Pre-Feasibility Project Report

For

Construction of New Civil Enclave at Bareilly Airforce Base in Uttar Pradesh

AIRPORTS AUTHORITY OF INDIA

Chapter 1

New Civil Enclave at Bareilly Airforce Base

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1.1 Background

Trishul Airforce Base of the Indian Air Force at located at Izzatnagar, 6 kilometers North of Bareilly in the State of Uttar Pradesh. The Airforce base is not open to civilians except some high government officials on government work.

A MOU has been signed between Govt. of Uttar Pradesh, Civil Aviation Department and Airport Authority of India for development and operationalisation of civil enclave adjacent to at Bareilly Airforce Base.

Reference Point:

Latitude	28˚ 25' 28.63" N
Longitude	79° 27' 57.91" E
Elevation	173 m

1.2 Construction of New Civil Enclave adjacent to Bareilly Airforce Base

Airport Authority of India has planned for development of new civil enclave adjacent to Bareilly Airforce Base.

Scope of work is prepared for development of a new civil enclave at Bareilly for construction of Apron to park 02 Nos. of ATR 72 type of Aircraft, link taxi track and terminal building for 150 passengers (75 Arrival and Departure) as per IMG norms and with car park for 75 cars.

As per CPMS forecast the PHP is 100, however considering one ATR -72 passenger load the PHP has been taken 150 passengers.

A. Civil Works

Apron and Taxiway

i. Construction of apron of dimension 95 m x 100 m, suitable for the parking of 2 nos. of ATR-72 type of aircraft in power in/power out configuration

with 3.5 m wide shoulders all around the apron along suitable GSE are of dimension 20m x 50 m.

ii. Construction of linked taxi track dimension of 835 m x 18 m with 3.5 m shoulders on either side of the taxi track, subject to clearance from IAF.
iii. Development of taxiway strip with suitable grading.
iv. The slope on apron, taxiway, strip etc should be as prescribed in DGCA CAR, under various paragraphs
v. Storm water drains to be provided to operational/non-operational areas.
vi. Construction of boundary wall of 2.45 m + 0.45 m with concertina coiled barbed wire.
vii. Perimeter road of 3.5 m with all around the boundary wall inside the airport.

Terminal Building

2500 sqm Terminal Building for 150 peak Hour Passengers (75 Arrival + 75 Departure)

(I) Common Concourse

Common Concourse area should have provision for snack bar, toilets, AHU switch room, drinking water, first aid room, supporting office for AAI and airlines.

(II) Check –In Area

(i) The check in area will have 04 nos. Check-in counters and adequate queuing space.
(ii) 01 no baggage conveyer belt for registered baggage.
(iii) Adquate number of tablets (ladies, gents and physically challenged persons) back up offices for airlines, AHU, switch room, drinking water facilities, storing space for 50 baggage trolleys etc.
(iv) Seating arrangement for passengers after check-in and before security check.
(v) Isolated smoking area with proper ventilation.

(III) Security Hold Area

The security hold area should accommodate at least 75 pax at a time with adequate number of toilets (ladies, gents and physically challenged persons), frisking both 03 nos. (02 gents and 01 ladies), space for X Ray machine for hand baggage, AHU, Switch room, drinking water, snack bar facility.

(IV) Baggage Collection/Arrival Lounge

(i) The baggage collection and arrival lounge should have 01 no. conveyor belt of adequate length.
(ii) Adequate space for storing baggage trolleys, space for storing of mishandled/unclaimed baggage.
(iii) Adequate number of toilets (ladies, gents and physically challenged persons), AHU, Switch room, drinking water, prepaid taxi counter.
(iv) Provision of Information Counter & Prepaid Taxi Counter.

(B) Electrical Works

(i) Internal and external electrification for Terminal Building Complex, associated building, car park and roads
(ii) Augmentation of main power supply, submission equipment, DG Sets for Secondary Power Supply and associated ancillary buildings
(iii) Provision of central air-conditioning & ventilation (HVAC) system & BMS for New Terminal Building
(iv) Provision of conveyor belts at departure area and Baggage Carousels at arrival hall
(v) Provision of fire detection & alarm system, provision of fire hydrants and water sprinklers system as per standards along with fire extinguishers
(vi) Provision of adequate number of signage inside and outside the terminal building, car park area and City side approach road and air side area for guidance of passengers and visitors.

