PM MITRA PARK UTTAR PRADESH LIMITED

Development of Prime Minister - Mega Integrated Textile Region and Apparel Park (PM-MITRA Park)

FEASIBILITY REPORT FOR PM-MITRA PARK AT LUCKNOW, UTTAR PRADESH

December 2024

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ABBREVIATIONS

Abbreviations	Full Form
%	Percentage
Bn	Billion
BOQ	Bill of Quantity
BOT	Built Operation Transfer
dB	Decibel
DIC	District Industrial Centre
DPR	Detailed Project Report
EIA	Environmental Impact Assessment
ESR	Elevated Storage Reservoir
etc.	Et cetera
EXIM	Export Import
FY15	Financial Year 15
g.	Grams
GAD	General Agreement Drawing
GIS	Geographical Information System
GSR	Ground Storage Reservoir
GST	Goods and Service tax
Ha	Hectare
HT Line	High Tension Line
ICT	Information and Communication Technology
IMS	Intermodal Station
INR	Indian Rupee
IRC	Indian Road Congress
IT Park	Information Technology Park
IVI	Importance Value Index
km	Kilometre
km^2	Square Kilometre
LCV	Light Commercial Vehicle
LPG	Liquid petroleum Gas
ml	Millilitre
MLD	Million Litre per Day
mm	Millimetre
PM-MITRA PARK	Prime Minister - Mega Integrated Textile Region and Apparel Park
MoEF&CC	Ministry of Environment, Forest and Climate Change
MPN	Most Probable Number
MSMEs	Medium and Small-Scale Enterprise
MW	Mega watt
NH	National Highway
LDA	Lucknow Development Authority
LMA	Lucknow Metropolitan Area
LNN	Lucknow Nagar Nigam
No	Number
PAP	Project Affected Persons
PHC	Primary Health Centre

Abbreviations	Full Form
PM	Particulate Matter
PPP	Public -Private Partnership
QAP	Quality Assurance Plan
RoW	Right of Way
SBC	Safe Bearing capacity
SCF	Seasonal Variation Factor
SEZ	Special economic Zone
SH	State Highway
SIA	Social Impact Assessment
SPV	Special Purpose Vehicle
Sq.km	Square Kilometre
STPs	Sewage Treatment Plants
CETPs	Common Effluent Treatment Plants
SWM	Solid Waste Management
SWOT	Strength, Weakness, Opportunities & Threat
TOD	Transit Oriented Development
ToR	Terms of Reference
ZLD	Zero Liquid Discharge
RoW	Rest of World

1 PROJECT SITE

1.1 LOCATION

Lucknow is the capital city of the Indian state of Uttar Pradesh and is also the administrative headquarters of the eponymous district and division. It is the fourteenth most populous city and the twelfth most populous urban agglomeration of India. Lucknow has always been a multicultural city and flourished as a cultural and artistic hub of North India. It continues to be an important centre of governance, administration, education, commerce, aerospace, finance, pharmaceuticals, technology, design, culture, tourism, music and poetry. Lucknow sits on the northern western shore of the Gomti River.

A PM-MITRA Park is proposed to be set up at Atari village in the Lucknow district falling in the Awadh region of Uttar Pradesh. The overall area of the site is 1000 acres. The PM-MITRA Park is proposed to be developed by a Special Purpose Vehicle (SPV) with an aim to provide Industrial services to Textile industries in the Awadh region.

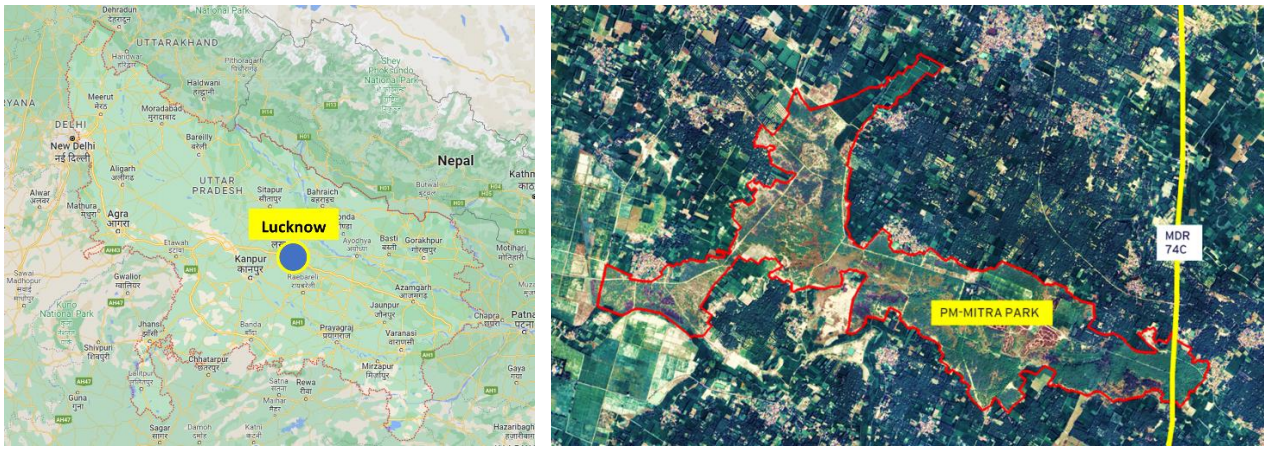


FIGURE 1-1: PM-MITRA PARK SITE
Source: Consultant

1.2 REGIONAL CONNECTIVITY

The PM-MITRA Park is a part of Atari Village near Malihabad Tehsil of Lucknow District, Uttar Pradesh. PM-MITRA Park has been strategically located in the North-West of Lucknow District. It has also been such located between the boarder of Lucknow & Hardoi Districts. It is well connected

to rest of the country via Lucknow and will serves as an industrial zone of Lucknow and thus, add to the economic growth of the Awadh Region. The PM-MITRA Park is connected through Northern Railways railway line and other National Highways such as NH-30, NH-27 & NH-731, etc. Lucknow is about 37km to the South and Kanpur is about 90km from the PM-MITRA Park, while Nadarganj industrial area (biggest industrial area of Lucknow) is about 45km.

Lucknow, the capital of Uttar Pradesh is situated 23 Mts. above sea level. It is situated on 26° 30'- 27° 10' North latitude and 80° 30'- 81° 13' East longitude. Lucknow covers an area of 2528 sq. km and is surrounded on the eastern side by District Barabanki, on the western side by district Unnao, on the southern side by Raebareli and on the northern side by Sitapur and Hardoi districts. The Gomti River, the chief geographical feature, meanders through the city, dividing it into the Trans-Gomti and Cis-Gomti regions. This city is in seismic zone III.

1.2.1 ROADS

The site is located on the MDR-74C which connects to the NH-30 in the north and the NH-731 in the south. NH-44 is the longest highway in India with a length of about 4,122 km connecting Srinagar in Jammu and Kashmir to Kanyakumari in Tamil Nadu via Agra in Uttar Pradesh. Passing through Punjab, Haryana, Delhi, Rajasthan, Madhya Pradesh, Maharashtra, Telangana, Andhra Pradesh and Karnataka states, this acts as the major connection between Northern and Southern India. NH- 44 connects with Lucknow via Kanpur to Jhansi which is 410km away.

TABLE 1-1: ROAD CONNECTIVITY WITH OTHER PARTS OF INDIA

Sr. No	Connectivity	Description
1	Road	Lucknow is connected by road with all the major cities of the country. It has four dedicated bus stations i.e. Alambagh, Charbagh, Kaisar Bagh and Ayodhya Road. Some of the major cities and their distances are: ► Agra 363 km, ► Ayodhya 135 km ► Delhi 497 km

Currently the only way to approach the proposed site is through the MDR-74C which is 2 lane road. Currently the MDR-74C connects NH-30 (Lucknow-Sitapur Highway) with the Atari Village which further connects Delhi.

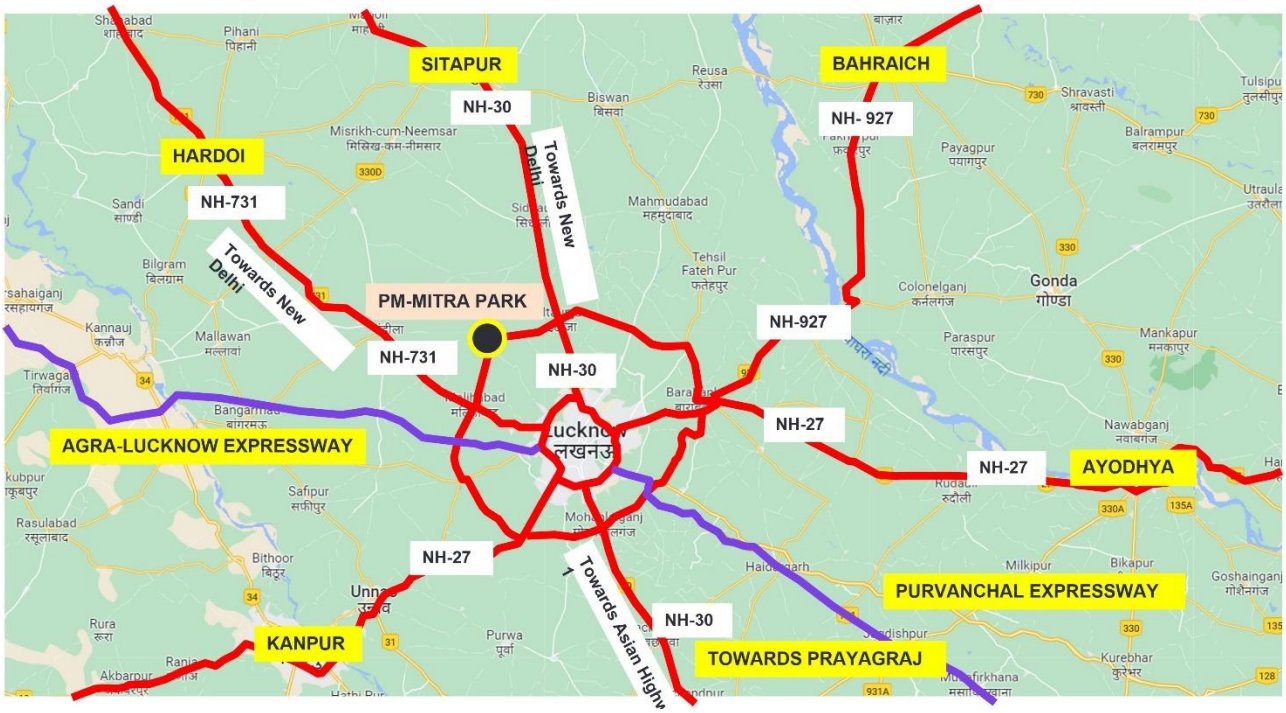


FIGURE 1-2: ACCESS ROADS TO PROPOSED SITE

Source: Consultant Analysis

1.2.2 RAILWAYS

Lucknow is served by several railway stations in different parts of the city. The main long-distance railway station is Lucknow Railway Station located at Charbagh. It has an imposing structure built in 1923 and acts as the divisional headquarters of the Northern Railway division. Its neighbouring and second major long-distance railway station is Lucknow Junction railway station operated by the North Eastern Railway. The city is an important junction with links to all major cities of the state and country such as New Delhi, Mumbai, Hyderabad, Kolkata, Chandigarh, etc.

The city has a total of fourteen railway stations. The Lucknow–Kanpur Suburban Railway was started in 1867 to cater for the needs of commuters travelling between Lucknow and Kanpur. Trains running on this service also stop at numerous stations at different locations in the city forming a suburban rail network. Lucknow is one of the major railway stations in the Awadh Region. Lucknow is Headquarter to Northern Railways.

The nearest railway station to the proposed PM-MITRA Park is Malihabad railway station on the Lucknow-Delhi railway line. The Lucknow-Delhi Railway Line is the nearest abutting railway line to the site. The Malihabad Station, is about 15km from the site. Other important railway stations on the Lucknow-Delhi rail route include Charbagh Railway Station, Kakori, Alamnagar, Dilawarnagar, Rahimabad, etc.

