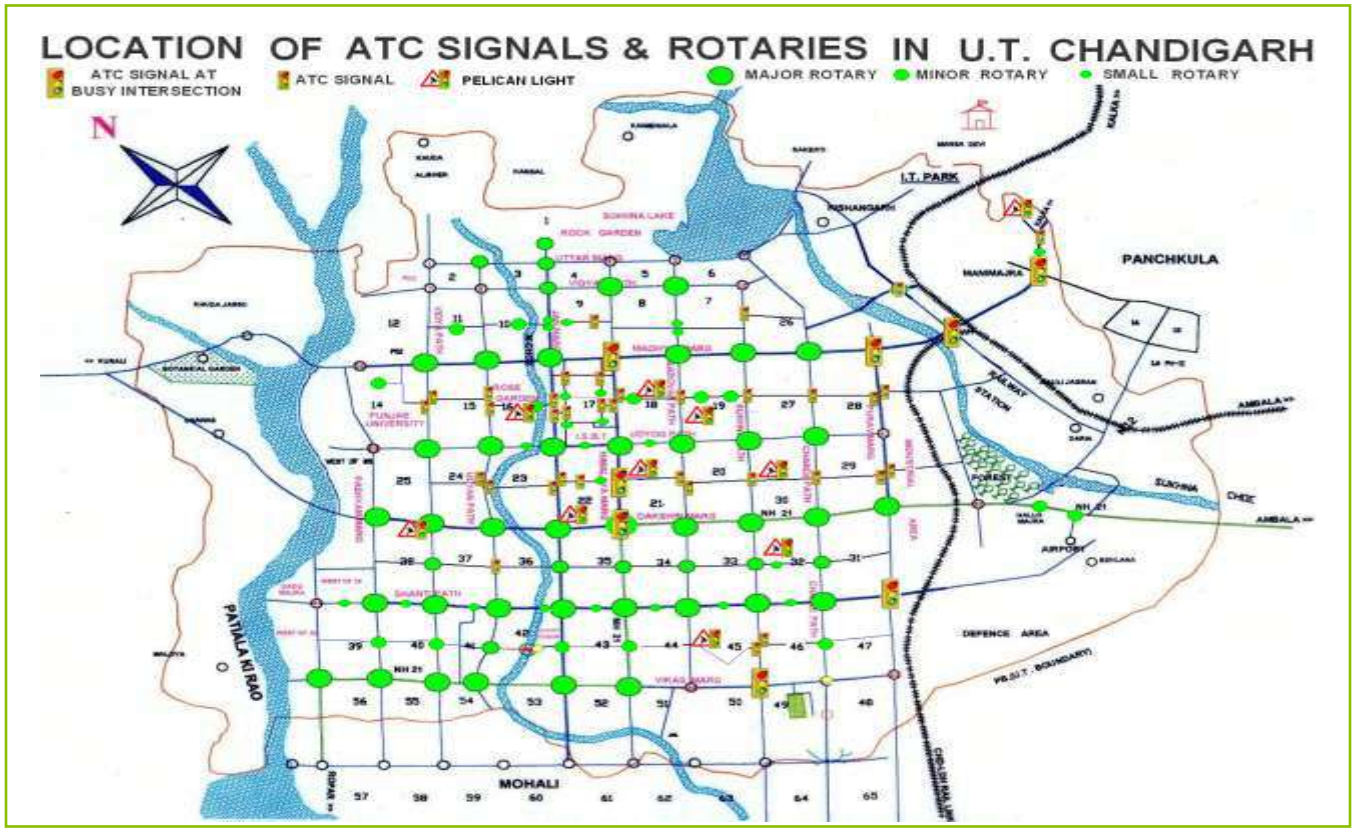
5. Mass emission standards for new vehicles were notified in the country in 1991. In Chandigarh Bharat Stage II norms are applicable.



'वात आ वातु भेषजं शंभु मयोभु नो हृदे, प्रण आयूंषि तारिषत'

Pure fresh air is an invaluable drug, which is useful for our heart as a medicine, is enjoyable. The heart gets it and increases our age.

ऋग्वेद 10/186/01

Switching to more efficient and cleaner fuels from solid fuels (wood, biomass) can help you to reduce indoor air pollution.

WATER

आपो हि ष्ठा मयो भुवस्तानऽऊर्जे दधातन । महे रणाय चक्षसे ।।

यो वः शिवतमो रसस्तस्य भाजयतेह नः । उशतीरिव मातरः ।।

तस्माऽअरं गमाम वो यस्य क्षयाय जिन्वथ । आपो जनयथा च नः ।।

O water body, you are the source of happiness. So, make sure you conform to the finest scenic work that is mighty, O Water Group! Your welfare juice will be available to us in sufficient quantity which satisfies the entire world by which you are responsible for our origin. Such public utility can endow us with its qualities.

- Yajurveda11/50-52, 36/15

Water is the elixir of life and it's importance cannot be underestimated. No living being can survive without water. According to the recent report of WHO, by 2025, half of the world's population will be living in water-stressed conditions. Thus, it is crucial to realize the significance of this depleting natural resource and develop relevant strategies for its sustainable use and conservation. Chandigarh for that matter has been playing well within boundaries. The present water supply service area of Municipal

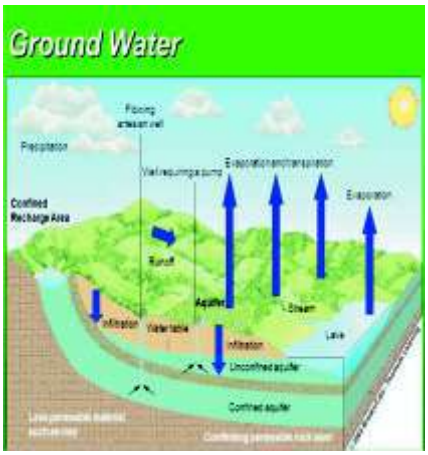
Corporations Chandigarh (MCC) is 114 Sq.Km, which includes MCC area of 79.34 Sq.Km and rural area of 34.69 Sq.Km.

The urban area falls in jurisdiction of Municipal Corporation and the water supply system is entrusted to Public Health Wing of MCC. The rural area comprises of 13 villages overseen by the Engineering Department. The water supply to the villages is provided with tube wells in and around the villages. Other urban/rural areas have water source of 67MGD (Millions of Gallons per day) from Bhakra Main Canal which is 27 km away from Chandigarh and 20 MGD from 239 tubewell located in the city.

Status of Ground Water

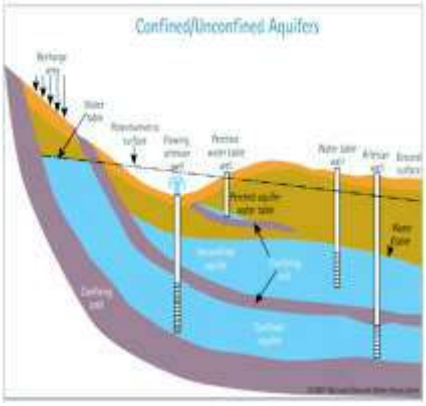
Status of Ground Water	2015	2016	2017
Annual Replenishable Ground Water Resources (MCM)	2156 ham	2159 ham	2159 ham
Available Ground Water Resource	1940 ham	1943 ham	1943 ham
Balance Ground Water	1940 ham	1943 ham	1943 ham
Provision for Industrial/Domestic and other uses & Natural Discharge etc.	216 ham	216 ham	216 ham

Source: Scientist 'D' & TS For Regional Director, Superintending Hydrogeologist For Reg. Dir. Ground Water B. Chandigarh



Ground water is one of the most important natural resource. It is the water that is present beneath the earth's surface, in rock formations and in soil pores. Ground water level of Chandigarh has increased over the past few years (2015-2017).The data collected by Central Ground Water Board, Chandigarh shows that the status of ground water for Industrial/ Domestic, other uses & natural discharge has remained constant at 216 ham from 2015 to 2017.

As far as the status of Annual Replenishable Ground Water Resources is concerned, it has increased from 2156 ham in 2015 to 2159 ham in 2017. The available ground water resource , has increased from 1940 ham in 2015 to 1943 ham in the next two years.



The demand for water in Chandigarh has increased considerably owing to its highly dense population structure. It is estimated that by 2026, the water demand will be 523.41 (Millions of litres per day) MLD (116.31 MGD) that is about 22.73% higher than the 2011 demand of 426.50 MLD (94.78 MGD). This is due to excessive pumping of water than the required replenishment. Our efforts include monitoring and implementing national policies for the sustainable development and management for conservation and augmentation of ground water resources based on ecological efficiency and equity.

Fourteen billion pounds of garbage mostly plastic, is dumped into the ocean every year.

Monsoonal Water Range

Year	Pre-Monsoonal Water Level Range	Post-Monsoonal Water Level Range	Units
2013	4.62-22.49	2.98-20.50	m bgl
2014	2.05-21.48	2.55-20.50	m bgl
2015	3.07-38.47	2.72-39.67	m bgl
2016	3.09-30.97	2.82-28.85	m bgl
2017	3.75-42.52	2.44-41.16	m bgl

Source: Scientist' D' & TS For Regional Director, Suprintending Hydrogeologist For Reg. Dir.GroundWaterB.Chandigarh

Chandigarh is recipient to heavy rainfall during the months from July to September and receives an average rainfall of 1059.3 mm, which is calculated to be approximately 60380.1 million liters or 13241 gallons or 36.28 MGD per annum. It is this water source that helps in recharging of ground water and various confined/ unconfined aquifers.