(C) Airport Systems

(i) Public Address System and Car Calling System
(ii) Surveillance close circuit TV System (SCCTC) and provision of adequate number of close circuit TV monitors, in the Security Control Room, Terminal Manager Room, APD Office, etc.
(iii) Provision of Flight Information Display System (FIDS) with adequate number of Display Devices in departure, arrival and security hold area for passenger facilitation.
(iv) Provision of adequate number of X ray machines for scanning Registered baggage (RB)/Hand Baggage (HB) including provision of required number of ETDs, DFMDs & HHMDs as per BCAS norms.
(v) Provision of adequate no. of VHF FM sets (Walkie-Talkie, Base Stations and Mobile Stations)

(vi) Provisions of Telephone Exchange/ digital EPABX/IP EPABX system for Terminal Building including Telephone /Intercom instruments, wiring, etc.

(D) IT Systems

(i) Passive and Active Networking components such as OFC, UTP cabling, routers, Core and Access switches and accessories. Provision of Raceways, cable tray and conducting and cabling
(ii) Sever room and adequate space for keeping network switches along with electrical power points & UPS
(iii) Access Control System as per BCAS requirement
(iv) Provision of internet, VPN bandwidth, Wi-Fi System

(E) Miscellaneous Works

(i) Construction of regular boundary wall segregating the operational area of Civil Enclave and perimeter wall /fencing all around the city side.
(ii) Construction of pump house for overhead water tank and sump etc for terminal building
(iii) Provision of gates to segregate air side and city side area with security ground posts at the entry and exit gates.
(iv) Construction of perimeter road of 3.5 m width with shoulders all along the boundary wall inside operation area.
(v) Construction of 04 lane approach road from nearest main road to Terminal Building via shortest distance.
(vi) Horticulture and gardening works on city and airside of terminal building.
(vii) Provision of water storage and water supply scheme and rain water harvesting system
(viii) Provision of sewage disposal system and garbage disposal system
(ix) Construction of vehicle parking, ticket counter, driver rest room and toilet on city side of terminal building.

1.5 Project Site Details

The site for proposed civil enclave comprises 36.75 Acres of land. It is located at Longitude 28° 25′ 28.63" N and Latitude 79° 27′ 57.91" E with elevation of 173 m amsl. Area around of new civil enclave of SOI Toposheet is shown in **Figure 1.1.** The map showing 10 km radius area around the proposed civil enclave on Google map is shown as **Figure 1.2.** The site plan of the proposed civil enclave is shown in **Figure 1.3.** Ground floor plan, first floor plan and

elevation for terminal building at proposed New Civil Enclave at Bareilly Air Force Station are given **Figure 1.4**, **Figure 1.5** and **Figure 1.6**, respectively.