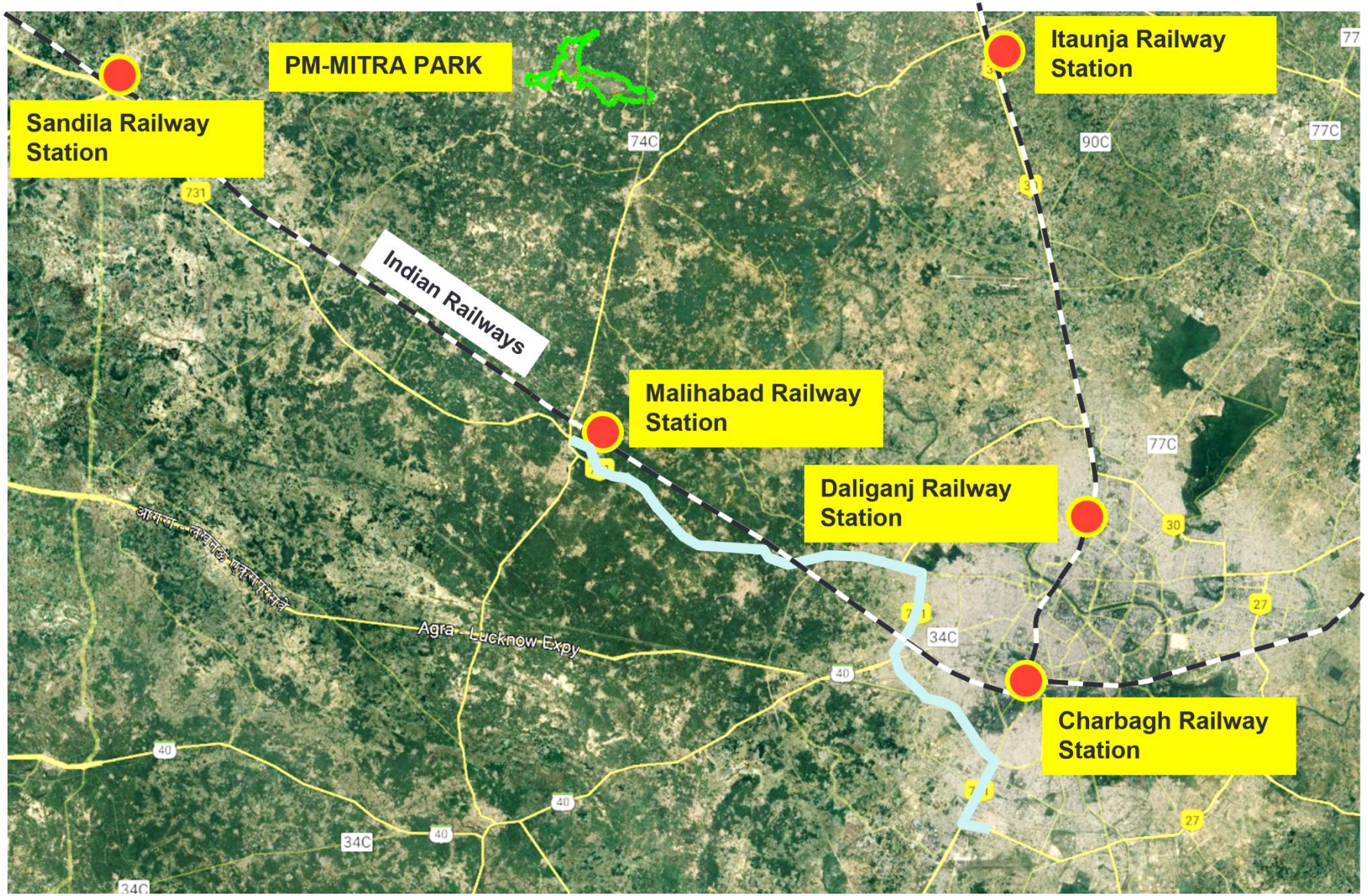


FIGURE 1-3: EXISTING RAILWAY LINE CONNECTING LUCKNOW CITY

Source: Google Earth and Consultant

1.2.3 AIR CONNECTIVITY

The closest Airport to this PM-MITRA Park will be the Chaudhary Charan Singh International Airport which is at 45kms from the site.

1.2.4 INLAND WATERWAYS

The site is not connected to any of the Waterways or Ports directly. The nearest waterways close to the site is at Prayagraj which is 238 km away.

1.2.5 PORT CONNECTIVITY

- **Mundra Port –** Mundra port is directly connected both by rail and by air to Lucknow. Frequent trains and flights are available between the two cities. It is connected with Mumbai port directly through Mumbai-Agra National Highway.
- **Mumbai Port** – Mumbai is directly connected both by rail and by air to Lucknow. Frequent trains and flights are available between the two cities. It is connected with Mumbai port directly through Mumbai-Agra National Highway.
- **Kolkata & Haldia Port –** Kolkata is connected directly by train and by air to Lucknow. Haldia is connected via Kolkata. Frequent trains and flights are available between the two cities. Lucknow is directly connected with Kolkata through National Highway (NH-19). This gives it direct road access to Kolkata Dock System and Haldia Dock Complex.
- **Paradip Port –** Paradip is not connected via Air. Airport facility is unavailable at Paradip. Closest airport connectivity is through Kolkata. Few trains are available between the two cities. Connectivity to Paradip is connected through NH-19.
- **Kandla Port** – Lucknow is not directly connected with Kandla through rail. Nearest airport connectivity from Lucknow is through Ahmedabad. Lucknow is connected with Kandla through NH-21 directly.
- **Vishakhapatnam Port** - Vishakhapatnam is directly connected via rail and air to Lucknow. Vishakhapatnam is connected to Lucknow through NH-30.
- **Mormugao Port** – Mormugao is not connected directly via train to Lucknow. Air connectivity is to Goa. Connectivity between Lucknow and Mormugao is through NH-30.

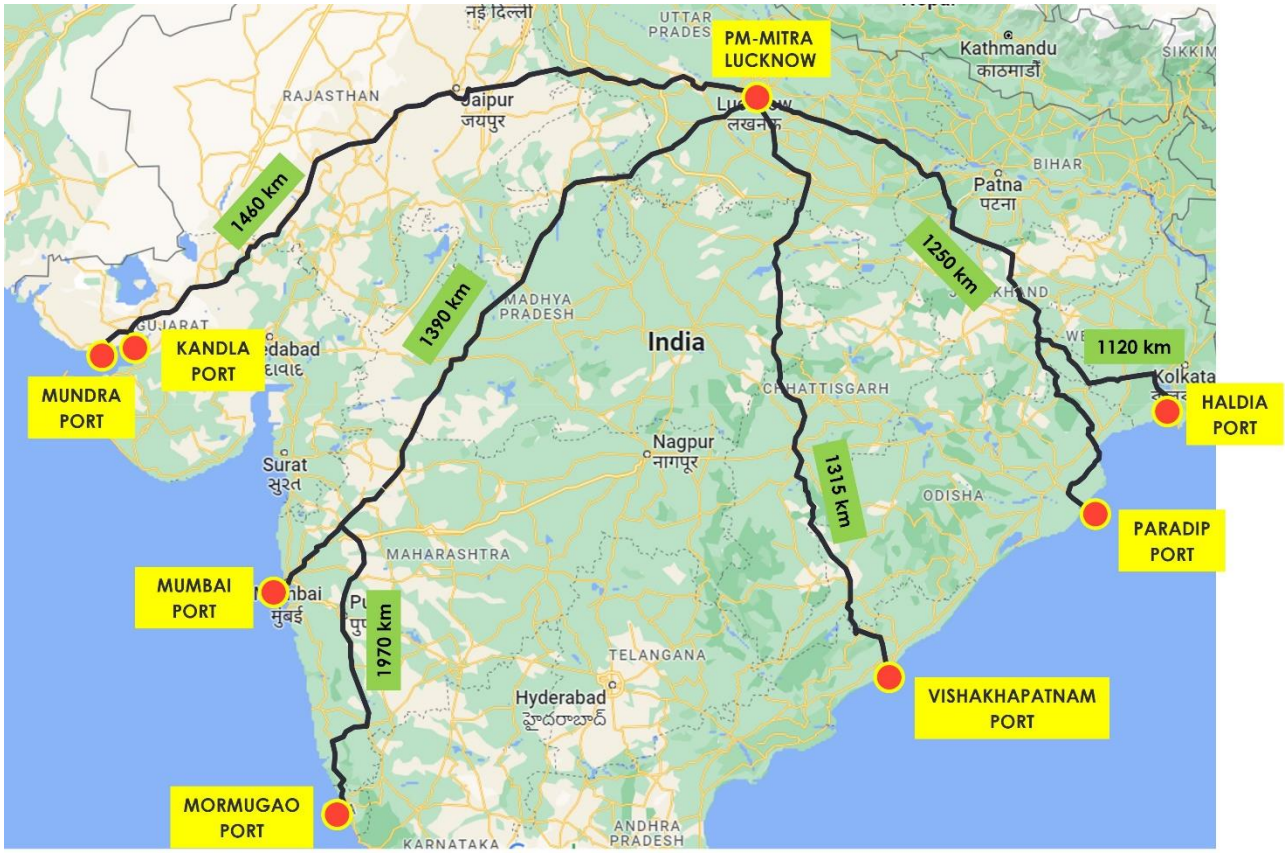


FIGURE 1-4: ROAD CONNECTIVITY OF PM-MITRA PARK FROM KEY PORTS

Source: Consultant

1.3 ENVIRONMENTAL CONDITIONS

1.3.1 CLIMATE

1.3.1.1 Seasons

Lucknow has a humid subtropical climate with cool, dry winters from mid-November to February and dry, hot summers with sunshine from March to mid-May. More than nine-tenths of the annual rainfall occurs from June to October when the city receives an average of 827.2 millimetres (32.57 in) from the southwest monsoon winds, although occasionally frontal rainfall from the northeast monsoon will occur in January. [1]

- Winter - November to February.
- Summer - March to the middle of May.
- Monsoon - June to October.

[1] *Source: Weather SPark*

1.3.1.2 Temperature

In winter the maximum temperature is around 25 °C or 77 °F and the minimum is in the 3 to 7 °C (37.4 to 44.6 °F) range. Fog is quite common from mid-December to late January. Summers are very hot with temperatures rising into the 40 to 45 °C (104 to 113 °F) range, the average maxima being in the high 30s Celsius.

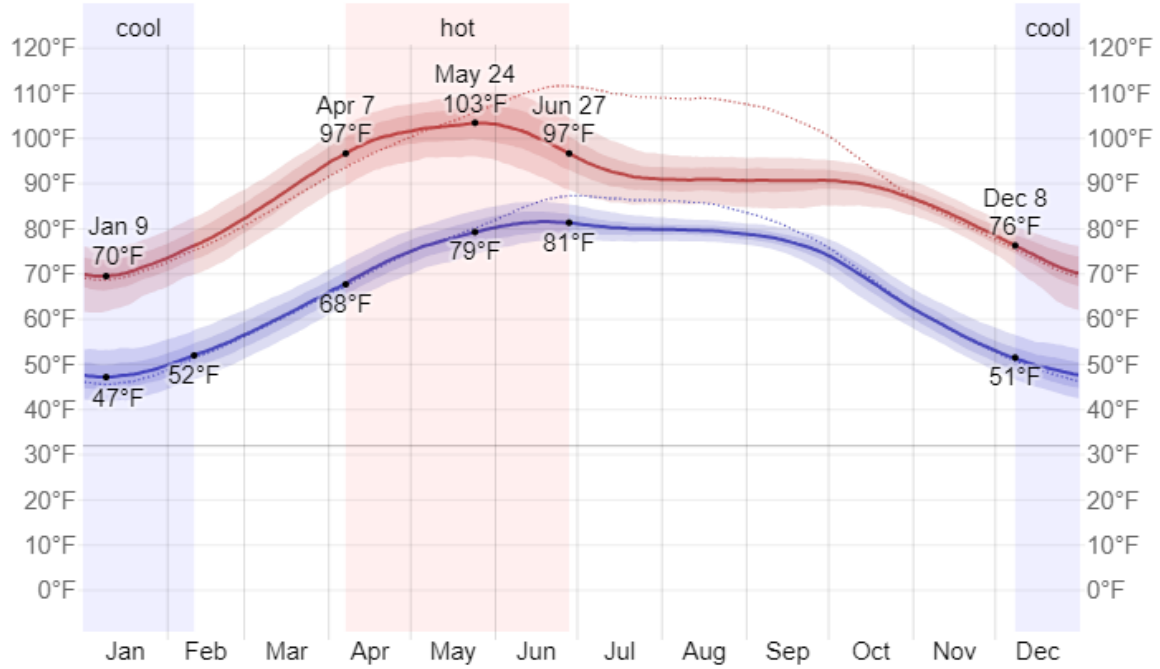


FIGURE 1-5: AVERAGE HIGH AND LOW TEMPERATURES OF THE DAY

Source: Weather SPark

1.3.1.3 Rainfall

Lucknow experiences extreme seasonal variation in monthly rainfall. The climate of Lucknow is sub-tropical, with a rainy season from mid-June to early October, due to monsoon, and a dry season from mid-October to early June. The month with the most rain in Lucknow is July, with an average rainfall of 8.9 inches.