Water Supply, Demand and Consumption Scenario

The below graph shows a detailed description of the current and prospective water scenario in Chandigarh. It highlights an understandable comparison between the demands of drinking water over the years, which is most likely to increase, keeping in view the constant demand and unnecessary exploitation of water resources. It projects more than 60% increment in population of the city from 2011 to 2036. With increased urbanization, the demand for fresh water may also rise up to 30% as compared to the current requirement. It is high time to take progressive steps in order to tackle futuristic water related issues. For effective operationalisation of above agenda, use of tertiary treated water for various household purposes like cleaning, washing and gardening can prove to be a useful measure. In addition to this, we can inculcate sustainable farming practices, like no-till farming, sprinkler irrigation, improved drainage, time of use charge and metered supply.

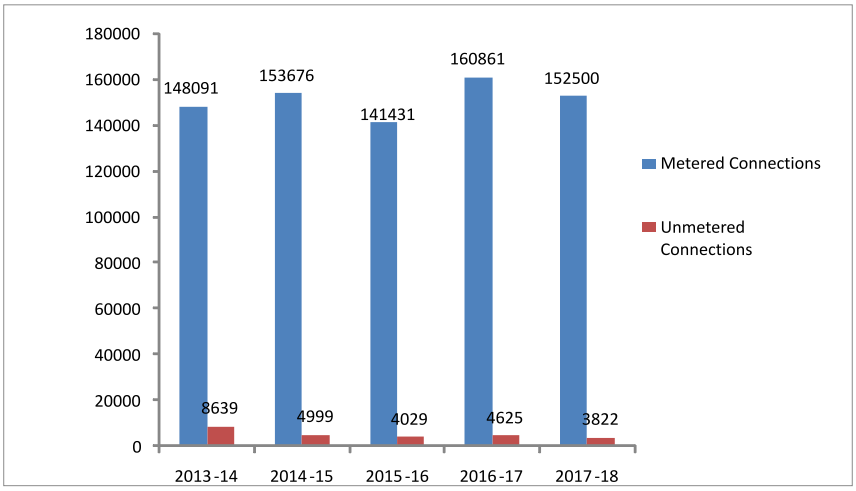
Year	Population in Lacs	Domestic Requirement @ 150 LPCD in MLD	Industrial Commercial @ 4000 gallon/Acres/Day Area in Acres	Industrial Commercial Requirement in MLD	Community Institutional @ 4000 gallon/Acres/Day Area in Acres	Community Institutional Requirement in MLD	Requirement For Stand Post Lav Blocks MLD	Wastage Water Leakage %	Total Leakage MLD	Total Requirement	Horticulture Requirement @5400 Gallon/Acres/ Day Area in Acres	Horticulture Requirement in MLD	Gross Requirement MLD
2011	10.55	158.25	1921.63	29.09	3048.5	46.15	20.07	15	38.04	291.6	6600	134.9	426.5
2016	12.79	191.85	1998.5	30.26	3170.44	48	24.43	8	44.18	338.72	6600	134.9	473.62
2021	13.71	205.65	2078.44	31.47	3297.25	49.92	29.77	8	47.52	364.33	6600	134.9	499.23
2026	14.96	216.9	2161.6	32.73	3429.15	51.92	36.29	8	50.68	388.51	6600	134.9	523.41
2031	15.59	233.85	2248	34.03	3566.32	53.99	44.19	8	54.91	420.98	6600	134.9	555.88
2036	16.95	254.25	2338	35.4	3709	56.15	53.86	8	59.95	459.61	6600	134.9	594.51

Source: Climate Action Plan, UT., Chandigarh



Do you know : 15 million children under the age of five die each year because of diseases caused by drinking water.

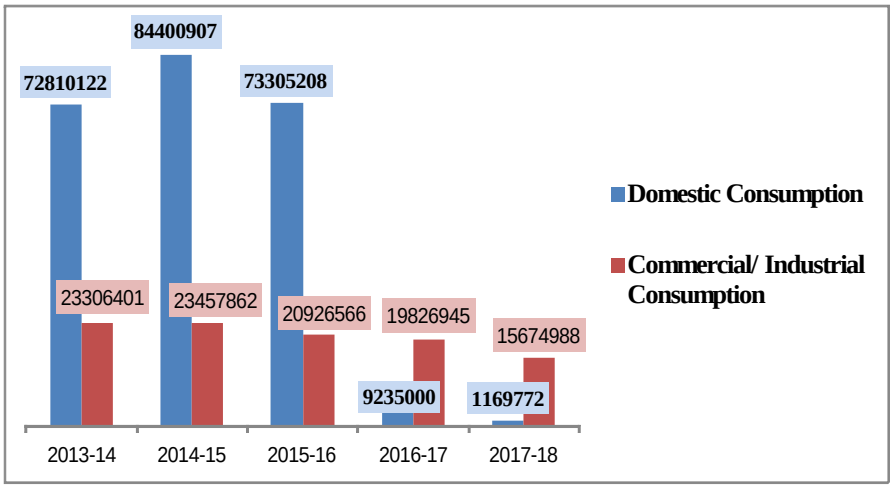
Metered/ Unmetered Connections



Source: Executive Engg., MCPH, Div 2, Chandigarh. Superintending Engineer, MCPH Circle, Chandigarh. (M.C-17).

During the period of 2013-14 to the year 2017-18, metered connections have increased from a total number of 1.48 lakhs to 1.52 lakhs with the increase in population of the city; the demand for fresh water has increased accordingly. However, with the continuous efforts of the municipal corporation, Chandigarh, the connections taken under the unmetered coverage, are reducing steeply, from 8.63 Lakh in 2013-14 to 3.82 Lakh in 2017-18.

Water Consumption

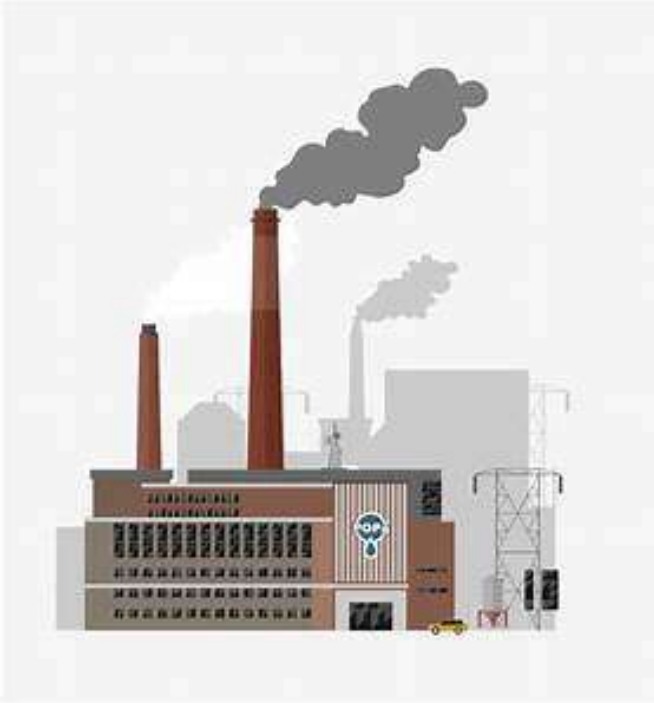


Source: Executive Engg., MCPH, Div 2, No. of Water Works & Water Consumption (Rural)

The above graph shows the water consumption rate in Domestic sector and Commercial/Industrial sector of Chandigarh. From 2013 to 2016, the water consumption in the domestic sector is more than the Commercial and Industrial sector. But the trend has been altered from the past few years (2016-2018). The possible reason is the relentless construction of industrial units in and around Chandigarh. The categorization of industries are based on the following type-

Do you know : Asia has a maximum numbers of polluted rivers than anywhere else in the world

Red Category - 192
Orange Category - 575
Green Category - 577
White Category-1625



Water Polluting Industries

Name of Industry	Number
Electroplating	98
Foundries	33
Hotel & Restaurants	229
Sewage Treatment Plants	5
Automobile Service Stations	91
Hospitals	44
Wire Drawing with Pickling	48
Wire Drawing without Pickling	7
Zinc processing units	4
Microbreweries	11

Source: CPCC, Chandigarh

Status of Drinking Water

Year	Not Covered Partially Covered	Level of Supply (LPCD)	No of Existing Water Source	Type of Water Source	No of Stand Post Taps	Total No. of House Connection
2013-14	100%	Potable Water 10 Hrs Per Day	2 No's	Canal Water & Deep Bore Tubewells	233 No's	156730 No's
2014-15	100%	Potable Water 10 Hrs Per Day	2 No's	Canal Water & Deep Bore Tubewells	319 No's	158363 No's
2015-16	100%	Potable Water 10 Hrs Per Day	2 No's	Canal Water & Deep Bore Tubewells	720 No's	142633 No's
2016-17	100%	Potable Water 10 Hrs Per Day	2 No's	Canal Water & Deep Bore Tubewells	720 No's	156668 No's
2017-18	100%	Potable Water 10 Hrs Per Day	2 No's	Canal Water & Deep Bore Tubewells	720 No's	156668 No's

Source: Executive Eng., MCPH, Div.1, 2 & 3, O.S.D. Chief Engg., Chandigarh. Superintending Engineer, MCPH Circle, Chandigarh. (M.C-17)

Fresh drinking water scenario on Chandigarh from the year 2014-15 to the year 2017-18 is covered on a 100% basis with potable water discharge of 10 hours per day. There are two types of water sources commonly in use, namely- Canal water and deep bore tube wells. The total number of house connections in the past five years has decreased from 158363 in 2014 to 156668 in 2018.