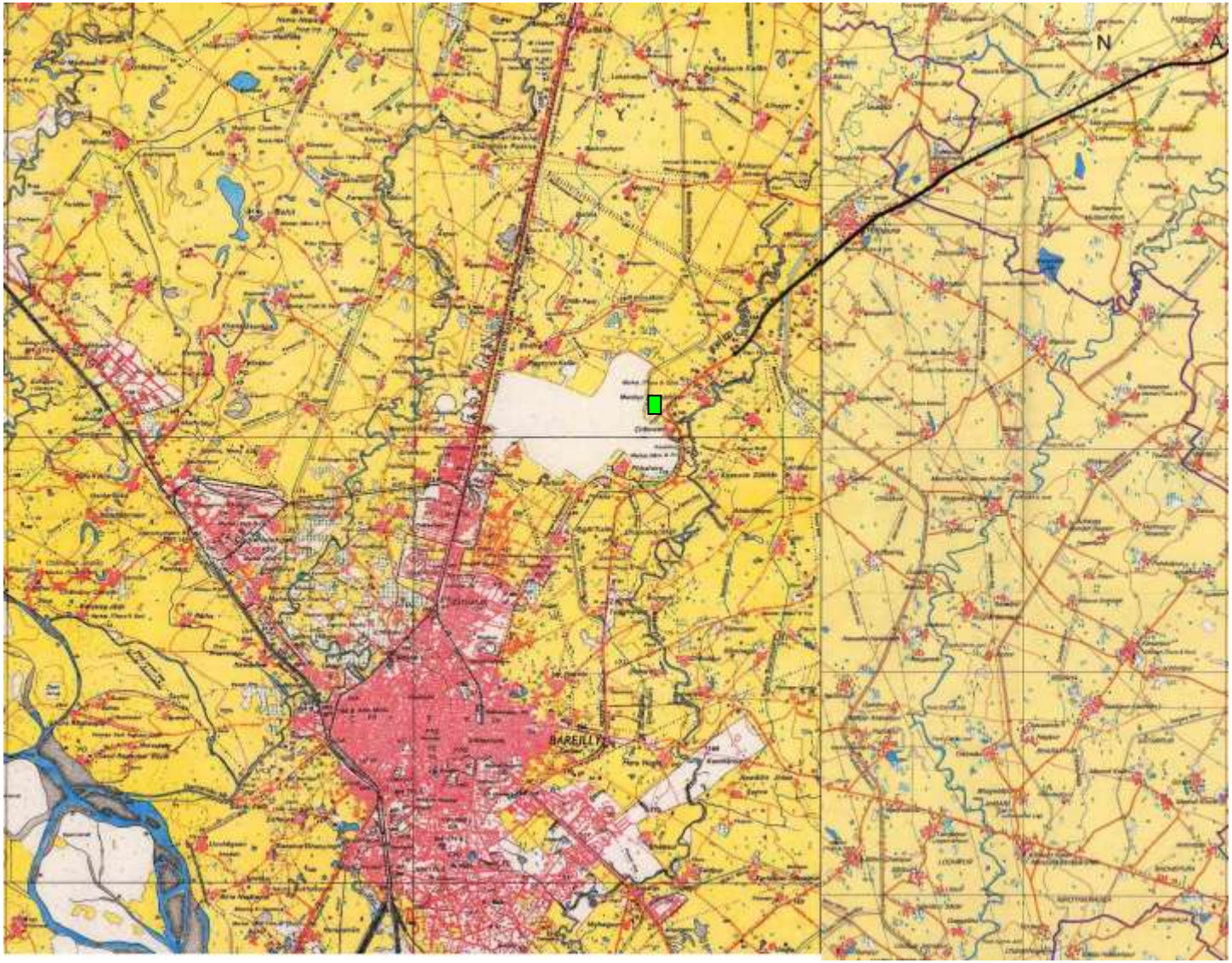

Figure 1.1: Area around of New Civil Enclave of SOI Toposheet

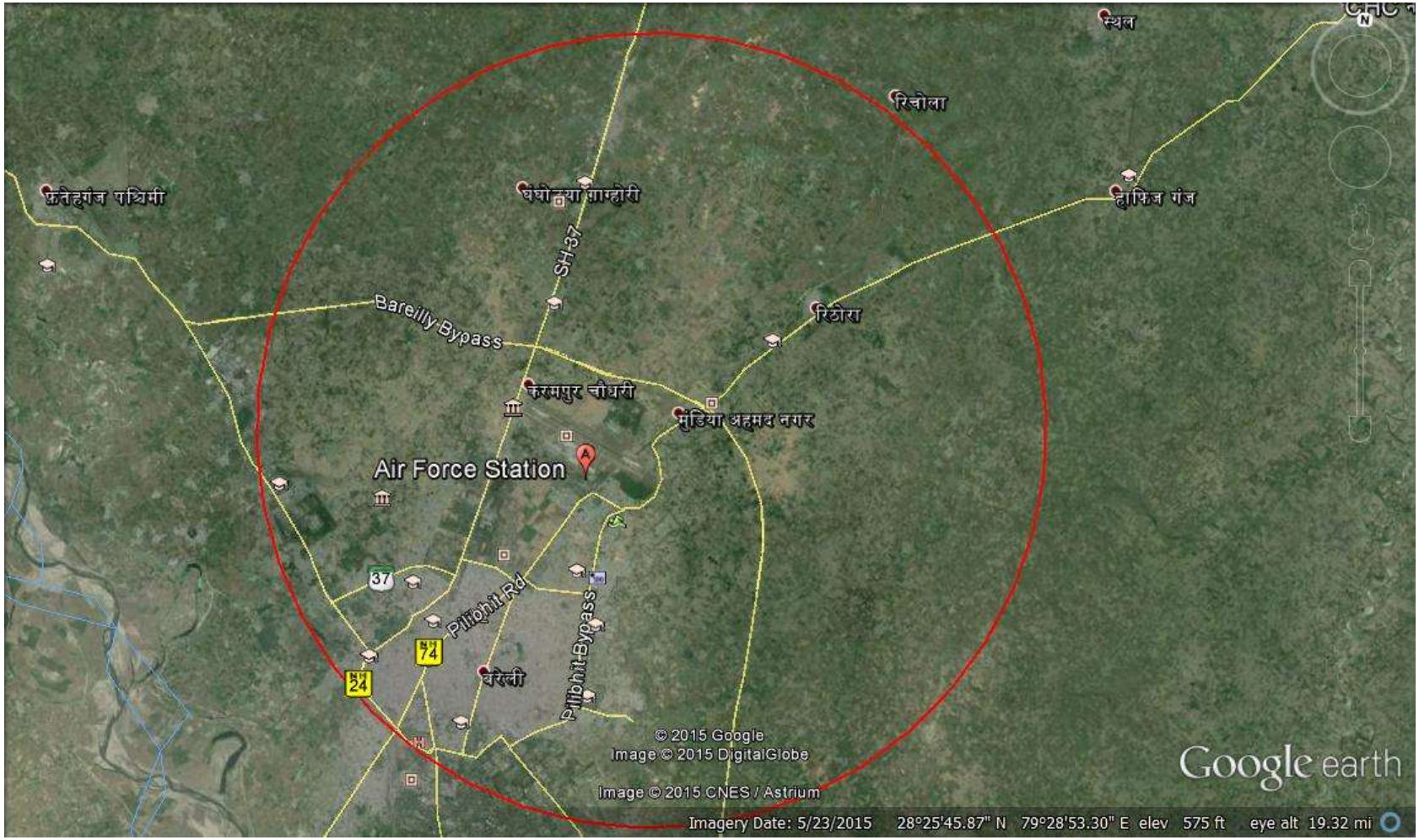

Figure 1.2: 10 Km Radius Area around the proposed Civil Enclave on Google Map

Figure 1.3: Site Plan for Proposed New Civil Enclave at Bareilly Air Force Station