The rainless period of the year lasts for 2.3 months, from November 1 to January 10. The month with the least rain in Lucknow is November, with an average rainfall of 0.2 inches.

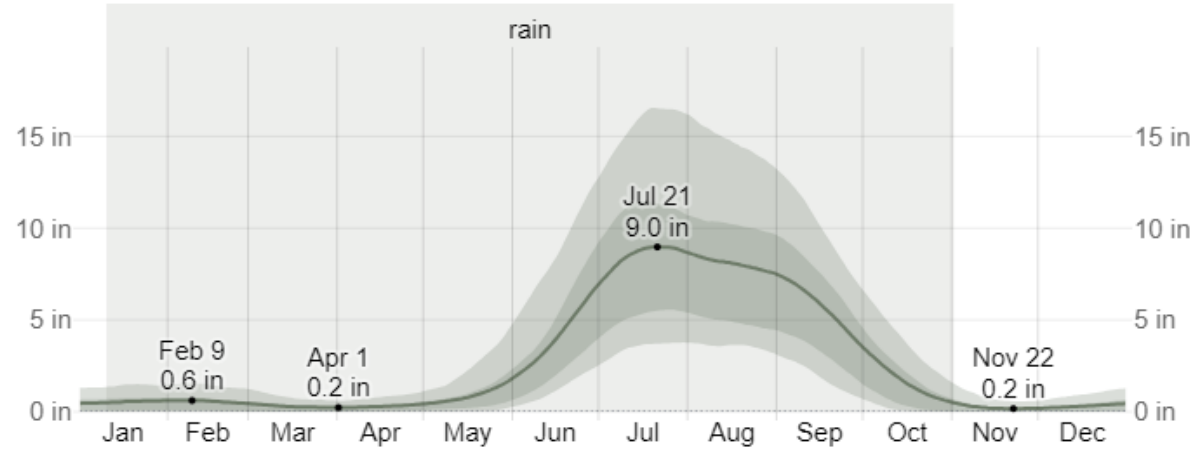


FIGURE 1-6: AVERAGE MONTHLY RAINFALL

Source: Weather SPark

1.3.2 WIND

This section discusses the wide-area hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.[2]

The average hourly wind speed in Lucknow experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 7.8 months, from January 21 to September 15, with average wind speeds of more than 6.2 miles per hour. The windiest month of the year in Lucknow is June, with an average hourly wind speed of 8.0 miles per hour.

The calmer time of year lasts for 4.2 months, from September 15 to January 21. The calmest month of the year in Lucknow is October, with an average hourly wind speed of 4.6 miles per hour.

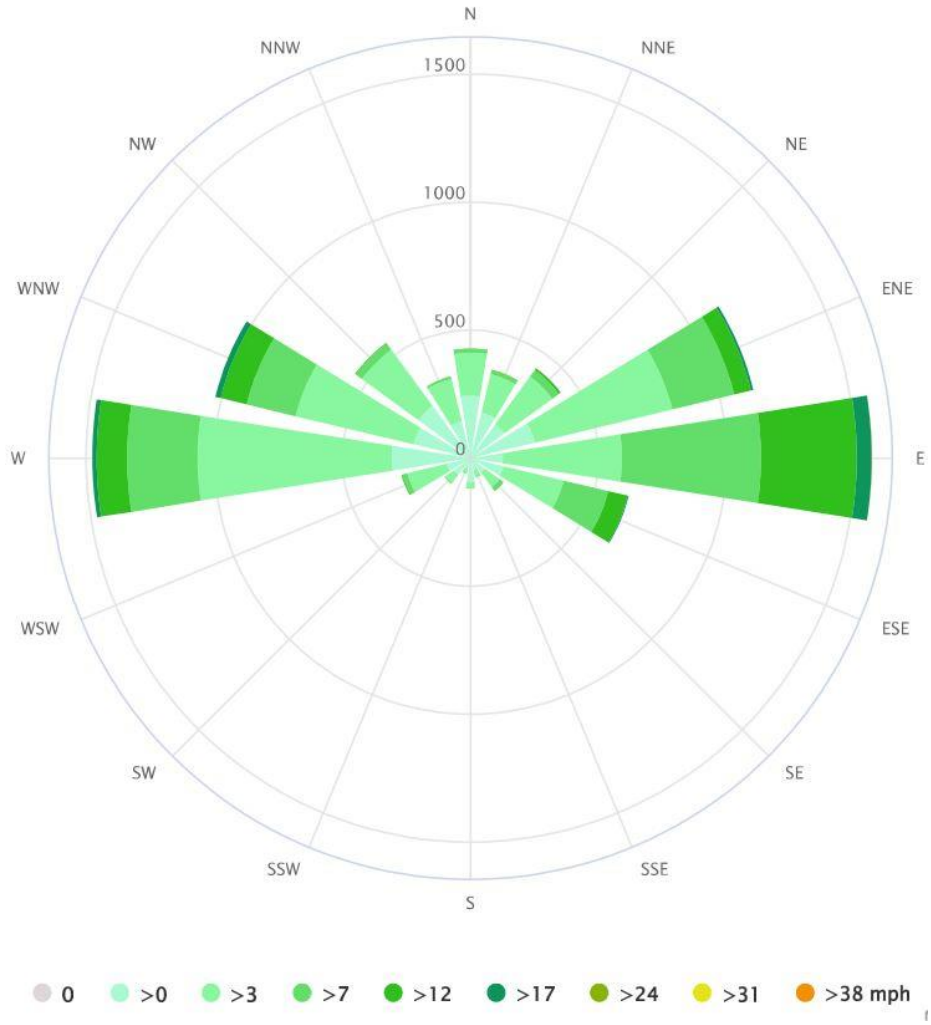


FIGURE 1-7: WIND ROSE DIAGRAM LUCKNOW

Source: Weather Spark

[2] *Source: Weather SPark*

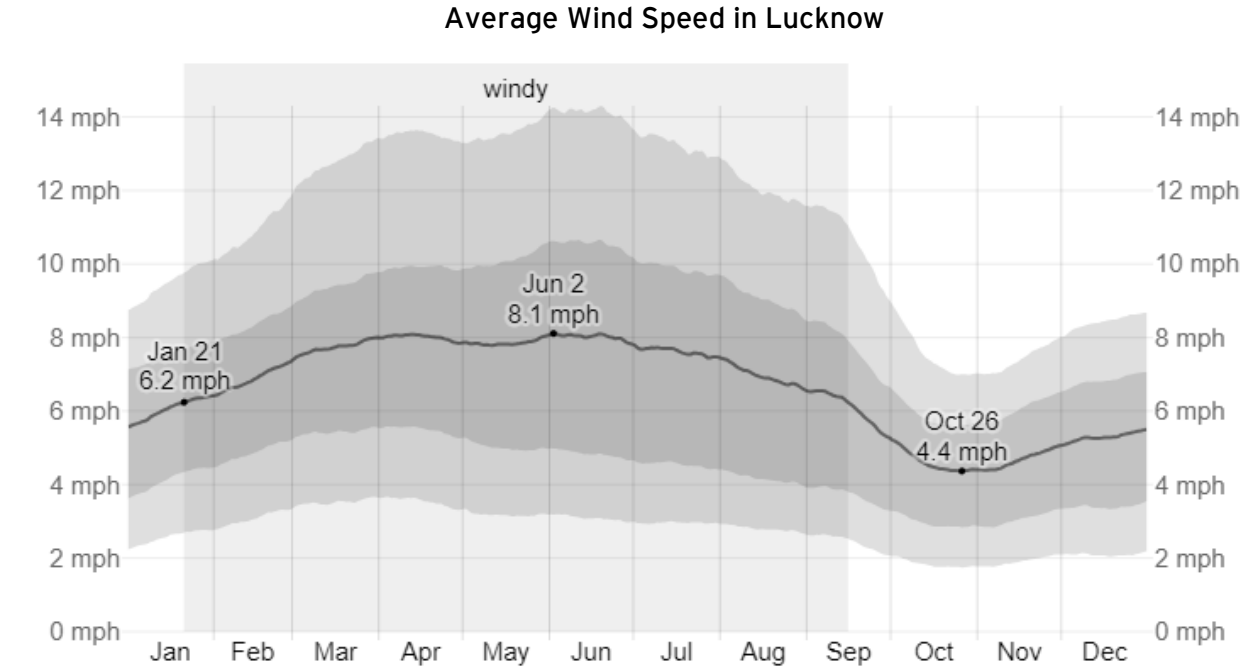


FIGURE 1-8: AVERAGE WIND SPEED

Source: Weather SPark

In terms of wind direction, the predominant average wind direction in Lucknow varies throughout the year. The percentage of hours in which the mean wind direction from each direction is shown below.[3]

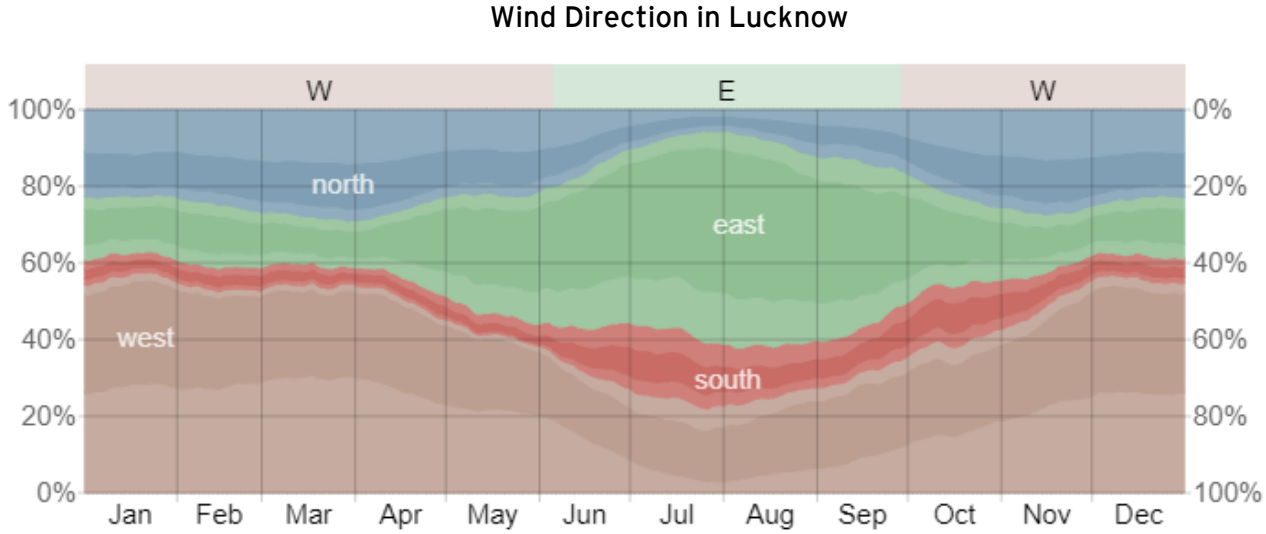


FIGURE 1-9: PERCENTAGE OF HOURS IN WHICH MEAN WIND DIRECTION FROM EACH COORDINAL DIRECTION EXCLUDING HOURS WHERE THE MEAN IS LESS THAN 1.0MPH

Source: Weather SPark

[3] *Source: Weather SPark*

1.4 SITE CONTEXTS

1.4.1 ELEVATION

The site is organic in shape with the longest side along east-west stretch. Parts of the Northern part and Western part of the site have a higher elevation of 125 m above mean sea level. The site slopes gradually from its highest point at 125 m to its lowest point of 119 m above mean sea level towards South-eastern edge.