Do you know : As per reports by UNESCO, 27% of the urban population do not have piped water in their homes.

Water Conservation Practices in Chandigarh

Chandigarh has a total rain water harvesting capacity of more than 70% of the total land area. The total capacity of water that would be available for recharge annually is : 58 sq km (area) x 1059.3 (rainfall) x 0.5 (rainfall coefficient)= 30,720 million litres. To reduce dependence on ground water a short term legal frame work was been laid by the Administration to make provisions for rain water harvesting mandatory while granting the additional covered area to all plots above 500 sqm (1 Kanal) area, with Order/Notification dated 16.10.2008.

Artificial Recharge and Rain Water Harvesting

With the exponentially increasing demand of water resources due to escalating population, the city beautiful "Chandigarh", has also implicated the scheme at the remarkable speed in a very short span of time. The rainwater harvesting potential of Chandigarh, with an area of 114 sq km and the average annual rainfall of 1059.3, is calculated to be 60380.1million liters or 13241gallons or 36.28 MGD. Thus, the potential is more than the water pumped out of aquifers and therefore, efficient harvesting of rain water and proper recharging of ground water will go a long way in contributing towards sustainability of water supply.

Details about the installed capacity of artificial recharge schemes implemented in Chandigarh:

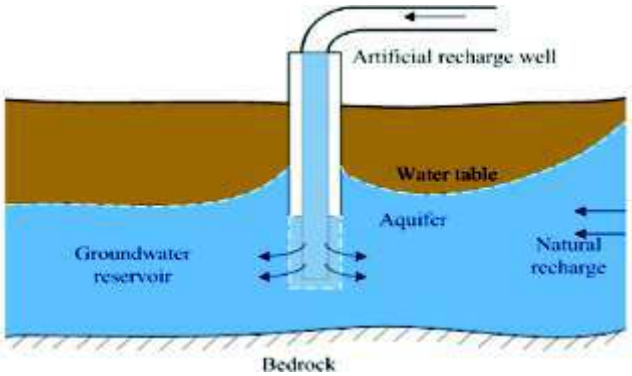
No. of Units	Type of scheme	Total annual
6	Roof Top Rain Water Harvesting	0.144-0.13
1	Roof Top & Pavement catchments Rain Water	34.5
1	Recharge Trenches	9.5

Source: Executive Engineering Project Public Health Division No. 1 & 7, Chandigarh

Construction of storm water harvesting and ground water recharge structures is also at full swing throughout the city to cover the roads (15.89 sq. km), rooftops of residential areas, (30.19 sq.km) shopping areas (3.97 sq. km), public and institutional

Storm Water Harvesting Sources	Area Covered
From Roads	15.89 sq.km
From the Rooftop of Residential area	30.19 sq.km
From Public and Institutional Buildings	7.94 sq.km
From Shopping area	3.97 sq.km

Source: Ex.Er. Project Public Health Division No.7,Chandigarh, Chandigarh Housing Board, 8, Jan Marg, Sector 9 D



Do you know : About two million tons of human waste is disposed of in water every day.

2. Recycle and Reuse of treated waste water:

Municipal Population	**10.54 Lacs**
Volume of Domestic & Industrial Waste Water Generated	**54 MGD (Approx.)**
Treated wasted water	**48.85 MGD**
No. of STPs	**5 No.s**
Capacity of Each STP	**11 MGD - 3 BRD**
	5 MGD - Raipur Kalan
	30 MGD - Diggian
	1.25 MGD - Raipur Khurd
	1.6 MGD - Dhanas
	Total : 48.85 MGD
Proposed STPs	**Maloya- 5.04 MGD**
	Raipur Kalann - 2 MGD
	Kishangarh Near Sukhna Lake - 0.44 MGD
Mode of Disposal	**Natural Choe for all except Diggian. Diggian STP effluent goes to Irrigation Channel**

Source: CPCC, Chandigarh

Chandigarh has a properly hooded sewerage facility in addition to a fully functional treatment facility. Out of the total water being supplied to the residents of Chandigarh, 54 MGD sewage effluent is being generated per day. At present, 48.85 MGD is being treated in the city with the total proposed STP capacity of 56.33 MGD. Considering the importance of water, Chandigarh initiated tertiary treatment of waste water at Diggian STP (10 MGD) and later supplied it for the non-potable uses such as irrigation of gardens, washing purposes, etc to different sectors.

Action Plan for Water Conservation: U.T. Chandigarh

As per new guidelines by the CPCB, the BOD of treated waste water should be below 10 mg/L, thus the upgradation of all STP's in the city is under process.

Supply of tertiary treated water is planned to increase from 10 MLD to 30 MLD for the use in sectorial garden, parks, household lawns etc.

All the large developments, housing and institutional campuses etc. with a total site area >30 acres must adhere to Zero storm water runoff from the site.

Use of recycled water will be compulsory for all non-potable uses for all large buildings with an area of more than 2000 m^2 in all new developments.

All apartments with more than 20 tenements or area of more than 2000 m^2 should make plumbing and infrastructure provision for enabling localized sewage treatment, use of recycled water for flushing, washing and for watering gardens.

Water Quality of the City:

CGW Toxic Elements in Ground Water							
Year	Field	Pb	Cd	Mn	Fe	Cr	As
2017	Water Samples of Tap Water	0.009-0.015 mg/l	0.006-0.007 mg/l	0.000-0.030 mg/l	0.130-1.390 mg/l	-	-
2017	Water Samples of Hand Pump	0.000-0.110 mg/l	0.004-0.006 mg/l	0.001-0.800 mg/l	0.100-3.430 mg/l	-	-
2017	Water Samples of Tubewell	0.000-0.022 mg/l	0.004-0.007 mg/l	0.003-0.360 mg/l	0.000-2.89 mg/l	-	<0.01

Source: Central Ground Water Board, North Western, Chandigarh

Owing to the efficient efforts of the Municipal Corporation, Chandigarh, every house of the green city has access to clean drinking water. As the number of agricultural land holdings are very few, the use of harmful chemicals that have potent lethal effects on land and water is very much under control. Thus the water quality of Chandigarh lies well within limits as prescribed by the BIS standards of drinking water. Water analysis conducted by the Central Ground Water Board in both deep and shallow aquifers shows the absence of heavy metals and any such impurities.

Drains/STPs of Chandigarh

Do you know : About 700 million people worldwide drink contaminated water.

Water Quality Analysis of STPs:

STP DIGGIAN OUTLET - 2018(MBBR)															
Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	6.5	7.0	7.2	7.1	7.0	6.9	6.9	7.1	7.3	7.4	7.2	7.1
2	DO	mg/l	-	--	3.9	3.5	3.3	2.9	1.9	3.2	4.9	4.5	4.2	2.6	1.2
3	COD	mg/l	250	198	198	200	187	130	128	95	71	61	56	126	135
4	BOD	mg/l	30	79	96	47	63	58	49	41	21	28	28	51	58
5	TSS	mg/l	100	84	72	73	85	65	56	43	19	46	30	45	39
6	NH_3-N	mg/l	50	20	26	32	25	32	23	30	21	28	37	41	34
7	PO_4-P	mg/l	5.0	3.74	2.21	2.44	3.16	3.01	2.48	2.11	2.05	2.20	3.50	3.10	4.30
8	Total Coliform	MPN/100ml	-	9.3×10^4	9.3×10^2	1.4×10^4	9.6×10^3	1.7×10^5	2.7×10^5	1.7×10^5	7.6×10^4	9.3×10^5	8.0×10^6	1.8×10^6	2.7×10^6
9	Faecal Coliform	MPN/100ml	-	6.1×10^4	6.1×10^2	1.1×10^4	5.4×10^3	6.1×10^4	6.9×10^4	1.4×10^5	5.4×10^4	6.9×10^5	4.5×10^6	1.4×10^5	1.4×10^5

Note: The above mentioned Standards/Permissible Limit are meant for discharge in Inland Surface Water. Finally treated water mixes with river ghaggar hence, same norms will be applicable.

STP Dhanas-2018															
Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	8	7.9	7.6	7.5	7.3	7.4	7.7	7.6	7.6	7.6	7.6	7.2
2	DO	mg/l	-	--	5.4	4.1	4.9	1.9	2.8	3.6	4.5	5.9	5.2	5.3	5.3
3	COD	mg/l	250	84	86	124	67	65	41	33	36	14	22	39	62
4	BOD	mg/l	30	21	17	33	24	26	13	12	87	4	7	10	12
5	TSS	mg/l	100	24	16	24	17	19	17	11	8	17	6	11	10
7	NH_3-N	mg/l	50	19	10	36	38	37	32	30	22	10	12	13	13
8	PO_4-P	mg/l	5	0.82	0.39	0.78	0.97	0.51	0.65	0.53	0.4	BDL	1.3	BDL	1
9	Total Coliform	MPN/100 ml	-	21	7.6×10^3	69	34	9.3×10^3	2.2×10^3	9.3×10^4	6.1×10^4	172	2.0×10^4	1.1×10^5	5.4×10^4
10	Faecal Coliform	MPN/100 ml	-	14	5.4×10^3	45	32	6.9×10^3	1.8×10^3	2.0×10^4	2.2×10^4	130	1.3×10^4	6.9×10^4	2.7×10^4

Source: CPCC, Chandigarh

Do you know : The Ministry of Drinking Water and Sanitation launched the Har Ghar Jal Yojana to provide piped water supply to every household by 2030.