Figure 1.4: Ground Floor Plan for Terminal Building at Proposed New Civil Enclave at Bareilly Air Force Station

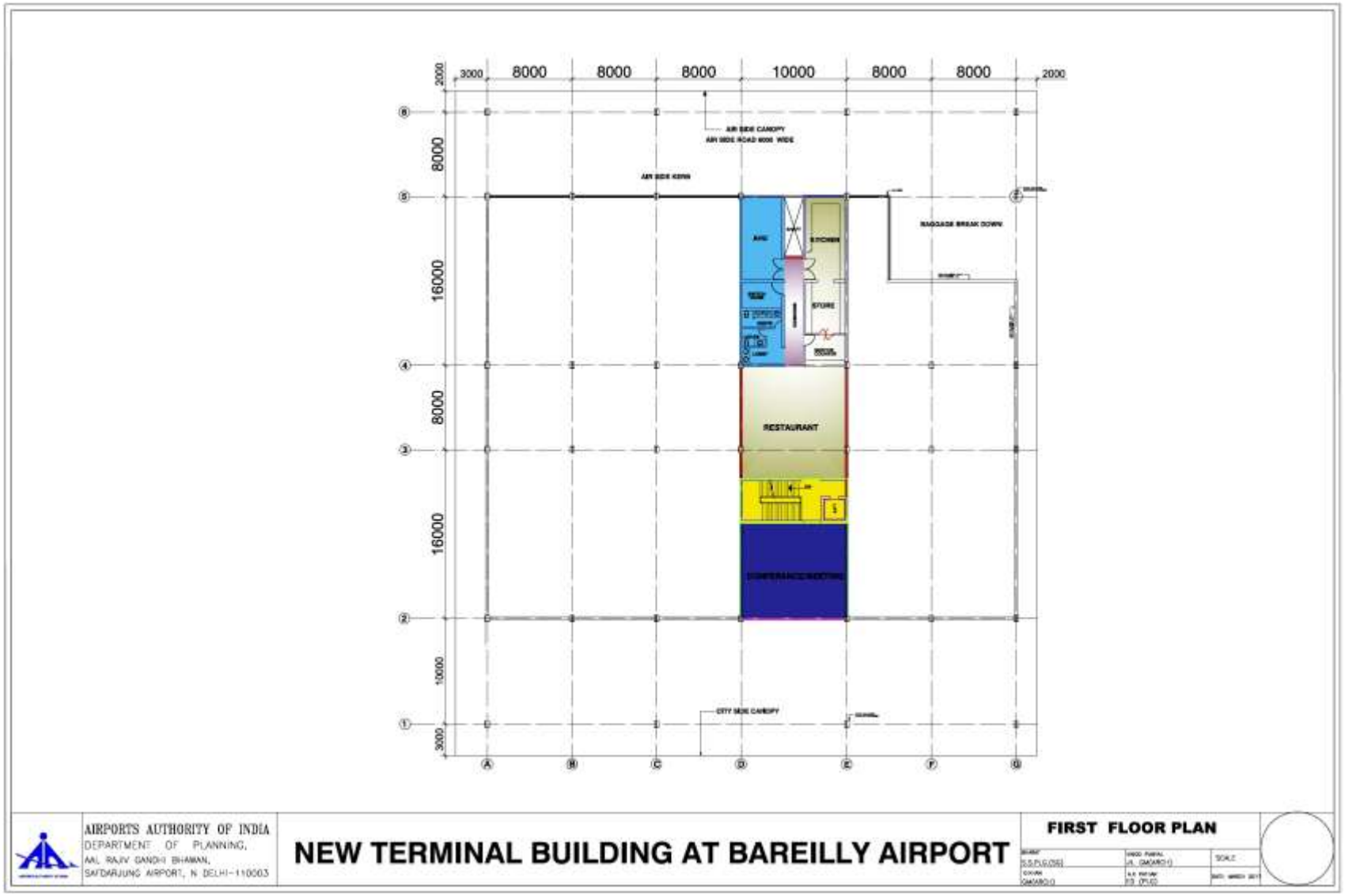

Figure 1.5: First Floor Plan for Terminal Building at Proposed New Civil Enclave at Bareilly Air Force Station