1.4.2 SLOPE

The proposed PM-MITRA Park site has gentle slope throughout with majority of the site and has maximum slope of less than 2.50% approximately. Thus, the total site is easy buildable and does not require major earthwork for building the infrastructure layout.

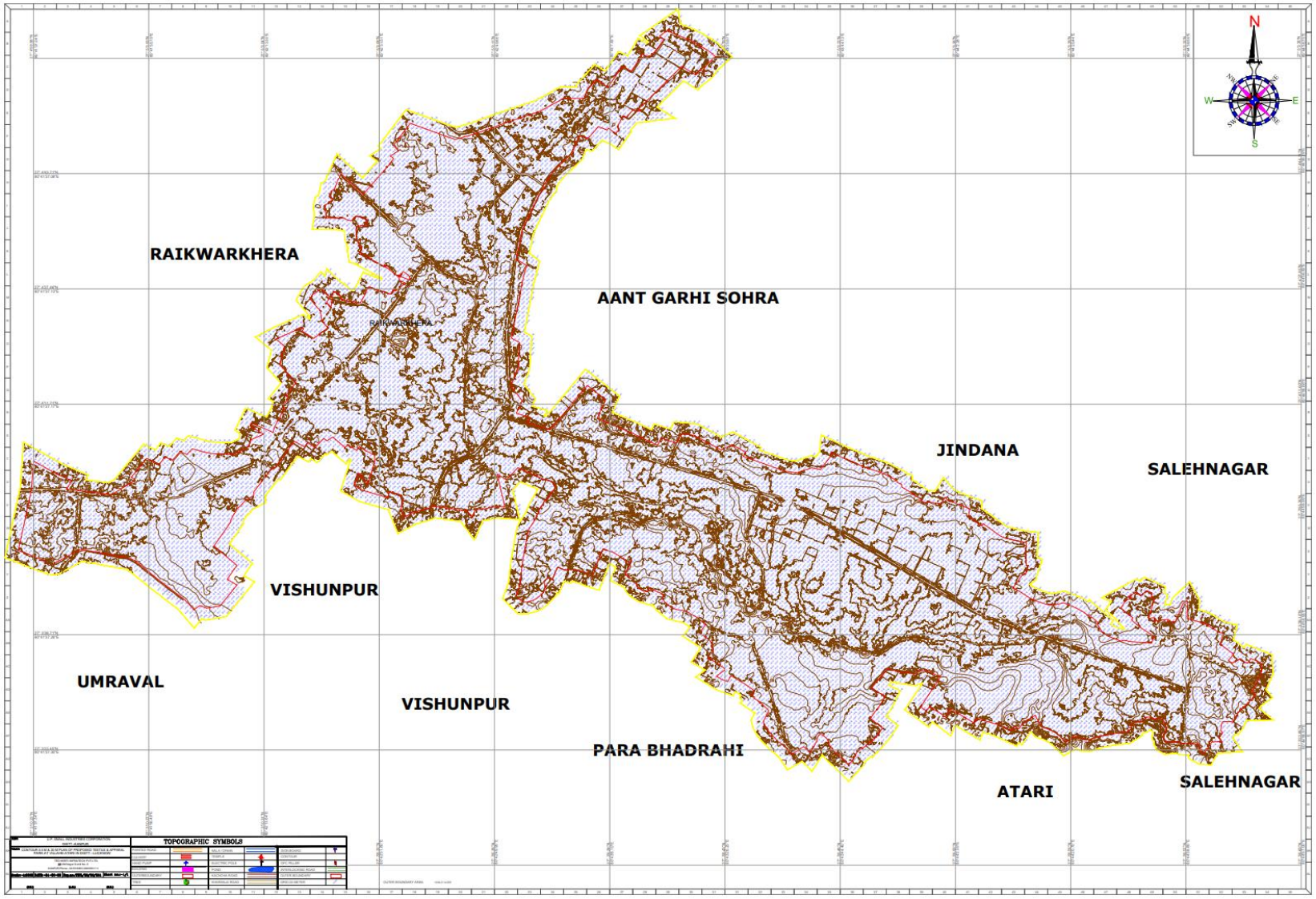


FIGURE 1-10: CONTOUR PLAN OF PM-MITRA PARK SITE AT LUCKNOW

Source – Department of Handloom and Textile, GoUP

1.4.3 DRAINAGE

In general, the area drains naturally from parts of the North-western edge and South-western part towards the south-eastern direction. Drainage pattern of the site is governed by the high ground, located in the part of the North-western edge and South-western part of the site. As the site gradually slopes down towards the south-eastern direction, the surface water runoff from the entire area can be made to drain towards natural outfall points with minimal grading of the land. The site slopes gradually from its highest point at 125m above mean sea level to its lowest point of 119 m at all around the boundary of the site.

1.4.4 COMPOSITE SITE ANALYSIS

Part of the North-western edge and South-western edge of the site has higher elevation. The site slopes gradually to its south-western part. Wind blew from West and North-west direction to the site.

1.5 SITE PHOTOGRAPHS

FIGURE 1-11: PM-MITRA PARK LUCKNOW SITE PHOTOGRAPHS

Source: Consultant

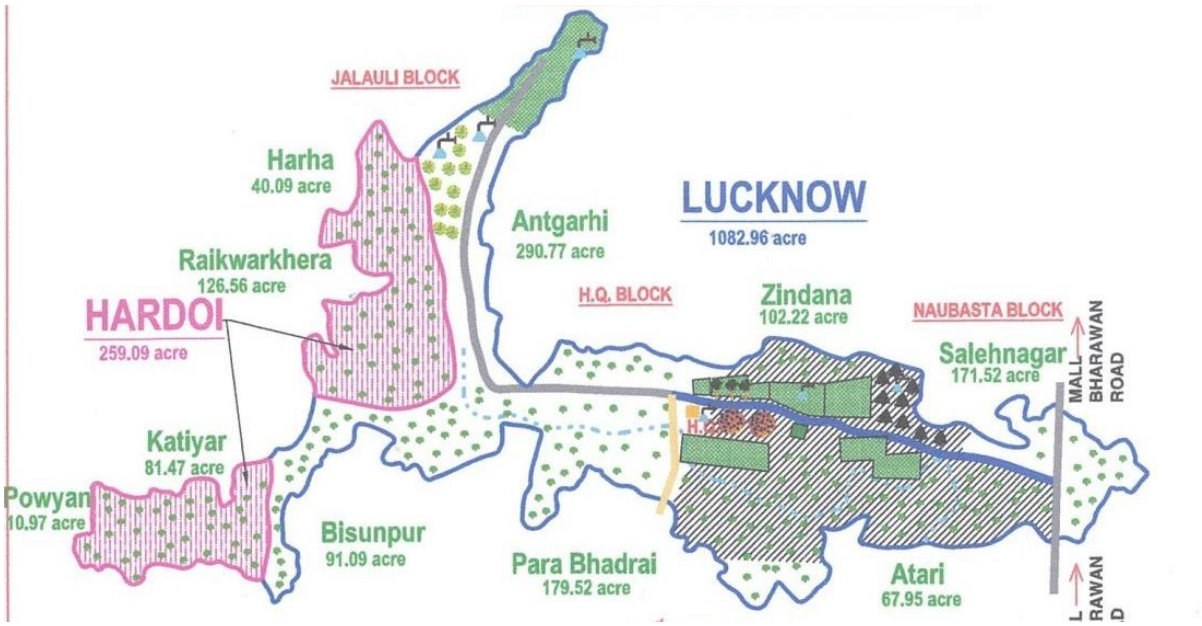


FIGURE 1-12: PM-MITRA PARK LUCKNOW & HARDOI GOVERNMENT LAND MAP

Source: Consultant

2 MARKET ASSESSMENT

2.1 INTRODUCTION

The textiles and apparel industry in India boasts strengths throughout the entire value chain, encompassing fibers, yarns, fabrics, and apparel. This industry is exceptionally diverse, spanning a wide spectrum of segments, from traditional handloom and handicraft products to wool, silk, and the organized textile sector. The organized textile industry in India is characterized by the use of capital-intensive technology, enabling mass production of textile goods, including spinning, weaving, processing, and apparel manufacturing.

Traditional sectors, such as handloom, handicrafts, and small-scale power-loom units, play a pivotal role in providing employment to millions of individuals in rural and semi-urban areas. They offer both direct and indirect employment opportunities, serving as a means of livelihood for countless people, notably including a significant number of women and rural residents. Moreover, these sectors align perfectly with the Government's key initiatives, such as Make in India, Skill India, Women Empowerment, and Rural Youth Employment.

In line with the government's commitment to foster inclusive and participative development in India, the primary focus has been on increasing textile manufacturing. This involves establishing top-notch manufacturing infrastructure, technological upgrades to promote innovation, and the enhancement of skills and traditional strengths within the textile sector. Schemes like the PM MITRA Parks Scheme and PLI Scheme have been introduced by the Indian government to enhance the competitiveness of the Indian Textile and Apparel industry.

India holds a prominent position in the global textile and apparel market. In 2020-21, India's textile, apparel, and handicrafts exports accounted for 11.4% of the total, making it the world's third-largest exporter in this sector. Furthermore, India stands as a leading global producer of cotton, jute, and silk. It is the second-largest silk producer and is responsible for producing 95% of the world's hand-woven fabric.

The Indian technical textiles segment is valued at $16 billion[4], ranking it among top five largest market in the world. Additionally, India has emerged as a major player in the production of Personal Protective Equipment (PPE). The country is home to more than 600 certified companies producing PPEs, and the global PPE market is expected to grow from $52.7 billion in 2019 to over $92.5 billion by 2025[5].

[4] *Invest India*
[5] *Invest India*

2.2 GLOBAL OVERVIEW OF TEXTILE AND APPAREL INDUSTRY

2.2.1 Global Market Size

The size of global textile and apparel market in 2022 was around USD 1,699 Billion, which is expected to grow at a Compound Annual Growth Rate (CAGR) of 4.0 per cent to reach over USD 2,370 Billion in 2030. United States and European Union are the largest market for apparels with collective share of 30.72%, which accounts for about 11% of world's population. Among the top five markets, India and China are anticipated to grow at a steady CAGR of 8 per cent and 9 per cent respectively, as compared to the global growth rate of 4.0 per cent over the next few years.

TABLE 2-1: SIZE OF GLOBAL TEXTILE AND APPARELS MARKET[6]

Country/Region	Value in 2022 (USD Bn)	% Share 2022	CAGR 2022 – 30 (P)	Value in 2030 (P)
United States	276	16.24 %	3%	350
EU – 27	246	14.48 %	3%	310
China	244	14.36 %	8%	450
India	92	5.41 %	9%	180
Japan	64	3.77 %	3%	80
UK	74	4.36 %	3%	95
Brazil	39	2.30 %	5%	60
Canada	24	1.41 %	5%	35
RoW	640	37.67 %	3%	810
World	**1,699**		**4%**	**2,370**

2.2.2 Global Textile and Apparel Trade:

In 2021, the global textile and apparel trade was USD 871 billion having grown at approximate 3% CAGR since 2017. It is expected to reach USD 1.2 trillion by 2030, growing at a CAGR of 4%. Apparel was the largest traded category in 2021 with a 57% share. Fabric is the second most traded category after apparels, with a share of 17% of the total textile and apparel trade.