Do you know : 97% of the earth's water is saltwater in oceans and seas. Of the 3% that is freshwater, only 1% is available for drinking.

STP 3BRD FINAL OUTLET - 2018 (11 MGD)															
Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	6.5	7.3	7.3	7.2	7.2	7.3	7.5	7.3	7.7	7.3	7.3	7.3
2	DO	mg/l	-	--	6.9	1.7	6.2	5.9	4.4	5.4	4.6	5.1	4.8	5.6	3.6
3	COD	mg/l	250	100	37	122	33	27	34	73	25	17	11	32	28
4	BOD	mg/l	30	33	15	50*	9	7	11	25	9	5	3	8	9
5	TSS	mg/l	100	52	27	93	28	10	35	77	5	25	9	7	7
6	NH_3-N	mg/l	50	3	3	4	3	7	3	5	5	3	3	6	10
7	PO_4-P	mg/l	5	3.71	0.44	8.32	1.76	1.83	1.8	1.91	1.57	BDL	3.8	1.5	3.1
8	Total Coliform	MPN/100 ml	-	3.8×10^4	2.1×10^1	6.9×10^4	3.0×10^3	1.1×10^4	1.1×10^3	1.8×10^3	7.6×10^3	7.6×10^4	9.3×10^3	8.0×10^4	7.6×10^4
9	Faecal Coliform	MPN/100 ml	-	3.2×10^4	1.7×10^1	4.5×10^4	2.2×10^3	4.5×10^3	6.9×10^2	9.2×10^2	3.2×10^3	1.4×10^4	6.1×10^3	4.5×10^4	4.0×10^4

Source: CPCC, Chandigarh *Becaise of silt deposition

STP RAIPUR KHURD - 2018															
Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	7.8	7.5	7.5	7.3	-	-	7.3	7.2	7.3	7.6	7.1	7.3
2	DO	mg/l	-	1.7	2.7	2	0.92	-	-	NIL	NIL	NIL	NIL	0.48	NIL
3	COD	mg/l	250	187	254	262	215	-	-	223	245	147	195	158	167
4	BOD	mg/l	30	84	103	95	90	-	-	84	114	64	59	62	69
5	TSS	mg/l	100	87	79	57	88	-	-	147	141	68	95	84	56
6	NH_3-N	mg/l	50	41	41	40	35	-	-	39	38	41	28	26	31
7	PO_4-P	mg/l	5	1.71	2.55	0.61	0.65	-	-	0.8	1.57	BDL	1.2	1	2.1
8	Total Coliform	MPN/100 ml	-	4.0×10^3	4.1×10^3	7.6×10^3	6.9×10^3	-	-	4.0×10^4	4.5×10^4	1.1×10^5	1.7×10^5	3.0×10^5	1.4×10^6
9	Faecal Coliform	MPN/100 ml	-	2.0×10^3	2.0×10^3	5.4×10^3	4.0×10^3	-	-	1.4×10^4	1.4×10^4	4.5×10^4	1.1×10^5	1.8×10^5	4.5×10^5

Source: CPCC, Chandigarh

STP Raipur Kalan-2018															
Sr.No.	**Parameters**	**Unit**	**Permissible Limit**	**Jan.**	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**
1	pH	-	5.5 to 9.0	7.3	6.8	7	7	7	7	7.1	7	7.1	7.1	6.9	7.1
2	DO	mg/l	-	0.6	NIL	NIL	NIL	NIL	NIL	NIL	NIL	0.4	NIL	NIL	NIL
3	COD	mg/l	250	312	182	150	110	147	149	130	170	181	138	118	145
4	BOD	mg/l	30	122	82	77	60	66	69	47	84	60	59	59	70
5	TSS	mg/l	100	157	21	26	25	49	38	43	48	59	38	41	22
6	NH_3-N	mg/l	50	37	41	34	27	29	34	35	33	32	36	29	43
7	PO_4-P	mg/l	5	3.8	4.23	3.65	4.23	4.4	4.23	3.95	2.61	3.5	3.8	3.5	4.7
8	Total Coliform	MPN/100 ml	-	1.4×10^4	2.7×10^3	5.4×10^3	6.9×10^3	9.3×10^5	2.0×10^4	4.0×10^4	3.2×10^4	1.7×10^3	4.5×10^4	1.4×10^5	3.2×10^5
9	Faecal Coliform	MPN/100 ml	-	1.1×10^4	1.7×10^3	4.0×10^3	4.5×10^3	6.9×10^5	1.1×10^4	7.6×10^3	8.3×10^3	1.4×10^3	2.0×10^4	9.3×10^4	2.7×10^5

Do you know : Water serves as nature's thermometer, helping to regulate the earth's temperature

Sukhna Choe-Exit Point from Chandigarh - 2018

Sr.No.	Parameters	Unit	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.
1	pH	-	7.3	7.3	7.5	7.2	7.2	7.3	7.2	7.5	7.6	7.6	7	7.5
2	Conductivity	µs/cm	930	971	959	950	954	888	810	918	719	1010	956	1018
3	DO	mg/l	0.83	NIL	NIL	NIL	NIL	NIL	2.2	NIL	NIL	NIL	NIL	NIL
4	COD	mg/l	423	508	546	242	264	301	148	242	163	321	362	386
5	BOD	mg/l	195	267	270	125	123	167	64	179	75	207	133	220
6	NO_3-N	mg/l	1.3	--	1.1	2.1	1.3	4.3	2.4	4.2	2.6	1.1	1.9	2.3
7	NH_3-N	mg/l	--	31	34	33	31	27	20	32	24	30	33	41
8	Phosphate	mg/l	--	3.34	3.21	3.68	3.94	2.45	2.12	2.46	1.4	2.8	2.6	3.6
9	TSS	mg/l	261	317	418	148	159	147	180	136	139	295	250	408
10	TDS	mg/l	441	533	464	452	493	520	199	580	517	580	488	464
11	TFS	mg/l	367	453	565	454	450	439	283	547	425	426	438	424
12	Turbidity	NTU	195	270	320	210	190	180	300	160	148	155	170	220
13	TH as $CaCO_3$	mg/l	260	258	270	270	264	250	106	236	240	268	250	270
14	Ca as $CaCO_3$	mg/l	160	160	160	160	152	140	84	162	130	150	150	160
15	Mg as $CaCO_3$	mg/l	100	98	110	110	112	110	22	74	120	118	100	110
16	Sulphate	mg/l	72	76	85	57	64	61	55	53	52	67	48	63
17	Chloride	mg/l	52	55	47	70	61	57	33	56	45	53	61	41
18	P-Alkalinity	mg/l	NIL	NIL	NIL	16	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
19	Total alkalinity as $CaCO_3$	mg/l	506	514	420	406	446	378	322	398	308	422	396	418
20	Fluoride	mg/l	BDL	BDL	BDL	BDL	0.07	0.2	0.12	0.13	0.15	0.21	0.13	0.22
21	colour	Hazen	30	40	50	30	40	30	30	40	40	40	40	40
22	Boron(B)	mg/l	0.15	0.3	0.28	0.24	0.22	0.23	0.24	0.25	0.16	<1	<1	<1
23	TKN	mg/l	2.9	3.2	2.9	1.5	3.3	3.9	1.9	3.7	2.3	3.1	7.3	6.1
24	Potassium	mg/l	4	5	6	6	7	7	5	9	6	8	9	12
25	Sodium	mg/l	23	28	20	17	23	26	16	31	17	20	48	17
26	Total Coliform	MPN/100	1.4×10^5	7.6×10^4	2.7×10^4	3.2×10^4	7.6×10^6	4.5×10^6	9.3×10^4	7.6×10^4	1.0×10^6	1.4×10^6	4.5×10^6	3.8×10^6
27	Faecal Coliform	MPN/100	1.1×10^4	5.4×10^4	1.7×10^4	2.2×10^4	3.2×10^6	1.2×10^6	6.9×10^4	5.4×10^4	7.6×10^5	4.5×10^5	6.9×10^5	5.4×10^5

Source: CPCC, Chandigarh

Do you know : 15 million children under the age of five die each year because of diseases caused by drinking water.