Figure 1.6: Elevation for Terminal Building at Proposed New Civil Enclave at Bareilly Air Force Station

Chapter 2

Water Supply, Sewerage, Drainage And Fire Fighting

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2.1 Introduction

At proposed new civil enclave at Airforce Base Bareilly, terminal building is proposed covering an area of approx. 2500 sqm.

2.2 Expected Population per Day at New Civil Enclave

The expected population per day at the new civil enclave is given below:

Arriving and Departing Passengers	-	500
New Civil Enclave Staff (day time)	-	40
New Civil Enclave Staff (24 hourly)	-	35
Drivers/Visitors	-	100

Water required as per National Building Code 2005 Part IX Table 2 is given below.

Terminal Staff (day time)	-	70 Litres/Head/Day
Terminal Staff (24 hourly time)	-	135 Litres/Head/Day
Air Passenger	-	15 Litres/Head
Floating population	-	15 Litres/Head

2.3 Total Water Required

Water requirement for the proposed civil enclave is estimated as given below:

For Domestic Water Use

Air Passengers (500x15)		-	7500 Litres
Staff day time (40 x70)		-	2800 Litres
Staff (35 x135)		-	4725 Litres
Visitors (100x15)		-	1500 Litres
Total		-	16525 Litres
	Say	-	17 kld

For Crush Fire Tender Water Use	-	6 kl
For HVAC Use	-	10 kl

Total water requirement is estimated as 33 Kl per day (35 Kl). The water balance diagram is shown in **Figure 2.1**. The water requirement for flushing and landscaping will be met through reuse of treated waste water from STP.