[6] *Annual Report 2023 by Wazir Advisors*

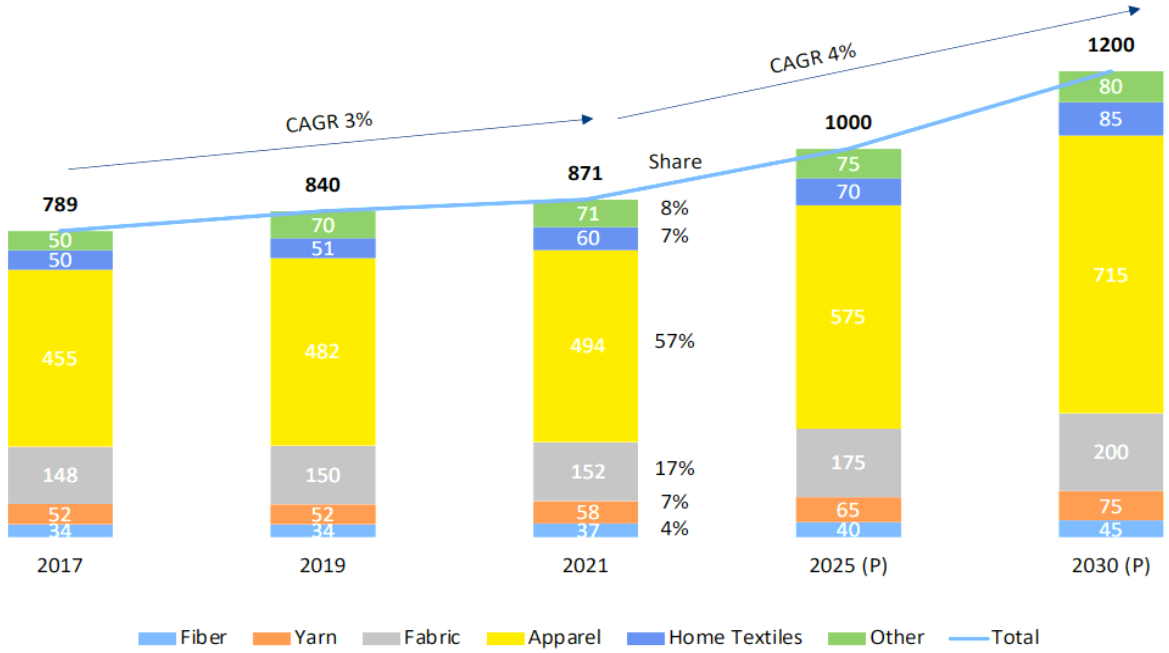


FIGURE 2-1: CATEGORY-WISE SHARE OF GLOBAL TEXTILE AND APPAREL TRADE[7]

China was the largest exporter in 2021 with a global trade share of approximately 37% followed by Bangladesh with a share of approximately 5%. In 2021, India secured its position as the world's third-largest exporter of textiles and apparel, while securing the second largest textile export share, valued at USD 26.3 billion.

TABLE 2-2: LEADING COUNTRIES IN EXPORT OF TEXTILE & APPARELS IN 2021 (VALUES IN USD BN)[8]

Country	Textile	Apparel	Total	Share (%)
China	153.5	164.9	318.3	37%
Bangladesh	2.4	40.1	42.5	5%
India	**26.3**	**15.2**	**41.5**	**5%**
Germany	15.1	25.2	40.3	5%
Vietnam	9.1	28.7	37.8	4%
Italy	12.3	24.7	36.9	4%
Turkey	15.8	18.3	34.1	4%
USA	20.4	5.2	25.5	3%
Spain	5.3	15.4	20.7	2%
Netherlands	6.1	13.8	19.9	2%
RoW	110.9	142.2	253.0	29%
Total	356.8	481.9	838.7	

It may be observed that the export of Apparel is larger as compared to the export of textiles, except India and USA.

[7] *Wazir Advisors*
[8] *Wazir Analysis*

2.3 INDIAN TEXTILE & APPAREL INDUSTRY

India's textile and apparel industry is one of the oldest industries in Indian economy dating back several decades. India is the world's second-largest producer of textiles and apparels. The textiles and apparel industry contribute 2.3% to the country's GDP, 13% to industrial production and 12% to total exports. It has around 45 million of workers employed in the textiles sector, including 3.5 million handloom workers.

2.3.1 DOMESTIC MARKET SIZE

The estimated size of India's textile and apparel market for the year 2022-23 stands at USD 125 billion. The domestic market takes the lead, contributing around 76% to this market size, leaving the remaining 24% for exports. Within the domestic market the majority approximately 74% is accounted for by apparel, while technical textiles hold a share of 20%[9].

The Indian domestic Textile & Apparel market has grown from USD 50 billion in 2010-11 to USD 110 billion in 2021-22, registering a growth of 7%. The market is further expected to grow at 10% CAGR from 2021- 22 to reach USD 250 billion by 2030-31.

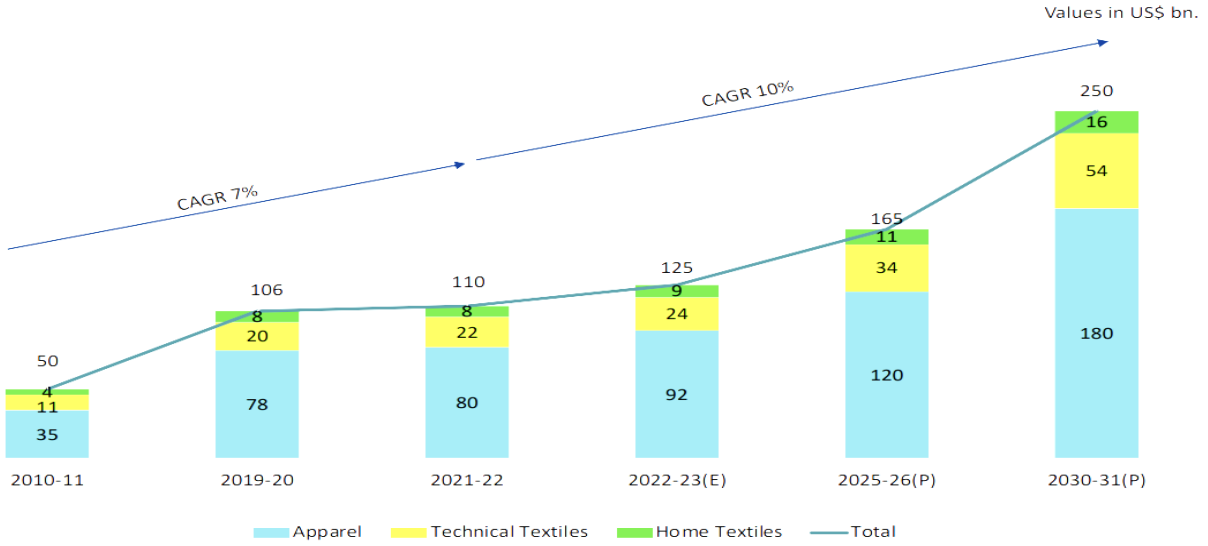


FIGURE 2-2: INDIAN TEXTILE & APPAREL MARKET SIZE

Source: Annual Report 2023 by Wazir Advisors

2.3.2 TEXTILE AND APPAREL EXPORT

With massive raw materials and manufacturing base across the value chain, India is the 3rd largest textiles and apparel exporter globally, with its exports worth USD 43 Bn in 2021-22. India's textiles and apparel exports are expected to reach USD 100 Bn by 2030-31, growing at a CAGR of 10 per cent. The exports have grown at a CAGR of 4% since 2010-11[10]. Indian textile and apparels are exported to more than 100 countries. USA, EU-27 and UK accounts for approximately 47% of the country's export. The other major export destinations include China, UAE, Bangladesh, Sri Lanka, Turkey etc.

[9] *Annual Report by Wazir – Indian Textile and Apparel Industry 2023*
[10] *Annual Report 2023 by Wazir Advisors*

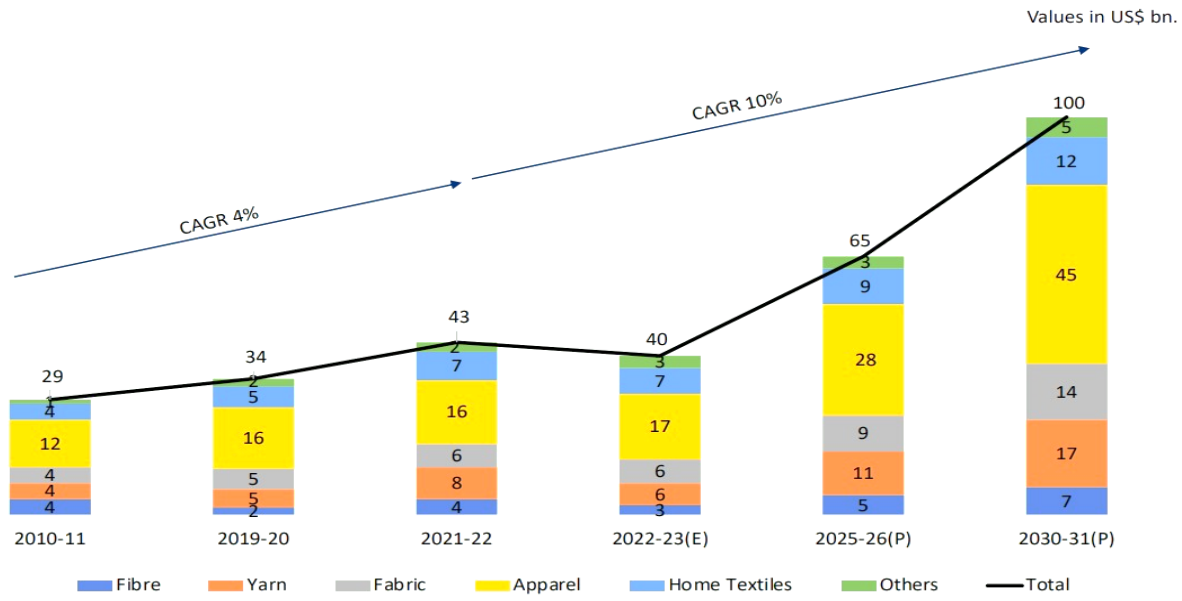


FIGURE 2-3: TEXTILE AND APPAREL EXPORT FROM INDIA

2.3.3 OVERVIEW OF TECHNICAL TEXTILES

Technical Textiles in India is growing with the rise of end user industries. The country is emerging as a significant player in the technical textiles industry and contributes to approximately 10% of global consumption. India's technical textiles market is estimated at USD 19 Million in 2021-22, witnessing growth at a CAGR of 10 per cent since 2005-06. Technical Textiles contributes to around 0.75% of India's GDP and around 12% of Indian Textile market which is less when compared to other countries like China where technical Textiles accounts for 20% of the total Textile Industry.

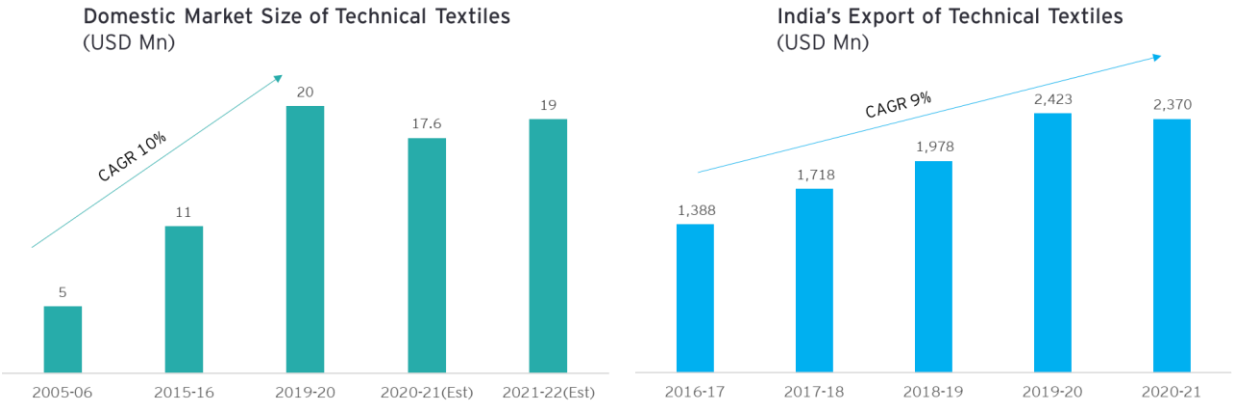


FIGURE 2-4: OVERVIEW OF TECHNICAL TEXTILES[11]

The global market size for technical textiles grew to USD 239.38 billion in 2024, up from USD 222.38 billion in 2023, reflecting a CAGR of 7.6%. Market growth is expected to accelerate at a CAGR of 8.20% in the coming years, driven by factors such as infrastructure modernization,

[11] *Wazir Analysis*

aerospace & defence applications, medical advancements, growing awareness of hygiene products, and circular economy practices. By 2028, the global technical textiles market is projected to reach USD 327.79 billion.