N-CHOE Exit Point from Chandigarh (2018)

Sr.No.	Parameters	Unit	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	6.6	6.9	7.1	7.3	7.1	6.9	7.1	7.1	7.4	7.4	7	7.1
2	Conductivity	µs/cm	644	551	668	663	643	638	616	559	724	584	611	696
3	DO	mg/l	NIL	0.6	1	0.7	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
4	COD	mg/l	261	261	214	176	168	141	164	82	114	160	204	228
5	BOD	mg/l	161	117	98	80	73	65	77	49	82	79	65	69
6	NO_3-N	mg/l	5.9	--	2.4	2.1	2	2.2	2.4	2.8	1.2	1.5	2	6.3
7	NH_3-N	mg/l	23	17	20	17	24	18	22	15	19	23	23	29
8	Phosphate	mg/l	2.55	2.05	2.05	2.36	2.51	1.83	2.01	1.03	1.4	2.4	2.4	3.3
9	TSS	mg/l	100	149	82	81	105	82	80	62	37	100	120	113
10	TDS	mg/l	326	259	350	394	297	317	342	345	390	384	300	318
11	TFS	mg/l	267	269	236	273	310	271	274	289	317	280	248	324
12	Turbidity	NTU	110	160	118	125	109	95	113	92	96	112	119	112
13	TH as $CaCO_3$	mg/l	190	206	230	212	220	194	214	210	242	220	220	220
14	Ca as $CaCO_3$	mg/l	118	100	120	120	124	116	122	120	138	128	142	140
15	Mg as $CaCO_3$	mg/l	72	106	110	92	96	78	92	90	104	92	78	80
16	Sulphate	mg/l	66	72	49	52	52	51	62	54	63	68	74	66
17	Chloride	mg/l	42	45	50	45	48	46	45	42	42	40	41	40
18	Total alkalinity as $CaCO_3$	mg/l	260	208	252	258	254	246	246	224	264	234	266	282
19	P-Alkalinity	mg/l	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
20	Fluoride	mg/l	0.28	BDL	BDL	BDL	BDL	BDL	0.13	0.14	0.13	<1	0.12	0.12
21	colour	Hazen	30	20	20	20	20	20	20	20	30	30	30	30
22	Boron(B)	mg/l	0.19	0.21	0.15	0.14	0.14	<1	0.12	0.15	0.08	<1	<1	<1
23	TKN	mg/l	4.2	4.7	4.2	4.1	3.9	4.3	4.9	4.9	5.3	4.9	26	10.9
24	Potassium	mg/l	7	9	11	8	8	9	10	10	11	12	22	2
25	Sodium	mg/l	23	27	37	30	24	38	43	43	47	28	17	39
26	Total Coliform	MPN/100 ml	2.2×10^4	3.2×10^4	1.4×10^6	6.1×10^5	2.2×10^6	1.7×10^5	5.4×10^5	2.7×10^5	2.7×10^6	2.7×10^6	1.8×10^7	7.6×10^6
27	Faecal Coliform	MPN/100 ml	1.8×10^4	2.0×10^4	9.3×10^5	4.1×10^5	1.1×10^6	1.4×10^5	4.0×10^5	1.4×10^5	8.6×10^5	8.0×10^5	8.0×10^6	1.1×10^5

Source: Action Plan for Control of Pollution in river Ghaggar, CPCC, Chandigarh

Do you know : Wular Lake is the largest fresh water lake and Chilka is the largest salt water lake of India.

PATIALA KI RAO DRAIN /CHOE- EXIT Point from Chandigarh 2018

Sr.No.	Parameters	Unit	Permissible Limit	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	pH	-	5.5 to 9.0	7.6	7.5	7.4	7.2	7.2	7.5	7.6	7.4	7.3	7.4	7.6	7.8
2	Conductivity	µs/cm	--	983	1053	1059	1077	1024	1092	984	903	256	1053	910	1046
3	DO	mg/l	--	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
4	COD	mg/l	250	709	634	548	489	339	382	292	809	125	404	430	463
5	BOD	mg/l	30	437	348	289	288	245	248	171	388	53	180	220	253
6	NO_3-N	mg/l	10	7.20	--	6.20	5.90	5.30	4.30	7.40	5.20	3.60	2.00	1.40	1.10
7	NH_3-N	mg/l	50	32	43	33	44	46	46	28	28	23	51	50	30
8	Phosphate	mg/l	5.0	--	3.84	3.34	3.88	1.66	3.66	2.96	3.85	BDL	4.40	3.50	3.45
9	Total Suspended Solid	mg/l	100	586	526	460	556	381	327	323	2359	36351	301	336	394
10	TDS	mg/l	--	546	550	535	487	579	562	515	520	438	689	498	502
11	TFS	mg/l	--	415	498	818	828	669	573	667	2147	30159	811	468	484
12	Turbidity	NTU	--	480	470	485	420	340	390	320	1450	39000	210	228	280
13	TH as $CaCO_3$	mg/l	--	286	252	254	230	230	276	268	310	280	340	302	280
14	Ca as $CaCO_3$	mg/l	--	152	184	176	162	180	184	184	210	186	188	202	162
15	Mg as $CaCO_3$	mg/l	--	134	68	78	68	50	92	84	100	94	140	100	118
16	Sulphate	mg/l	--	80	81	85	76	64	75	55	78	32	74	71	56
17	Chloride	mg/l	--	48	48	57	57	50	60	55	59	62	65	62	59
18	Total alkalinity as $CaCO_3$	mg/l	--	418	462	456	520	482	512	458	424	406	500	460	440
19	P-Alkalinity	mg/l	--	22	NIL	10	NIL	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil
20	Fluoride	mg/l	2.0	0.32	0.22	0.17	0.17	0.13	BDL	BDL	0.15	BDL	BDL	BDL	BDL
21	colour	Hazen	--	60	30	30	30	40	40	40	40	50	40	40	40
22	Boron(B)	mg/l	--	0.17	0.19	0.23	0.17	0.22	<1	0.19	0.16	0.28	<1	<1	<1
23	TKN	mg/l	--	8.90	7.80	7.10	6.70	6.10	5.70	7.90	6.90	6.80	5.60	4.30	3.80
24	Potassium	mg/l	--	33	41	39	34	30	24	35	33	38	21	21	15
25	Sodium	mg/l	--	81	83	72	63	55	63	62	82	53	63	82	89
26	Total Coliform	MPN/100	--	1.1×10^5	1.3×10^5	1.4×10^7	9.3×10^5	1.4×10^7	4.5×10^5	4.5×10^5	3.8×10^6	4.5×10^6	3.0×10^6	1.8×10^7	1.4×10^7
27	Faecal Coliform	MPN/100	--	9.3×10^4	8.0×10^4	1.1×10^7	6.9×10^5	9.3×10^6	2.0×10^5	2.0×10^5	1.7×10^6	2.0×10^6	1.8×10^6	8.0×10^6	6.1×10^6

Source: Action Plan for Control of Pollution in river Ghaggar, CPCC, Chandigarh

Do you know : Sukhna Lake in Chandigarh is man-made, created by damming the seasonal stream that comes down from the Shivalik Hills, Sukhna Choe.

Gound Water Qualty- (2018)

Sr.No.	Parameters	Desirable Limit	Units	Dadu Majra		SEC-15		SEC-22		VILL PALSORA		DHANAS		Sec -35		Sec -20	
				April	Oct	April	Octr	April	Oct	April	Oct	April	Oct	April	Oct	April	Oct
1	Temp.	--	^0C	21.5	24	22	24.5	22	--	22	24	22.5	24	22	24	20.5	24
2	pH	6.5 to 8.5	--	7.6	7.6	7	7.6	7	--	7	7.2	7.3	7.7	7	7.3	7.2	7.4
3	Conductivity	--	µs/cm	746	753	938	878	853	--	1181	1210	664	647	905	863	721	662
4	BOD	--	mg/l	<1	<1	<1	<1	<1	--	<1	2	<1	<1	<1	<1	<1	<1
5	COD	--	mg/l	9	21	4	21	8	--	7	28	10	17	8	24	7	21
6	NO_3-N	50	mg/l	2.8	2.5	1.7	5.9	1.6	--	0.4	<1	2.6	2.6	5.2	4.7	4.6	4.9
7	NH_3-N	--	mg/l	BDL	0.85	1.03	0.92	0.15	--	0.76	1.44	0.49	0.77	BDL	0.55	BDL	1.03
8	Turbidity	5	NTU	3	2	132	44	4	--	50	13	46	18	4	5	6	4
9	P-alk	--	mg/l	14	NIL	28	NIL	18	--	16	NIL	12	NIL	18	NIL	20	NIL
10	T-alk	200	mg/l	322	354	366	374	352	--	450	496	310	328	412	412	288	280
11	Hardness as $CaCO_3$	300	mg/l	294	240	262	180	294	--	244	160	204	180	314	200	278	260
12	Ca as $CaCO_3$	75	mg/l	224	146	142	90	274	--	212	72	182	116	256	116	228	174
13	Mg as $CaCO_3$	30	mg/l	70	94	120	90	20	--	32	88	22	64	58	84	50	86
14	Sulphate	200	mg/l	35	39	55	50	33	--	66	72	18	22	34	39	51	51
15	TDS	500	mg/l	394	656	590	769	421	--	627	765	353	368	489	528	388	398
16	Total Fixed Solid	--	mg/l	355	370	567	460	436	--	616	552	270	258	398	378	331	310
17	TSS	--	mg/l	4	4	147	8	9	--	8	7	17	7	2	4	3	5
18	Fluoride	1	mg/l	0.85	0.77	0.14	0.31	0.46	--	0.34	0.28	BDL	BDL	0.2	0.37	0.9	0.88
19	Chloride	250	mg/l	50	35	45	45	45	--	80	85	20	18	27	28	23	16
20	Phosphate	--	mg/l	0.02	BDL	0.35	BDL	0.01	--	0.05	BDL	0.01	BDL	0.02	BDL	0.04	BDL
21	Colour			<5	<5	10	10	<5	--	10	10	10	<5	<5	<5	<5	<5
22	Boron		mg/l	0.07	<1	0.05	<1	0.06	--	0.11	<1	0.07	<1	0.07	<1	0.06	<1
23	TKN		mg/l	BDL	<1	BDL	<1	BDL	--	BDL	<1	BDL	<1	BDL	<1	BDL	<1
24	Sodium		mg/l	51	49	38	32	42	--	128	128	41	36	**38**	28	44	39
25	potassium		mg/l	BDL	1	3	3	1	--	5	5	2	2	**2**	2	BDL	<1
26	Fecal Coliform	--	MPN/100 ml	34	<2	--	<2	22	--	--	11	84	<2	<2	<2	<2	<2
27	Total Coliform	--	MPN/100 ml	39	<2	--	7	26	--	--	32	94	<2	<2	<2	<2	<2

Source: CPCC, Chandigarh

Do you know :An estimated 1000 children die every day in India due to polluted water.