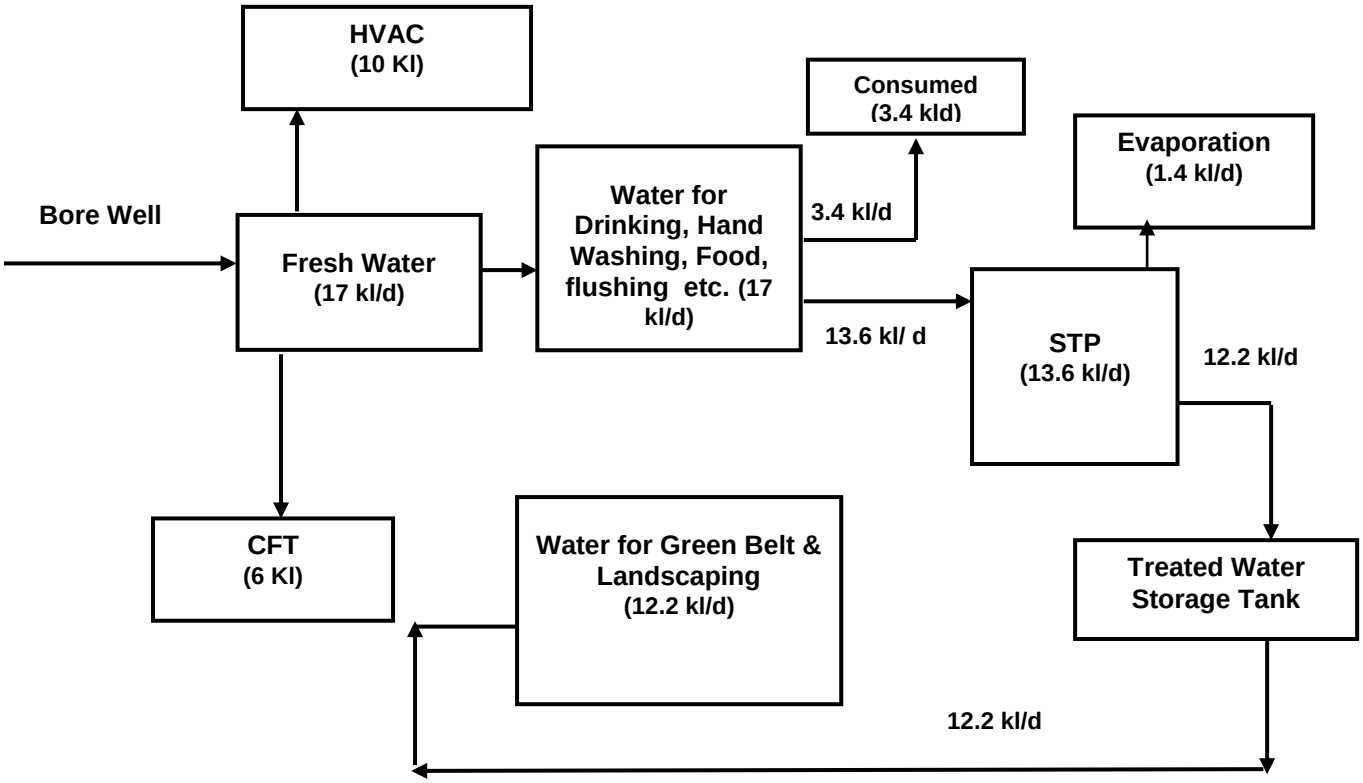

Figure 2.1: Water Balance Diagram for Proposed Civil Enclave

2.4 Sources of Water

Water requirement will be met through tube wells.

2.5 Sanitary Fixtures And Toilet Accessories

Water Closet: All water closets will be wall hung with concealed dual flushing cistern and in lodders and staff toilets WC will be provided with dual flushing cistern. Under counter/ circular above counter wash basins with battery operated auto sensor pillar taps will be provided.

- Flat back wash basins with CP brass self closing pillar tap will be provided in lodders and staff toilets.
- Semi stall urinal with battery operating auto sensor flush valves.
- Frosted Glass urinal portion with metal clips.
- CP adjustable shower with Diverter and spout in rest room's and VIP toilet.
- Vitreous china recess toilet paper holder.
- Automatic soap dispenser on wash basins (Stainless steel).
- Automatic air purifier (Stainless steel).
- Toilet tissue paper holder (Stainless steel).
- Automatic electrically operated hand drier (Stainless steel).

2.6 Water Distributions Pipe and Fittings

G.I. / composite Pipe and fitting for hot and cold water. Heavy class G.I. pipe and fitting in shaft and under floor. All external under ground water pipe will be cast iron Class LA conforming to IS:1536 with specials and lead joints.

2.7 Sewerage Treatment and Disposal

As per water balance diagram, 14 kl/d sewage will be generated after the operation of new terminal building which will be treated in STP of 20 kl/day capacity.

2.8 Sewage Treatment Plant

Sewage generated from the new civil enclave will be treated in well designed Sewage Treatment Plant (STP). It is proposed to installed Moving Bed Biofilm Reactor (MBBR) type sewage treatment plant of 20 kl capacity.

Design of STP

Approximately 20 kl per day sewage/waste water will be generated from the proposed airport. Sewage will be collected and treated in well-designed sewage

treatment plant. After meeting stipulated standards, treated waste water will be utilized for flushing purpose, irrigation of greenery and landscaping.

Details of Sewage Treatment Process

The sewage from the proposed new civil enclave shall be collected by gravity into the collection tank/equalization tank of Sewage Treatment Plant (STP) via perforated screens to prevent the large particles into system. In equalization tank, pH and temperature of incoming sewage will be equalized. The sewage from equalization tank will be pumped to Moving Bed Biofilm Reactor (MBBR) reactor for biological treatment, where required quantity of air in presence of MBBR system will be supplied to meet the oxygen requirements by mean of blower and fine bubbles air diffusers. After MBBR reactor, sewage will flow by gravity to settler (tube type) where sludge will be settled at the bottom due to gravity. This settled sludge will be recycled through sludge pump to MBBR reactor to meet the mixed liquor suspended solids (MLSS) requirement, excess sludge will be discharged through filter press for final disposal. Final discharge of waste water from settler will be collected in chlorine contact tank, where some chlorine will be dosed for disinfections of treated waste water. Then, treated sewage will be pumped for tertiary treatment through duel media filter or it will be passed through Ultraviolet (UV) disinfection system. Treated sewage will meet the norms prescribed by Uttar Pradesh Pollution Control Board and will be utilized for flushing, HVAC and for irrigation of greenery & landscaping purpose. Treated wasted water will not be discharged out side the boundary of proposed airport.

Design Parameters

Design parameters for proposed STP are given below:

Sl.	**Parameters**	**Inlet**	**Outlet**
1.	BOD	300 mg/l	Less than 20 mg/l
2.	COD	400 mg/l	Less than 150 mg/l
3.	Oil & Grease	50 mg/l	Less than 10 mg/l
4.	TSS	200 mg/l	Less than 50 mg/l
5.	PH	6.5-8.5 mg/l	6.5-8.5 mg/l

No treated waste water will be discharged outside the airport. Unit wise description of the proposed STP is given below and shown in **Figure 2.2:**

Screen Chamber

Prior to the actual treatment of the wastewater, a screen chamber will be provided. In this chamber removable type mechanical bar screens will be provided for removal of various large size elements, such as paper, cloth, plastic etc, etc, which may

hamper the satisfactory functioning of subsequent units of the STP, if not removed at early stages.