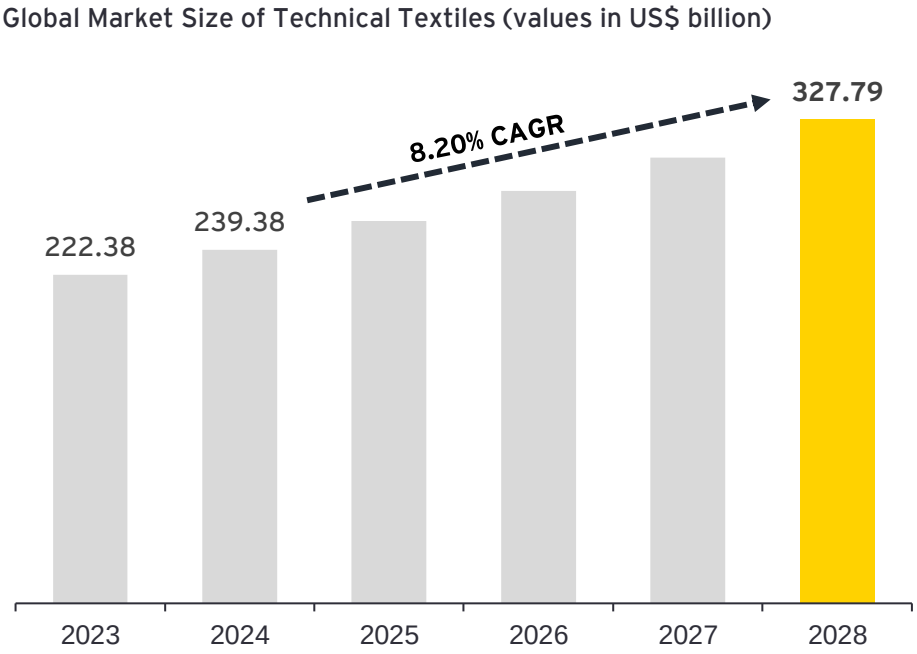


FIGURE 2-5: GLOBAL MARKET SIZE OF TECHNICAL TEXTILES
Source: NITI Aayog, Business Research Company

Indian technical textiles market ranks **fifth largest globally**, standing at **USD 21.95 billion** in 2021-22. Production within India accounted for USD 19.49 billion, while imports amounted to USD 2.46 billion and penetration level of technical textiles in India varied from **5-10%** across different application areas, compared to **30-70%** globally in 2021-22. In 2022-23, the Indian Textile and Apparel Market Size was USD 165 Bn, with Technical Textiles contributing USD 24 Bn or 14.5% of the total market. In 2021-22, the overall Indian Textile and Apparel Export were valued at USD 41.5 Bn, of which technical textiles exports amounted to USD 2.85 Bn, representing 6.8% of the total exports.

TABLE 2-3: SIZE INDIAN TECHNICAL TEXTILES MARKET

#	Criteria of Indian Technical Textiles	2021-22	2026	2035	2047
1	Total market size (USD billion)	21.95	45	123	309
2	Total exports (USD billion)	2.85	6	16	50
3	Growth rate (CAGR in %)	9	15	12	8
4	Penetration level (%)	5-10%	13-20%	25-35%	40-60%

Source: NTTM Compendium 2024, Ministry of Textiles, GoI

Shift in export trends in technical textiles: packtech declines, indutech gains

Packtech continues to be the **largest exported technical textile category from India**, although its share has decreased from 40% in FY19 to 33% in FY24.

TABLE 2-4: SEGMENT WISE EXPORT OF TECHNICAL TEXTILES

Category Exported	FY19	FY24	Growth
Agrotech	85	110	30%
Buildtech	11	37	229%
Clothtech	158	164	4%
Geotech	35	47	36%
Hometech	116	135	17%
Indutech	**371**	**644**	**74%**
Meditech	95	156	65%
Mobiltech	235	322	37%
Packtech	**809**	**853**	**5%**
Protech	47	69	45%
Speciality Fibres & Composites	1	1	57%
Sportech	37	47	28%
Total	**1,999**	**2,586**	

Source: NTTM Compendium 2024, Ministry of Textiles, GoI

In contrast, **Indutech exports have shown a significant rise**, increasing from 19% in FY19 to 25% in FY24.

Some of the key factors driving the growth of the technical textiles industry in India are:

- Rising Consumer Awareness: With rising disposable incomes and changing lifestyles, areas like health and hygiene have become a prime concern for consumers. This has led to an increase in the consumption of medical textiles such as facial wipes, dental floss, sanitary napkins, diapers, etc. Also, with an increasing focus on the importance of sports and fitness, the consumption of Sportech products such as activewear, sports footwear and sports equipment has risen.
- Escalating Expenditure on Defence and Security: As India is on the way to become a global power, it is increasing its focus on upgrading its defence and security measures. This has led to increasing demand of bullet proof jackets and gloves, shoes, high altitude clothing, etc. Government's increasing focus in this sector is also pushing growth in the technical textiles industry.

- Scope of Import Substitution: Although India at present imports a significant number of technical textiles products, further investments in technology intense product segment can help in substituting imported products by the domestic product.
- Product & Process innovation: With constantly evolving technology, innovations in various sectors enables the use of technical textiles. For instance, evolving manufacturing processes has led to the creation of "smart fabrics" with interesting physical properties. These fabrics can further lead to the production of new products and improvement of the existing ones.
- Growing Manufacturing industry: The growing manufacturing sectors including automobiles, construction, etc. has led to an increase in consumption of technical textile products. For example, the automobile sector is expected to grow at 12% CAGR to produce over 75 million vehicles by 2025. Components such as tyre cord, seat belts, insulation felts, etc. are all part of Mobiltech and hence, the growth of automotive industry would also enable the growth of the Mobiltech industry.

2.4 UTTAR PRADESH TEXTILE SECTOR SCENARIO

- Textile sector is one of the important traditional industries in the state Uttar Pradesh.
- Uttar Pradesh has about 2 Lakh handloom weavers and about 5 Lakh power-looms weavers with natural cluster development over hundreds of years. The silk sarees from Varanasi and Mau, Chicken Kari from Lucknow, Zari-Zardozi from Lucknow, Bareilly and Shahjahnpur, carpets from Bhadohi, Mirzapur and Sonbhadra and Durries from Sitapur are the strength and pride of the entire country. Most of our Handloom products carry the GI (Geographical Indicator) tag.
- Export of textile and apparel from Uttar Pradesh was valued at around INR 21,455 Cr (USD 214.55 billion) in 2021-22 including carpets and other textile floor coverings.
- Gautam Budh Nagar and Kanpur districts are among the India's largest clusters for ready-made garment and hosiery.

2.4.1 KEY INVESTMENT ENABLERS.

2.4.1.1 Major Production centres in Uttar Pradesh with unique textile products

TABLE 2-5: MAJOR PRODUCTION CENTRES

Centres	Products
Amroha	Picnic Mats
Azamgarh	Silk Sarees, Mixed Sarees and Fabric, Kharri Mats
Agra	Mats, Bedsheets, Furnishings, Heavy Dress Materials, Chenille Cotton Carpets
Bagpat	Bedsheets, Bed covers
Barabanki	Stoles, scarves, Lungis
Etawah	Bedsheets, Dress Materials, Mats, Mixed Fabrics
Farrukhabad	Cotton prints, Bedsheets, Dress materials, Mats, Chenille Cotton, Carpets

Fathepur Sikri	Heavy Cotton Fabrics, dress materials, Mats, Chenille Cotton Carpets
Gautam Budh Nagar	Apparels
Ghaziabad	Jacquard furnishings, Bedspreads, terry towels, linen, home furnishings
Hapur	Bed sheets, Bed Covers and Canvas cloths
Hathras	Chenille rugs, cotton carpets, Fabrics
Kanpur	Mats, Dusters, Cotton fabrics, Canvas cloths
Lucknow	Chikankari work
Moradabad	Bedsheets, Bed Covers
Rampur	Bedsheets, Bed Covers
Sitapur	Cotton Mats
Varanasi	Silk sarees, Sarees, Mixed fabrics, cut work Items, dress materials, furnishings, stoles, scarves, gauze and Leno Fabrics, brocades

2.4.1.2 Handloom & Textile clusters

TABLE 2-6: MAJOR HANDLOOM AND TEXTILE CLUSTER IN UTTAR PRADESH

Carpet Cluster Mirzapur – Bhadohi	▸ Bhadohi is known as the 'carpet city' of India. It is the largest manufacturer and exporter of hand noted carpet in India. ▸ The Mirzapur-Bhadohi region is the largest handmade carpet weaving cluster engaging around 3.2 million people in the industry[12]. ▸ The carpets of the region received the geographical indication (GI) tag, which means carpets manufactured in nine districts of the region i.e; Bhadohi, Mirzapur, Varanasi, Ghazipur, Sonbhadra, Kaushambi, Allahabad, Jaunpur and Chandauli would be tagged with handmade carpet of Bhadohi. ▸ Well known carpet types from Bhadohi include cotton Dhurry/Dhurries, Chhapra Mir carpets, loribaft, Indo Gabbeh.
Silk cluster Varanasi	▸ Varanasi silk Handloom cluster is world, and its dominance containers in producing the best quality silk fabrics, particularly sarees. ▸ The market size of silk products of Varanasi was about INR 1,300 Crore (USD 0.16 billion) in 2018-19, out of which 20% has been generated from the exports of the silk products[13]. ▸ 70% of the total domestic market of the Varanasi silk industry is in southern cities such as Hyderabad, Bangalore, Chennai Coimbatore etc. apart from these, Kolkata, Jaipur, Ahmedabad, Lucknow and Mumbai are the other key markets for the Varanasi silk products.

[12] *Bhadohi.nic.in/economy*
[13] *Department of MSME, Government of Uttar Pradesh*

	▸ Bangladesh and Nepal are the key international markets for Varanasi silk sarees. While UK, USA, and UAE are other key international markets for silk products. ▸ Varanasi silk product market consists of 80% of saree and brocades, 5% of lacha, 10% of dress material, 5% of Dupatta stole/scarf and 1% of other Silk products. ▸ Varanasi silk saree/fabrics with heavy embroidery work provide several variations in design and colour making it exclusive.
Readymade Garments cluster Gautam Budh	▸ The district is known as "City of Apparels" ▸ The cluster presents a diverse range of high quality ethnic and western apparels in the tune with the global trends and markets. in the past two decades the cluster has emerged leading exporter of Apparel from India. Majority of the exports from the cluster pertain to the US, UK, European union, Canada, etc. ▸ Currently more than 1700 units and 1000 Units are operating from Noida and Greater Noida respectively
Hosiery and Ready-made Garment cluster (Kanpur Nagar)	▸ Kanpur is home one of the most thriving leather, Hosiery and ready-made textile regions. The industry goes back to the British era when Kanpur was nicknamed "Manchester of India" for its perennially running cotton mills being home to thousands of dedicated cotton mill workers. It's one of the largest hosieries producing industrial regions of India. ▸ The textile cluster is mainly concentrated in areas within the central part of the city and in a sub urban area called Rooma.

2.4.2 EXPORT GROWTH OF TEXTILES IN UTTAR PRADESH

2.4.2.1 Uttar Pradesh stood 5th in the Country in overall exports

"Uttar Pradesh, India's fifth largest and the most populous state has always been in the forefront in the area of industrial development. The state has the status of 3rd largest economy of the country and has achieved remarkable growth in exports during last few years. As of 2021-22 export data Uttar Pradesh stood 5th in the Country in exports."[14]

Uttar Pradesh is not only renowned for its rich cultural heritage but also for its significant contributions to the country's textile and apparel export sector. With a diverse range of textile products, a thriving apparel manufacturing industry, and a strategic location, Uttar Pradesh has emerged as a key player in India's export landscape.