Sr.No.	Parameters	Units	Dadu Majra		SEC-15		SEC-22		VILL PALSORA		DHANAS		Sec -35		Sec -20	
			April	Oct.	April	Oct.	April	Oct.	April	Oct.	April	Oct.	April	Oct.	April	Oct.
28	ARSENIC	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
29	CADMIUM	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
30	COPPER	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
31	LEAD	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
32	NICKEL	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
33	ZINC	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
34	MERCURY	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
35	IRON	mg/l	0.43	--	0.78	--	0.92	--	1.2	--	2.1	--	0.09	--	0.84	--
36	CHROMIUM (TOTAL)	mg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
37	Alpha BHC	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
38	Beta BHC	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
39	Gama BHC (Lindane)	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
40	OP DDT	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
41	PP DDT	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
42	Alpha Endosulphan	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
43	Beta Endosulphan	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
44	Dieldrin	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
45	Carboryl (Carbamate)	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
46	2.4 D	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
47	Aldrin	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
48	Malathian	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
49	Methyl Parathian	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
50	Anilophos	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--
51	Chloropyriphos	µg/l	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--	BDL	--

Do you know : More than 80% of sewage in developing countries is discharged untreated, polluting rivers, lakes and coastal areas

Sukhna Lake (2018)

SUKHNA LAKE -2018														
Sr.No.	Parameters	Unit	Jan.	Feb.	March.	April	May	June	July	Aug.	Sept.	0ct.	Nov.	Dec.
1	pH	-	7.4	7.8	8.0	8.2	7.5	7.3	7.4	7.4	7.8	7.8	7.4	7.7
2	Conductivity	µs/cm	250	278	257	255	276	287	208	222	198	207	238	247
3	DO	mg/l	9.3	8.5	9.4	9.9	9.6	6.0	6.8	4.8	8.9	7.6	7.6	8.3
4	COD	mg/l	58	64	37	25	25	23	21	27	15	13	16	20
5	BOD	mg/l	3	4	4	3	3	4	4	4	3	1	3	2
6	NO_3-N	mg/l	0.80	--	0.70	0.90	1.10	4.70	1.40	4.90	1.10	0.90	0.20	1.30
7	NH_3-N	mg/l	0.49	0.59	0.58	0.54	1.85	1.89	1.47	1.68	1.51	0.63	1.06	1.48
8	Phosphate	mg/l	0.04	0.05	0.05	0.06	0.22	0.23	0.24	0.21	<1	BDL	BDL	0.24
9	Total Suspended Solid	mg/l	22	12	13	46	48	52	112	100	17	14	49	25
10	TDS	mg/l	149	181	138	160	201	187	166	235	203	286	150	138
11	TFS	mg/l	122	86	134	86	171	231	199	290	261	208	142	118
12	Turbidity	NTU	38	42	28	58	66	90	120	140	23	22	70	52
13	TH as $CaCO_3$	mg/l	160	160	140	116	130	136	96	136	100	116	120	160
14	Ca as $CaCO_3$	mg/l	84	130	90	84	76	90	52	92	60	72	80	80
15	Mg as $CaCO_3$	mg/l	76	30	50	32	54	46	44	44	40	44	40	80
16	Sulphate	mg/l	15	13	11	15	21	28	28	29	15	12	21	18
17	Chloride	mg/l	11	15	15	30	18	15	20	19	11	9	19	19
18	P-Alkalinity	mg/l	8	12	4	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
19	Total alkalinity as $CaCO_3$	mg/l	130	164	118	152	134	138	108	106	94	104	124	122
20	Fluoride	mg/l	BDL	0.15	0.16	0.12	0.15	0.38	0.40	30	0.32	0.37	0.18	0.35
21	colour	Hazen	5	5	5	5	5	10	10	10	5	5	5	5
22	Boron(B)	mg/l	0.06	0.13	0.15	0.12	0.14	0.16	0.18	0.19	0.14	<1	<1	<1
23	TKN	mg/l	4.90	4.20	3.70	3.90	3.40	4.10	4.10	4.70	3.70	4.20	6.50	5.30
24	Potassium	mg/l	9	8	7	7	8	8	9	9	11	8	9	6
25	Sodium	mg/l	45	40	23	27	30	33	37	40	40	46	48	36
26	TOTAL COLIFORM	MPN/100	<2	20	34	1.1×10^4	--	94	141	2.0×10^5	2.7×10^4	2.2×10^4	3.0×10^4	1.7×10^4
27	FAECAL COLIFORM	MPN/100	<2	17	27	4.5×10^3	--	63	94	1.1×10^5	1.7×10^4	1.8×10^4	1.3×10^4	1.2×10^4

Source:Member Secretary,CPCC Chandigarh

Chhath Pooja, 2018

Chatt Pooja Sample collected on 13.11.2018 to 16.11.2018 at 42 lake

Sr.No.	Parameters	Unit	Pre chatt Pooja	During Chatt	After Chatt Pooja
1	pH	-	7.9	7.6	7.3
2	Conductivity	µs/cm	487	484	493
3	DO	mg/l	8.7	8.6	2.2
4	COD	mg/l	15	18	24
5	BOD	mg/l	<1	2.9	6.7
6	Total Solid	mg/l	304	322	388
7	Total Dissolved Solid	mg/l	250	304	320
8	Total Suspended Solid	mg/l	8	11	16
9	Tubidity	NTU	2.3	4.2	12.7
10	NH_3-N	mg/l	BDL	1.16	1.17
11	PO_4-P	mg/l	BDL	BDL	BDL

Source: CPCC, Chandigarh

Do you know : There is ice on the poles of the moon, and on the poles of Mars and Mercury.

Chhath is an ancient Hindu Vedic festival historically native to the Indian subcontinent. The rituals of the festival are rigorous and are observed over a period of four days. It includes fasting and abstaining from water intake, standing in water for long periods of time and holy bathing. Such rituals not only degrade the water quality but also hamper its physiological health. It largely effects water properties like BOD, COD, DO and cause harm to aquatic life. Above is the table indicating various parameters that are being affected during and after this ritual.

Ghaggar Action Plan

River Ghaggar originates in Dagshai village in Himachal Pradesh and flows through Punjab and Haryana states into Rajasthan. It passes around 7 kms far from Chandigarh. However, waste water of Chandigarh whether treated or untreated finally goes to river Ghaggar. Keeping in view of deteriorated quality of river Ghaggar, Hon'able National Green Tribunal, in the matter of OA No. 138 of 2016 titled, ' Stench Grips Mansa's Ghaggar River' passed an order in which all the concerned have been directed to take corrective measures to stop pollution in river Ghaggar. For monitoring of the same, Hon'able NGT has constituted executive committee under the Chairmanship of Justice Pritam Pal, Former Judge, Punjab and Haryana High Court.

S. No.	Name	Designation
1	Justice Pritam Pal (Former Judge, Punjab and Haryana High Court, Chandigarh)	Chairman
2	Dr. Vimal Kumar Hatwal Joint Director (S), Regional Office, Chandigarh, Ministry of Environment, Forest and Climate Change	Member
3	Sh. J. Chandra Babu, Scientist – D, Central Pollution Control Board, New Delhi	Member

Source: CPCC, Chandigarh

As per direction of Hon'ble National Green Tribunal District Level Special Task force and State Level Special Task Force has been constituted vide order no. ED/2018/316 dated 07.09.2018.

S.No.	Members	Designation
1	District Magistrate, U. T. Chandigarh	**Chairman**
2	Superintendent of Police, Chd. Police	Member
3	Sh. Amarinder Sharma, Secretary, District Legal Services Authority	Member
4	SE, PH Division, Engg. Deptt., Chd. Admn.	Member
5	SE, PH Division, Municipal Corporation	Member
6	Scientist 'B', CPCC	Member Secretary

Source: CPCC, Chandigarh

Do you know : A kilo of cotton – enough for a shirt and a pair of jeans – needs 10,000 litres of water to produce.

State Level Special Task Force

S.No.	Members	Designation
1	Advisor to the Administrator, U. T. Chandigarh	Chairman
2	Secretary Environment, Chd. Admn.	Member
3	Secretary, Urban Planning, U. T. Chd.	Member
4	Secretary, Local Body, U. T. Chd.	Member
5	Commissioner, Municipal Corporation	Member
6	Chief Engineer, Chd. Admn.	Member
7	Member Secretary, CPCC	Member Secretary

Source: CPCC, Chandigarh

Action Plan for control of Domestic Sewage

As per information received from Engineering Department, Chandigarh Administration, Municipal Corporation, Chandigarh and Chandigarh Smart City Limited, action plan has been prepared regarding stoppage of discharge of waste water into Sukhna Choe & N-Choe, upgradation of existing STPs and installation of new STPs. Details of which are given as under.

Action Plan for control of discharge of waste water into Sukhna Choe

Sr. No.	Point	Status as on December 2018	Long Term/Short Term Action Plan	Financial Implications	Implementing Agency
1	Kishangarh Outlet	There is sewage water discharge from the outlet.	STP has been proposed to treat the waste water (Will be commissioned by Nov. 2021)	-	Chandigarh Smart City Ltd.
2	Outlet of Village Kishangarh inside Forest Nursery	There is sewage water discharge from the outlet.	Engineering Department, Chandigarh Administration will tap the same by 31.03.2019.	Rs. 19.94 Lakhs	Engg. Deptt., Chd. Admn.

