| | |
|--|----------------------------------|
| Designed Average Flow | 20m ³ /h |
| The proposed Capacity of Sewage Treatment Plant | 400m ³ /day |
| Operation Hours | 20h |
| Number of Students in Prince Hostel | 2350 |
| Number of Supporting Staff | 150 |
| The water supplied is designed for | 2500 people |
| Water required per head as per Water supply norms, Government of India | 135LPD(2350)and 25LPD(150) |
| Total water required for students and staff | 317.25+3.25KLD |
| Water required for the kitchen | 150KLD |
| Water supplied for both students, staff and kitchen | 600KLD (approx.) |
| Total wastewater generated from the Hostel | 575KLD |
| Number of wastewater treatment plants | 2(400KLD capacity) |
| Number of rooms | 88 |
| Number of flush tanks in each room | 2 |
| Total number of flush tank | 196 |
| The capacity of the flush tank | 5 litres |
| Total quantity of flushing water | 980litres (approx.1000litres) |
| Number of times flushing | 8times a day |
| Total quantity of flushing water | 8000 litres per day |
| Total quantity of flushing water supplied | 20000 litres per day |

Report on Biogas Plant Details

| S.No. | Particulars | Quantity and Cost |
|-------|--|--------------------|
| 1 | Capacity | 1.5tonnes |
| 2 | Food Waste | 900kg/day(2 times) |
| 3 | Cow dung | 450kg/day(2 times) |
| 4 | Water | 150litres(2 times) |
| 5 | Gas production quantity | 60kg/day |
| 6 | Gas production duration | 18hrs |
| 7 | Gas rate | Rs.50/kg |
| 8 | Total amount received through gas per day | Rs.3000/day |
| 9 | Total amount received through gas per month (savings) | Rs.90,000/month |