TABLE 2-7: EXPORT OF TEXTILE AND APPAREL FROM UTTAR PRADESH IN LAST 6 YEARS

T&A export figures of Uttar Pradesh during last 6 years

[14] *www.upepc.org/Home/ExportData*

SN	Commodity	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
1	Articles of apparel and clothing accessories, not knitted	9114.30	10953.69	10720.38	8291.34	10137.31	14711.84
2	Carpets and other textile floor coverings	4048.12	4606.15	4062.77	4515.83	4921.54	5404.4
3	Articles of apparel and clothing accessories, knitted or cr	2542.90	2779.77	2810.29	2458.97	2858.31	3601.29
4	Other made-up textile articles; sets; worn textile articles	1601.87	1807.20	1636.02	1714.18	2102.47	2118.14
5	Cotton	133.31	266.05	181.05	189.05	332.21	226.36
6	Man-made staple fibres	176.74	337.64	322.06	220.30	271.48	378.6
7	Silk	8.67	63.29	119.58	178.29	251.65	238.88
8	Man-made filaments	85.11	122.23	110.43	121.91	142.69	140.16
9	Special woven fabrics; tufted textile fabrics; lace; tapes	65.67	90.63	94.25	85.74	135.58	210.09
10	Wadding, felt and nonwovens; special yarns; twine, cordage	73.29	101.16	105.82	96.88	123.56	132.66
11	Impregnated, coated & laminated textile fabrics; textile ar	57.56	79.71	87.45	90.17	111.69	140.78
12	Knitted or crocheted fabrics	27.56	65.12	23.07	19.15	29.49	35

13	Wool, fine or coarse animal hair	12.69	12.18	10.84	35.42	27.86	19.48
14	Other vegetable textile fibres; paper yarn and fabrics	8.93	6.90	7.61	8.31	9.45	11.77
Total		**17956.72**	**21291.72**	**20291.62**	**18025.54**	**21455.29**	**27369.45**

2.4.3 UTTAR PRADESH TEXTILE POLICY 2022

Summary of Incentives to Industrial units by Government of Uttar Pradesh are as follows:

1	**Land Cost Subsidy** - Reimbursement of 25% of the land cost
2	**Stamp Duty** - 100% exemption from Stamp Duty
3	**Capital Subsidy** -15% of the cost of Plant & Machinery, for units with employment less than 50 25% of the cost of Plant & Machinery, for units with employment more than 50
4	**Interest Subsidy** -Reimbursement of 60% of the annual interest on loan for the purchase of Plant & Machinery, for 07 years, maximum of Rs 1.5 Crore per annum.
5	**Power Subsidy** - 100% exemption from Electricity Duty for 10 years Reimbursement of Rs2/kWh for 5 years for units with employment more than 50
6	**Employment Subsidy** -Rs 3,200/-per worker per month to mega and super mega Garmenting Units for 5 years (Investment more thanRs75 Cr or employment more than 1500)
7	**Freight Subsidy-** 25% to 75% reimbursement of freight cost of container from unit to port to new Garmenting units for 5 years

For details, please refer to the website of Uttar Pradesh Textile policies.

2.4.4 STRENGTHS OF PM MITRA PARK AT LUCKNOW

The PM MITRA Park in Lucknow stands as an example of strategic planning and development targeted at supporting the region's textile sector is the PM MITRA Park in Lucknow. It has several advantages and makes a substantial contribution to the region's social and economic structure. Setting up a textile manufacturing industry in Lucknow offers several advantages due to the city's strategic location, skilled labour, infrastructure, and supportive policies. Here are some key benefits:

- **Availability of Skilled Labor:** Lucknow has a long history in traditional textiles and crafts, especially in chikankari embroidery. Skilled artisans are available, which can benefit textile industries looking for both traditional and modern skills. Businesses are able to maintain high standards of workmanship and production because of the area's abundance of skilled experts and artisans.

- **Captive Market with Large Consumer Base:** Uttar Pradesh is the third largest consumer of textile products in India. In last few years, Uttar Pradesh has emerged as a hub for textile sector especially in man-made fibre sector.
- **Strategic Location and Connectivity:** Lucknow is well-connected by road, rail, and air, making it easier to transport raw materials and finished goods. This connectivity is advantageous for national distribution and export. For companies working in the park, this advantageous position also guarantees a smooth supply chain and logistical management.
- **State-of-the-Art Infrastructure:** The park has state-of-the-art facilities, such as sophisticated manufacturing facilities, a dependable power source, and fast internet access. Within the textile industry, this infrastructure promotes innovation and facilitates effective production procedures.
- **Growing consumer base and consumption:** Uttar Pradesh has a large and growing population with rising purchasing power, which can serve as a domestic consumer base for manufactured goods, reducing reliance on exports and providing a steady local market.
- **Growing Demand for Traditional Crafts:** With a rich heritage of textiles like chikankari, zardozi, and handloom weaving, there's a significant demand for these products in both domestic and international markets. A textile industry in Lucknow can capitalize on this demand.
- **Low Operational Costs:** Lucknow offers lower operational costs compared to metro cities, including lower wages and rent. This helps maintain cost-efficiency, making production more competitive.
- **Educational Institutes:** Lucknow is home to several technical and management institutes, including IIT Kanpur (nearby) and IIM Lucknow, which provide a well-trained workforce.
- **Access to industry partnerships:** Kanpur has been an industrial hub for a long time. Lucknow being the capital city has been witnessing growing industry base. Uttar Pradesh State Industrial Development Authority has developed more than 154 industrial hubs till now.

By establishing a textile manufacturing unit in Lucknow, businesses can leverage these advantages, creating a sustainable and profitable operation with both national and international appeal.

2.4.5 KEY TAKEAWAYS

Given the projected increase in market size to USD 1 Trillion globally and USD 190 Billion in domestic market, a huge opportunity lies ahead for growth within the industry. In view of these opportunities, the Textile and Apparel industry has been the focus sector of the central government as well as the state government. India has competitive advantage in terms of availability of raw material and strong strength across the value chain, as compared to Bangladesh and Vietnam. Whereas China has advantage both in terms of abundant raw material and strong presence across the value chain, but the expensive labour cost in China has made India as one of the most suitable destinations for textile and apparel industry.

The major issue that may be addressed is that a large share of the country's cotton produce is exported to China, where it is woven into fabrics and further transported to countries like China, Vietnam, Bangladesh and Cambodia for apparel manufacturing. It is estimated that a finished

garment can generate approximately four time of the yarn value and six time of the raw fibre value.

Key takeaways:

- Global Textile & Apparel trade is dominated by Apparels which accounted for 58% market share in 2019 vis-à-vis 53% in 2005. Therefore, in order to garner more share in exports, industry should focus more on Apparel manufacturing.
- Within the Apparel market, Synthetics account for 74% of the global market demand; India leads in Synthetic fibre production while lags in Synthetic fabric & Apparel production. Therefore, the industry should focus on Man Made fibre and Synthetic apparels.
- Industry should focus more on manufacturing high value product such as trousers, sweaters, and jackets, which accounts for approximately 60% of the market.
- Government to facilitate to establish mega units for fabrics and garmenting and provide best infrastructure in forms of mega textile and apparel park.

2.5 LUCKNOW DISTRICT PROFILE

Lucknow is the capital city of the Indian state of Uttar Pradesh (UP) and the second largest city after Kanpur in UP. Lucknow is also the administrative headquarter of the eponymous district and division. Lucknow has always been a multicultural city that flourished as a North Indian cultural and artistic hub and was the seat of power of Nawabs in the 18th and 19th centuries. It continues to be an important centre of governance, administration, education, commerce, aerospace, finance, pharmaceuticals, technology, design, culture, tourism, music, and poetry. Lucknow sits on the north-western shore of the Gomti River.

Hindi is the city's official language. However, the most prominent language spoken in Lucknow is the Hindi-Urdu language. Though it is an ancient language and is often referred to as Lucknawi Urdu. As the seat of the government of Uttar Pradesh, Lucknow is the site of Vidhan Sabha, the High Court and numerous government departments and agencies. It is also the location of many social and cultural institutions of national significance, such as the Kathak, Khayal, Nawabs and Classical music. It is also the birthplace of British pop star Sir Cliff Richard. With reference to health care Sanjay Gandhi Post Graduate Institute of Medical Science (SGPGI) at Rae Bareli Road has attraction of the U.P. State. As for as with relation to tourism several historical buildings constructed by Nawab's are situated in the city and attracting the tourist.

Lucknow, the capital city of the Indian state of Uttar Pradesh is world renowned for its traditional Chikankari & Zari-zardozi embroidery, Dashehari Mangoes. This traditional embroidery style is one of Lucknow's most ancient and well-known art forms, believed to be introduced by the Mughals.

2.5.1 TOPOGRAPHY & AGRICULTURE

Awadh, known as the granary of India, was important strategically for the control of the fertile plain between the Ganges and the Yamuna rivers known as the Doab. Situated in the heart of the great Gangetic plain, Lucknow city is surrounded by its rural towns and villages like the orchard town of Malihabad, historic Kakori, Mohanlal ganj, Gosainganj, Chinhat, Itaunja. The Gomti River, the chief geographical feature, meanders through the city, dividing it into the Trans-Gomti and Cis-Gomti regions. Lucknow city is in the seismic zone III. Lucknow has a warm humid subtropical climate with cool, dry winters from December to February and dry, hot summers from April to June. The rainy season is from mid-June to mid-September, when Lucknow gets an average rainfall of 896.2 millimetres (35.28 in) from the south-west monsoon winds, and occasionally frontal rainfall will occur in January. In winter, the maximum temperature is around 25 °C (77 °F) and the minimum is in the 2 to 3 degrees Celsius range. Fog is quite common from late December to late January. Summers are extremely hot with temperatures rising to the 40-to-46-degree Celsius range.[15]

2.5.2 INDUSTRIAL PROFILE OF THE DISTRICT

Existing States of Industrial areas in the district Lucknow.

[15] *MSME Development Institute, Kanpur*

TABLE 2-8: INDUSTRIAL AREAS IN LUCKNOW[15]

S. No	Name of Indus. Area	Land acquired (in Acre)	Land Development (in Acre)	No of Plots/ Sheds	No of Units/Shed in Production
1	Rural Ind. Estate, Talkatora	48.66	48.66	130/31	129/30
2	Mohanlal Ganj	2.33	2.33	80	80
3	B.T.Mishra pur	2.33	2.33	54	54
4	S.P.Kakori	2.24	2.24	1	
5	UPSIDA Ind. Area, Chinhat	701.76	671.12	140	103
6	Sarojini Nagar	235.09	235.09	150	93
7	Amausi	236.90	236.90	91	63

As given in the following table, MSME industries across the sectors of food/agro-based industries, repair & servicing, wood, metal, apparel, chemical, leather, engineering etc. are the key economy drivers of the district.

Ready garments and embroidery contribute most in terms of employment and revenue, which is approximately 26% and 8% respectively. Repairing and Servicing contributes ~15% to revenue, highest among all the enterprises and ~19% of work force is employed in this vertical.

TABLE 2-9: INDUSTRIES DETAILS[16]

NIC Code no.	Type of Industry	Number of units	Investment (Rs Lakh)	Employment
1010	Food/Agro Product	647	3879	3591
2029	Soda Water	23	84	170
1313	Cotton Textile	96	13	340
1313	Woollen, Silk, and artificial thread-based clothes	5	82	54
1394	Jute & jute based	20	82	89
4771	Ready-made garments & Embroidery	6403	2736	20146
1610	Wood/wooden based furniture	317	959	2477

[16] *Directorate of Industries, Govt of U.P, Kanpur*

NIC Code no.	Type of Industry	Number of units	Investment (Rs Lakh)	Employment
1709	Paper & Paper products	750	3508	4320
1511	Leather based	796	154	2955
1520	Rubber, Plastic &petro based	375	2651	2720
2011	Chemical/Chemical based	539	3025	2893
1920	Mineral based	330	2038	3925
2410	Basic Metal Industries	129	955	752
2511	Metal products	974	2380	5123
2811	Machinery & Parts except Electrical (Engineering units)	420	1843	3623
2710	Electrical machinery and Apparatus	327	1324	2478
3011	Transport Equipment's & Parts	269	1854	1822
3290	Misc. Manufacturing	1117	1608	3699
2829	Repairing & servicing	4801	5090	14357
	Total	18338	34265	75534

Ready-made garments and Embroidery sector of MSME with 6403 units in the district is the most prominent and economy contributing sector of the district. It is followed by sectors such as "Repair and installation of machinery and Equipment," "Misc. Manufacturing" with 4801 and 1117 units, respectively.