Oil & Grease Trap

The oil & grease trap will be provided to collect oil and grease trace coming with sewage. Collected oil & grease will be stored in a drum and disposed of in environmental sound manner.

Equalization Tank

As the quantity of the flow is non-uniform in nature, an equalization tank will have to be provided. By the provision of an equalization tank, wastewater characteristics will become homogeneous in nature and, therefore, better treatment can be achieved in the subsequent units of the STP. Diffused aeration will be provided in this tank to stir the contents of the tank completely.

MBBR Reactor (Biological Treatment)

Moving Bed Biofilm Reactor (MBBR) technology employs thousands of polyethylene biofilm carriers operating in mixed motion within an aerated wastewater treatment basin. Each individual bio carrier increases productivity through providing protected surface area to support the growth of heterotrophic and autotrophic bacteria within its cells. It is this high-density population of bacteria that achieves high-rate biodegradation within the system, while also offering process reliability and ease of operation.

This technology provides cost-effective treatment with minimal maintenance since MBBR processes self-maintain an optimum level of productive biofilm. Additionally, the biofilm attached to the mobile biocarriers within the system automatically responds to load fluctuations.

The bacteria/activated sludge grow on the internal surface of the carriers. The bacteria break down the organic matter from the waste water. The aeration system keeps the carriers with activated sludge in motion. Only the extra amount of bacteria growth, the excess sludge will come separate from the carriers and will flow with the treated water towards the final separator. The system can consist of a one stage or more stage system (see underneath schedule), depending on the specific demands. The specific bacteria remain in their own duty tank because of the fact that the carriers remain in only 1 tank, protected by screens.

A bio-film develops on the media, which move along the effluent sewage in the reactors. The movement within the reactors is generated by providing aeration with the help of diffusers placed at the bottom of reactors. This thin film on the media

enables bacteria to act up on the bio-degradable matter in the effluent sewage and thus reduce the BOD/COD content in presence of oxygen from the air used for fluidization. Aeration will be done with the help of twin lobe blowers. The MBBR reactors will increase the oxygen content of the sewage and thus, will help in the growth of the micro-organisms required to reduce the BOD. These micro-organisms will consume the organic matter and will convert it into active biomass, better known as sludge. The waste water, laden with sludge, will be transferred to tube settler for sludge separation.

Secondary Settling Tank Followed by Pre filtration Tank

The sludge formed will settle in the secondary settling tank followed by pre filtration tank. The settled sludge will be discharged in the Sludge Collection Tank and would be dewatered using sludge press. The clear supernatant from the outlet of the tube settler will be discharged as treated waste water and will be passed on to further treatment for final polishing. HDPE/PVC low maintenance tubes will be provided for trouble free operation of the tube settler.

Sludge Filter Press

The sludge from the settling tank of the STP will be collected in the tank and will be treated in the sludge press. This will be 18 plates CI sludge press completes with its pump and accessories. In sludge press, the sludge in the form of liquid slurry is fed into the press and dry solid cake of sludge is taken out from it. These dry cakes are used as manure for green belt and landscaping.

Pressure Sand Filter

For final polishing of the treated waste water, a Pressure Sand Filter (PSF) will be provided. The PSF comprises of a MS Vessel having filtering media sand topping for filtration of supernatant treated sewage water and thus ensuring clarity of water.

Activated Carbon Filter

For tertiary treatment, an Activated Carbon Filter (ACF) will be provided. This will be MS constructed tank in which activated charcoal/carbon will be filled as adsorbing media. This will not only adsorb impurities but will also act as the polishing tank for the final treated waste water. The resultant water shall be clear, odourless and will be reused for horticulture purpose.

Ultraviolet (UV) Disinfection System

Ultraviolet (UV) disinfection will use a UV light source. UV-rays are energy-rich electromagnetic rays that are found in the natural spectrum of the sunlight. They are

in the range of the invisible short wave light having a wavelength ranging from 100 to 400 nm.

UV light source is mounted so that water can pass through a flow chamber, and UV rays are admitted and absorbed into the stream. When ultraviolet energy is absorbed by the reproductive mechanisms of bacteria and viruses, the genetic material is rearranged and they can no longer reproduce. They are therefore considered dead and the risk of disease has been eliminated.