3	Outlet of Village Hallomajra	Around 70 % household have already been connected to sewer line.	By 31.01.2019 all the household will be connected to sewer line. After that there will no discharge of waste water.	-	MC, Chd.
4	Second outlet of Bapu Dham Colony (Known as Madrasi Colony)	The slum developers have constructed their toilets on the existing CBD. Matter has now been taken up with Estate Office, U.T. Chandigarh for removal of encroachment on the CBD at Bapu Dham Colony, so that flow coming into Choe may be plugged.	Municipal Corporation Chandigarh has stopped all such discharges points and there is no waste water discharge. (For long term CBD will be replaced by RCC pipe and will be completed by 31.12.2019)	Rs. 22.00 Lakhs	MC, Chd.

Source: CPCC, Chandigarh

Action Plan for control of discharge of waste water into N-Choe

Sr. No.	Point	Status as on December 2018	Long Term/Short Term Action Plan	Financial Implications	Implementing Agency
1	Leisure valley	01 outlets is discharging waste water	One Outlet has been plugged and there is little discharge from one outlet, will be plugged by 31.12.2018.	Rs. 5.00 Lakhs	MC,Chd.
2	01 outlet in Beant Memorial	Water logging	This is major work and will be completed by August, 2019.	Rs. 182.00 Lakhs	MC,Chd.

Do you know : Hot water freezes faster than cold water. This is known as the Mpemba Effect

3	Sector 52 (starting)	Two outlets discharging Sewage Water	The work will be taken care when the work of Sr. No. 2 will be completed (Will be plugged by 31.12.2019).	-	MC,Chd.
4	Sector 52 (End)	Two outlets discharging Sewage Water	One outlet has been plugged and another outlet will be plugged by 31.12.2019.	-	MC,Chd.

Source: CPCC, Chandigarh

Sewage Treatment

Chandigarh Smart City Limited is in process for upgradation of below 05 STPs to treat the waste water upto the level of 5 mg/l BOD and also in the process for setting up of new STPs as per detail given below.

Sr. No.	Location of STP	Capacity	Action Plan	Implementing Agency
1.	Diggian	30 MGD (136.2 MLD)	Will be upgraded to treat the waste water upto the level of 5 mg/l BOD **by Nov. 2021**	Chandigarh Smart City Limited
2.	3 BRD	11 MGD (49.94 MLD)	Will be upgraded to treat the waste water upto the level of 5 mg/l BOD **by Nov 2021**	Chandigarh Smart City Limited
3.	Raipur Kalan	5 MGD (22.7 MLD)	Will be upgraded to treat the waste water upto the level of 5 mg/l BOD **by Nov. 2021**	Chandigarh Smart City Limited
4.	Raipur Khurd	1.25 MGD (5.67 MLD)	Will be **upgraded to 2.0 MGD** Capacity and to treat the waste water upto the level of 5 mg/l BOD **by Nov. 2021**	Chandigarh Smart City Limited
5.	Dhanas	1.6 MGD (7.26 MLD)	Will be upgraded to treat the waste water upto the level of 5 mg/l BOD **by Nov. 2021**	Chandigarh Smart City Limited

Source: CPCC, Chandigarh

Further, the following Sewage Treatment Plants are under construction:-

Sr. No.	Location of STPs	Capacity	Implementing Agency
1	Maloya	5 MGD (22.70 MLD)	Municipal Corporation, Chandigarh
2	Raipur Kalan	1.25 MGD (5.67 MLD)	Engineering Department, Chandigarh Administration.

Source: CPCC, Chandigarh

One new Sewage Treatment Plant is also proposed to be constructed in Kishangarh Near Sukhna Lake, detail of which is given below:-

Sr. No.	Location of STPs	Capacity	Timelines	Implementing Agency
1	Kishangarh near Sukhna Lake	2.0 MLD	Will be Completed by November 2021	Chandigarh Smart City Limited

Source: CPCC, Chandigarh

Initiatives With a Vision-

Bulk generators and even houses where tertiary water supply is available, are asked to use as much as possible tertiary water which will reduce the fresh water consumption.

Whole of Chandigarh is connected with Sewerage System and there are dedicated sewerage lines to carry the waste water directly to the sewage treatment plant.

Waste water from whole of the Chandigarh goes to Terminal Sewage Treatment Plants. Now, as per order of Hon'ble NGT residential societies having more than 10,000 sq. meters built up area will have to install an on site STP.

Treated water is being supplied to various gardens and institutions for gardening purpose. Further, network is being laid to supply the treated water in all areas after which around 20 MGD tertiary waste water will be supplied. This will be completed by March 2020.

Chandigarh Smart City Limited is going to upgrade all the existing STPs to treat the waste water upto the level of 5 mg/l BOD.

CPCC is monitoring performance of STPs on monthly basis and results are shared with concerned agencies to take corrective measures.

Presently there is no Common Effluent Treatment Plant in Chandigarh as it is a very small city and generates waste water in very less quantity. There are around 100 electroplating units all of which have captive ETPs. Because of cost factor for the land, no CETP is feasible in U.T. Chandigarh. Now, there is one firm which is in process for setting up of CETP in Punjab and ready to accept the waste of electroplating units of Chandigarh.

Mawsynram, a village on the Khasi Hills, Meghalaya, receives the highest recorded average rainfall in the world.

- It is mandatory for the treated industrial effluent to get diverted to Sewage Terminal Treatment Plant and again be treated there. From there, tertiary treated waste water will be supplied to various gardens and institute.

- Sludge from ETPs of Industrial units which is not hazardous is being disposed with municipal waste and sludge which is hazardous in nature is being disposed through Treatment Storage & Disposal Facility (TSDP) Nimbua.

- Municipal Corporation, Chandigarh has banned the use of hand pump for drinking purpose. Tube wells are used for supply by MC, Chandigarh.

- In order to create awareness among general public regarding ill effect of improper disposal of waste water, health camps are being organized by Health Department. In future, more such awareness camps will be conducted.

- Regular cleaning and maintenance of 3 nos. choes i.e. N-Choe, Sukhna Choe and Patiala ki rao is being done by the Engg. Deptt. of Chd. Admn.

- The upgradation of 5 nos. existing STPs alongwith construction of new STP of 2 MLD capacity at Kishangarh is being done under Chandigarh Smart City Ltd.

- The inspection of these choes is being conducted from time to time.

- Executive Committee has been formed to monitor the water quality of river Ghaggar. Concrete action plan is being prepared to ensure that no untreated waste water goes into these choes.

Waste Management and Sanitation

Sustainable Development and Polluter Pay is the fundamental base for waste management rules in India. These principles, mandate municipalities and commercial set-ups to act in a responsible and environmentally sustainable manner, thus restoring the ecological balance. Waste generation is without a doubt, by-product of economic development that has led to various subordinate legislations for regulating disposal activities dealing with generated waste, under the umbrella law of Environment Protection Act, 1986 (EPA). Specific forms of waste necessitate varied types of authorizations, maintenance and adequate disposal mechanisms.

The key to efficient waste management is to ensure proper segregation of waste at source and to make certain that the waste goes through different streams of recycling and resource recovery. This reduced residue is then deposited scientifically at the required sites. For instance, sanitary landfills are the ultimate means of disposal for unutilized municipal solid waste from waste processing facilities and other types of inorganic waste that cannot be reused or recycled.

India churns out 18.5 lakh tonnes of e-waste annually.

As per Central Pollution Control Board, municipal areas in the country generate 1, 33,760 metric tonnes per day of municipal solid waste (MSW), of which only 91,152 TPD waste is collected and 25,884 TPD is treated. As per information available, municipal areas in the country generate 1,33,760 tonnes per day (TPD) of plastic waste, of which only 9,250TPD waste is collected and recycled.

Waste management can be achieved by proper collection at source, efficient transportation mode, processing, effective recycling and scientific disposal methods, in an effort to reduce the effect of these wastes on human health or local aesthetics or amenity.

Municipal Solid Waste Management in Chandigarh

With rapid urbanization and industrialization, there has been a marked rise in living conditions of people and this has lead to the generation of varied types of solid waste that needs to be effectively managed. For the sustainable development of any nation proper management of solid waste is very essential. Quantity estimation and characteristics of Municipal Solid Waste and its forecasting over the planning period is the key to its successful management plan. Chandigarh for that matter is doing much better than the majority of urban cities and states of the country.

The Municipal Corporation, Chandigarh is collecting daily around 500 tonnes of municipal waste from all over Chandigarh and hand over the waste to the garbage processing plant set up by M/s Jai Prakash Associates at Dadu Majra where they process the municipal solid waste to produce:

- Refuse Derived Fuel (RDF) (plant capacity – 500 MT/day)
- Compost (plant capacity – 300 MT/day)

Although due to efficient collection and segregation schemes launched by the administration, the collection efficiency has increased from 97% to 100%. The MC has resolved the scheme for solid waste management for Chandigarh in terms of scrutiny for un-attended areas for the collection of door-to-door garbage. In order to catalyze the waste management process, there are 36 Sehaj Safai Kendras, that will scientifically collect, segregate and dispose off the tons of garbage generated by the city every day. There is also 01 Urban Local Bodies (ULBs) responsible for implementation of the SWM, Rules, 2016, in the State. State Level Advisory Board (SLAB) has been constituted by municipal corporation, Chandigarh. Now, even the Bye Laws have been notified by MCC. 12 litres capacity bins (Blue & Green) have been distributed free of cost to all the households of Chandigarh and segregation of waste has been started in 21 wards (out of 26 wards). Municipal Corporation is using dumpers, tractors, trolleys; trippers for transportation of MSW to the garbage processing plant set up by M/s Jai Prakash Associates where they process the municipal solid waste to produce Refuse Derived Fuel (RDF) and compost.

Sehaj Safai Kendras:

In Chandigarh, the door to door collection & segregation of MSW is being done by 3,420 manual waste collectors. The waste collected is then transported to 36 special units called the Sehaj Safai Kendras, which were built-up by the city corporation with active involvement and participation of Resident Welfare Associations, NGOs, CAWEDS (Chandigarh Animal Welfare and Eco Development Society).

Sector	Location	Sector	Location
Sector 9	Back Side CITCO Petrol Pump	Sector 29	Back Side of Ram Sharnam Mandir
Sector 8	Opposite Dispensary	Sector 29	Back Side Garwal Bhawan
Sector 51	Near Burail Jail	Sector 28 B	Adjoining Himachal Bhawan
Sector 49-B	On Entrance of V-5 Road Sector 49 A & B	Sector 28	Near ITI
Sector 45	In Village Burail Near Dispensary	Sector 27 D	Adjoining House No. 3075
Sector 44	Near Petrol Pump Sector 44-C	Sector 27 B	Near Moti Ram Sr. Sec. School
Sector 42	Near Govt. College for Girls Sector 42-D	Sector 23 D	Near Electricity Grid Sub Station
Sector 4	Opposite Water Works	Sector 22	Adjoining Petrol Pump Sector 22-C
Sector 39	Near Rehri Market Sector 39-D	Sector 21	Near Labour Chowk Sector 20,21,33,34
Sector 37	Near Mini Market Sector 37-C	Sector 18	Near Lion's Club
Sector 36 C & D	Near Mali Huts	Sector 17	Back Side Anand Theatre
Sector 36 A & B	Back Side Hare Krishan Mandir	Sector 17	Near Udyog Bhawan
Sector 35 A & B	Near Markfed	Sector 15 C	Near Bal Niketan
Sector 35	Green Belt Adjoining Kerosene Pump	Sector 11	Near Electricity Grid Sub Station & Govt. School
Sector 33	Back Side Petrol Pump Sector 33-B	Ram Darbar	Near House No. 1735 in Labour Colony Ram Darbar
Sector 32	Adjoining S.D. College	Modern Housing Complex	Near Entrance at Railway Crossing
Sector 31	Near Tubewell Sector 31-B	Industrial Area	Near Cattle Pound (Gaushala)
Sector 30	Back Side H.No. 342	Industrial Area	Opposite Plot No. 93

Source:Municipal Corporation, Chandigarh

Recycling one ton of paper saves 682.5 gallons of oil, 7,000 gallons of water and 3.3 cubic yards of landfill space.

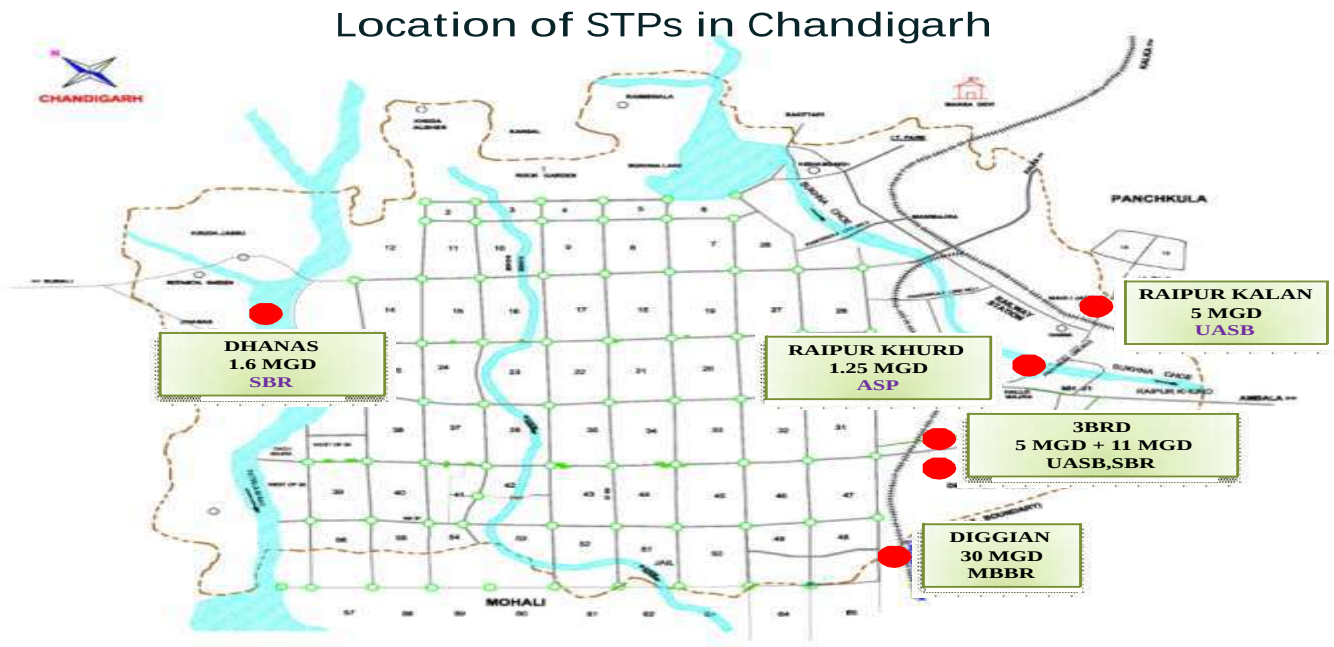
Sewage Scenario in Chandigarh

The city of Chandigarh has a well planned underground network of pipes for the disposal of sewerage generated in the city. It is obligatory for every residential/ non residential area. The sewage of the city flows under gravity in various pipes of different diameter ranging from 6" to 18" S.W. Pipes and 24" x 36" to 66" dia circular brick sewer. The total length of the sewer lines in the city is 890 km. The sewage is carried to a Sewage Treatment Plant (STP) for treatment and this treated sewage is then disposed off in an open Nallah. There are few pockets in the city which are at lower level and thus the sewage of these pockets cannot be discharged under gravity into the sewerage system of the city. The sewage of these pockets is pumped into the sewerage system and thereafter it flows under gravity to the Sewage Treatment Plant.

Source: https://www.researchgate.net/figure/Map-of-Chandigarh-city_fig1_276275442

Year	Total Length of Sewerage Pipelines Laid (KM)	Total Number of Sewerage Treatment Plants (STP's)
2013	1090	5 Nos
2014	1108	5 Nos
2015	1108	5 Nos
2016	1138	5 Nos
2017	1139	5 Nos

Source: Executive Engineer,MCPH, Div.4, Chandigarh



MSW Life Cycle Assessment

MSW life cycle assessment includes the following steps-

- Segregation
- Storage
- Collection
- Transportation
- Processing
- Disposal

1. Segregation

It is necessary for all waste generators to separate and store the solid waste in the following categories-

- Non-biodegradable or dry waste
- Biodegradable or wet waste
- Domestic, Hazardous waste, to be deposited in covered bins and handover segregated waste to designated waste collectors.

2. Storage

The color of bins for storage of segregated waste shall be: Green for bio-degradable waste, blue for non-biodegradable or dry waste and black for domestic hazardous waste.

3. Collection

In order to collect garbage from every house, area-wise specific time slot is set and published at conspicuous parts of that area and on the website of MCC.

4. Transportation

Vehicles used for transportation of waste shall be covered in such a manner that the collected waste is not exposed to open environment. The vehicles may also include compactors and mobile transfer stations

Recycling one aluminum can saves enough energy to listen to a full album on your iPod.

depending upon choice of technology of MCC. Collected segregated bio-degradable waste from residential and other areas shall be transferred to the processing plants like RDF, compost plants, bio-methanation plants or any such other facilities in a covered manner.

5. Processing

Ministry of Urban Development from time to time make respective standards as prescribed by the Central Pollution Control Board, which are as follows-

1. To minimize transportation cost and environmental impacts, preference shall be given to decentralized processing such as bio-methanation, microbial composting, vermin-composting and anaerobic digestion.
2. Through construction and demolition waste management.
3. Through waste to energy processes by refuse derived fuel for combustible fraction of waste or supply as feedback to solid waste based power plants
4. Ensure recyclables such as paper, plastic, metal, glass to reach the respective authorized recyclers.

6. Disposal

MCC shall undertake on its own or through any other agency, the construction, operation and maintenance of sanitary landfill and associated infrastructure for disposal of residual waste and inert street sweepings and silt from surface drains in a manner prescribed under SWM rules

Storm Water Drainage System in Chandigarh

The city has well laid out under ground storm water drainage system. The Storm Water Drainage System has been designed keeping in view the slope of the city i.e. from North West to South East. It was initially designed for a rain intensity of half inch per hour. However, because of the increased green areas/ open spaces coming under construction, the run off co-efficient has increased tremendously. This has resulted in the over loading of storm water drainage system and hence flooding of low lying pockets in the city. The Corporation had conducted a survey and identified 35 such pockets. The storm water drainage systems in these pockets have been augmented by providing additional lines and road gullies.