UV plant will have following features:

- Stainless steel construction
- Single lamp
- Long life of the UV Lamp

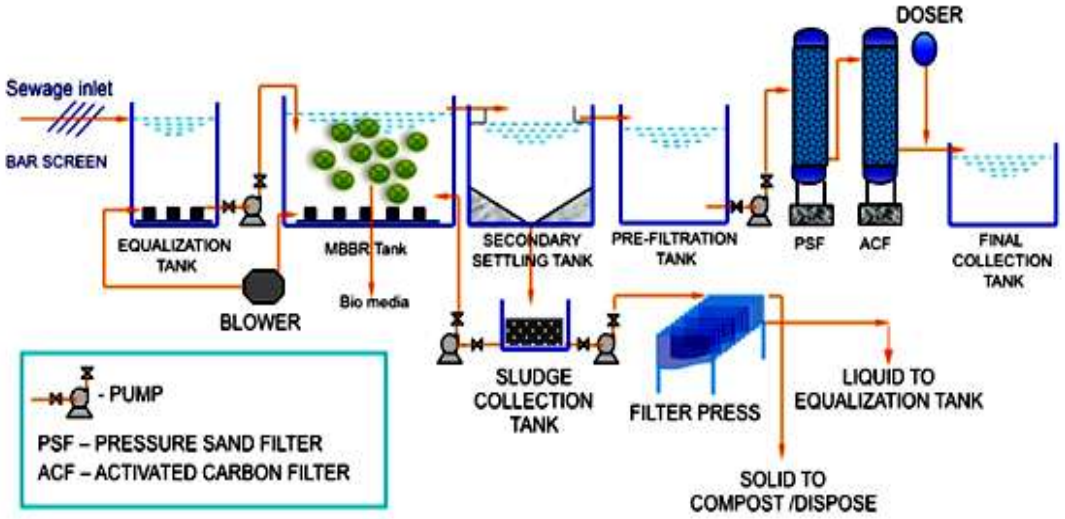

Figure 2.2: Schematic Diagram for MBBR Based STP

Chapter 3

Solid Waste Management

3.1 Solid Waste Generation

It is estimated that approx. 70 kg/d solid waste will be generated from the new civil enclave. From the terminal building, waste will be generated in the form of paper, plastics, polyethylene bags, and food waste, etc.

3.2 Solid Waste Management

The following measures will be taken for management of solid waste during operation phase of proposed new civil enclave.

- Solid wastes management will be carried out as per Solid Wastes Management Rule, 2016.
- Wastes shall be collected in designated waste bins based on their types, placed at the strategic locations.

The solid waste handling and disposal services will be outsourced to authorized agency to ensure disposal of solid waste generated from the proposed airport. Solid waste generated in the aircraft will also be disposed off at the designated waste collection points from where the agency will pick up the garbage bags.

The agency will collect the garbage from designated bins, which will be spread over the area of proposed civil enclave adjacent to Airforce base. The wet garbage of the aircrafts comprising of left over food in the tray from the security gates of flight kitchens will be disposed off at the specified places.

The collected garbage will be transported in covered container and will be arranged to dispose off after segregation of recyclable wastes as per provisions of Solid Wastes Management Rule, 2016. After collection of garbage, garbage bins will be disinfected every day by sprinkling disinfectant powder by the agency. Weekly washing of garbage bins will also be carried out by this agency.

After collection of waste, solid waste management plan to be followed by authorized agency is as given below:

- Segregation of recyclable and non recyclable wastes.
- Disposal of recyclable wastes for recycling.
- Composting of biodegradable organic of wastes for captive use
- Disposal of segregated wastes to common municipal waste landfill Site

Chapter 4

Energy Conservation

6.1 Energy Conservation Measures

During design and construction of new terminal building at the proposed Civil Enclave adjacent to Bareilly Airforce Base necessary measures will be taken for conservation of energy in line with “Energy Conservation Building Code - 2017” and “National Building Code 2005”. The important energy conservation measures proposed for new terminal building are described below:

- Terminal Building at new civil enclave will be designed and constructed for GRIHA Rating 4 star,
- Use of Energy Efficient building material & glass,
- Use of LED lamps instead of GLS lamps,
- Use of Solar Backed up Light Emitting Diode Lamps instead of par lamps,
- Energy efficient HVAC system,
- Solar passive techniques for terminal building,
- Use of 5 star BEE energy efficiency rating electrical equipments,
- Microprocessor-based Building Management System (BMS) will be installed for minimization of energy consumption,
- Automatic lighting on/ off control system will be provided in the terminal Building area for optimum utilization of energy.

It is proposed that 100 KW solar power generation plant will be established to produce clean energy.

By adopting above measures about 30% energy will be saved.