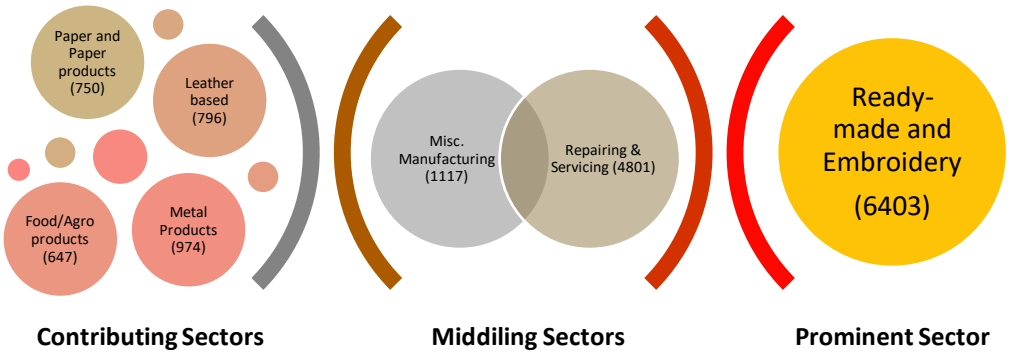


FIGURE 2-5: MSME LANDSCAPE OF THE DISTRICT

2.5.3 DISTRICT POPULATION

Out of total population of 4,589,838 (2011 census), 1,542,806 are working population. Out of total working population, 68.99% are working in other industries, 24.54% are cultivators and agricultural labourers and only 6.47% are household industry workers. This indicates that agriculture is the main source of income in the district.

TABLE 2-10: OCCUPATIONAL DISTRIBUTION OF MAIN WORKERS[17]

S.No.	Particulars	Lucknow	%
1	Cultivators	1,75,578	11.38%
2	Agriculture Labourers	203,029	13.16%
3	Household Industry Workers	99,863	6.47%
4	Others	1,064,336	68.99%

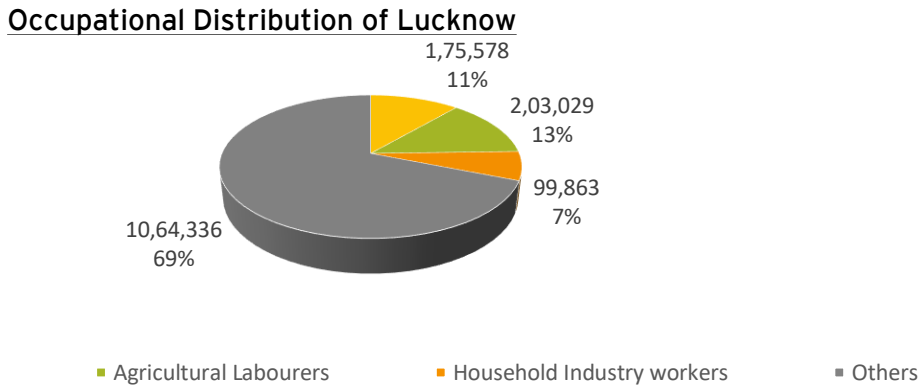


FIGURE 2-6: OCCUPATIONAL DISTRIBUTION OF LUCKNOW

2.5.4 MAJOR EXPORTABLE PRODUCT FROM LUCKNOW

The total export from Lucknow is approximately INR 1343.04 Crore for the financial year 2021-22.[18]

The following table depicts the value of export of seven major products from Lucknow:

TABLE 2-11: MAJOR EXPORTABLE PRODUCT

S. No	Product	Export value (in INR) from financial year 2021-22[18]
1	Malihabadi Mango	64.13 Lakhs[19]
2	Chikankari & Zari-Zardozi	50 – 60 Cr[19]

[17] *District census handbook 2011- Lucknow*
[18] *https://dashboard.commerce.gov.in/commercedashboard.aspx*
[19] *Turnover of Mango is for FY 2020-21as provided by DGFT and turnover of Chikankari & Zari-Zardozi is for FY 2018-19 as per DSR*

3	Engineering Goods	269.29 Cr
4	Rice	76.58 Cr
5	Sugar	64.35 Cr
6	Wheat	85.55 Cr
7	Chemicals	124.85 Cr
Total Export from Lucknow		1343.04 Cr[20]

Apart from the above-mentioned products, Service Sector Exports from Lucknow has tremendous untapped potential to take India's Services Export from the current US$200 Billion to US$700 Billion in the next 5 years. Lucknow is having a very well-developed infrastructure in the 7 out of 12 Champion sectors. The 7 Champion sectors are Tourism and Hospitality, Medical Value Travel, Education Services, Information Technology Enabled Services (ITeS), Audio- Visual Services, Transportation & Logistics Services and Environmental Services. Details are mentioned in Section 9.

2.6 PROPOSED MIX OF INDUSTRY

The PM MITRA Park is being established to strengthen the ecosystem by creating the entire textile value chain units in Lucknow. The establishment of an entire textile value chain manufacturing zone in Lucknow will address the critical infrastructure gaps impeding the growth of the cluster post Ginning value chain. The Park will have an enabling ecosystem for Spinning, Weaving, Knitting, Processing & apparel manufacturing through support infrastructure and Built- to- Suit units as per industry requirements.

This would encourage the stakeholders to diversify the product base and skill base of the manpower which would further facilitate production of value-added products that would fetch better price in the consumer market. The employment opportunities generated are ideally suitable particularly for women workforce and youth with low levels of formal education and low-income levels. The park will help in diversify the product base and in the process also involve the women members of weaver families towards providing alternate livelihoods and empowering them towards enhanced role-play and active participation in the development of the Cluster.

Within Textiles, the Apparel segment gives the highest value addition and also contributes to larger share in employment. Apparel making is also suited for employment for women and thus plays a critical role in improving the social dynamics. In terms of job creation potential, contribution of apparel sector is significantly higher compared to other segments in the Textile value chain, as illustrated in the below table.

[20] *https://dashboard.commerce.gov.in/commercedashboard.aspx*

TABLE 2-12: EMPLOYMENT GENERATION AS PER THE CASE STUDY

Sector	Direct Employment per Rs 1 crore of investment
Ginning	18 people
Spinning	1 Person
Weaving / Knitting	6 people
Textile Processing	18 people
Apparel	60 people

Source: Consultant

An increase in Apparel manufacturing can reduce the income imbalances in the regions with low per capita incomes, lead to more jobs as well as increase foreign exchange earnings through greater value addition across the value chain.

2.6.1 POTENTIAL OPPORTUNITIES

The textile industry, a cornerstone of global manufacturing and commerce, offers a diverse array of sector-wise opportunities for industries to invest in within the context of a textile park. A textile park, often designed as a centralized hub for entire textile value chain production and innovation, provides a conducive environment for businesses to thrive and grow. Here are some sector-wise Potential opportunities for industries to consider when investing in a PM MITRA textile park, Lucknow.

TABLE 2-13: POTENTIAL OPPORTUNITIES

Sector	Opportunities
Garment Manufacturing	➢ Vast pool of skilled and semi-skilled labour, ➢ Diverse range of traditional textiles and crafts ➢ Leveraging local textiles and materials for garment production ➢ The garment industry can contribute to women's economic empowerment
Processing & dying	➢ Sustainable practices are a significant opportunity includes using eco-friendly dyes, reducing water and energy consumption, and adopting low-impact processes. Eco-certifications, such as OEKO-TEX and GOTS, are becoming more important. ➢ The demand for customized and personalized textiles is growing. Dyeing and processing can play a role in producing unique, one-of-a-kind products. ➢ Digital textile printing allows for more precise and efficient colour application, reducing waste and enabling small batch production.
Weaving / Knitting	➢ Modernizing of traditional techniques while preserving the authenticity can lead to unique and sought-after textiles ➢ Fabric Innovation with distinct texture, Drapes and Functional Properties ➢ knitting sector can cater to both the local market and export demands, making it a versatile choice for expansion.
Spinning	➢ Spinning Sector can contribute to the Yarn Supply to Weaving Units inside the park or domestic yarn production, reducing dependence on imports or Logistics. ➢ Helps in Value addition and cost reduction considering the final product outcome. ➢ Upskilling and adopting advanced techniques can lead to high-quality yarn production, catering to varied industry needs.
Textile M/Cs manufacturing	➢ Cater the domestic demand to modernization of textile mills ➢ Manufacturing machinery for export can contribute to foreign exchange earnings. ➢ UP's strategic geographical location can facilitate exports to neighbouring countries and regions with robust textile industries.
Technical Textile	➢ Infrastructure Projects ➢ Urbanization

	➢ High Demand of Agro Textiles in Agriculture industry ➢ Rising of Automotive and Aerospace industry in state
MMF Production	➢ Export potential due to High Global Demand ➢ High use in technical textile ➢ Developing eco-friendly synthetic fibres made from recycled materials or bio-based sources aligns with sustainability trends.

2.6.2 PROPOSED PRODUCT MIX

For Lucknow in particular, the need for integrated textile clusters is more pronounced because of the reason that despite it being one of the largest producers of Value-added High fashion garments with Chikankari & Zari Zardozi work and availability & prudent raw material textile clusters near to Lucknow such as, Hardoi, Sitapur, Varanasi, Kanpur, Gorakhpur which contributing state in Textile Production to cater domestic as well as export market.

Establishment of PM MITRA integrated textile park at Lucknow would help in stemming the migration of skilled textile workers to other states in search of livelihood. In other states such as NCR, Maharashtra & Gujrat there are more than 12.32 million workers originally hailing from Uttar Pradesh are employed.

The broad objective of the textile park is to accommodate the value-added services of textile from cotton and non-cotton fibre. This aim is to produce **Approx 3.5 lakhs pieces** of garments along with about 8.71 Lakhs meter fabric on the daily bases in case of fully integrated Core textile value chain to adopt, the upstream capacity has been worked as depicted in the table below with multiple options. Below tables also explains the broad break-up of the units and their capacities (along with area required) and likely employment generation.

2.6.2.1 Fully Integrated land optimization ratio of Core textile Value chain industries.

The proposed product mix and area allocation for the Textile & apparel park is mentioned below based on Integrated Raw material / production requirements of Core textile Value chain.

TABLE 2-14: LAND OPTIMIZATION RATIO – OPTION 1

S.No	Sector	Area (In Acres)	Area Optimization ratio	Raw material / Day	Production / day	Proposed Employment Generation
1	**Garment Manufacturing**	94	17	6,22,741 Meters Fabric / Day	3,35,000 Pieces Garment / Day	50400
2	**Processing**	68	13	8,71,838 Meters Fabric / Day	6,22,741 Meters Fabric / Day	5430
3	**Weaving /Knitting**	189	36	5,09,690 Kilograms Yarn / Day	8,71,838 Meters Fabric / Day	3756

4	**Spinning**	129	24	6,99,421 Kilograms Fibre/ Day	5,09,690 Kilograms Yarn / Day	5540
5	**Warehousing**	53	10	Warehouse @10 % of Total Industrial use Area		3021
Total Area		**533.18**	**100**			**68147**

Source: Consultant

2.6.2.2 Proposed land optimization ratio of core Textile & ancillary industries in PM MITRA Park.

One of the main objectives of the Lucknow PM MITRA Park is to make it an integrated state-of-art spinning, weaving/Knitting, & garment manufacturing along with some dedicated space allocation to Technical textiles, Textile machines manufacturing, Man-made fibre production & Regional specialized industries in Textile sector base with support facilities ranging from warehouse for raw material and finished products, Dedicated Processing Zone for warping & sizing facilities as well as finishing and packing under one roof. The Park would thus have facilities from spinning to ready-made garments and knitwear manufacturing for export and domestic market. The likely area optimization ratio of core textile sectors and ancillaries in the park is as below.

Industrial area of 533.18 Acres out of total 1000 Acres area including warehouse facilities would be potential to produce Approx 4.5 Lakhs Pieces of Garment on daily basis followed by the backend production of Processing, Weaving & Spinning industries to produce & supply at least 50% integrated raw material requirements to forwarding sector.

The proposed industries along with area dedicate in below table is likely to generate employment of 80891 persons with an employment share of garment sector more than 80%.

TABLE 2-15: LAND OPTIMIZATION RATIO – OPTION 2

S.No	Sector	Area (In Acres)	Area Optimization ratio	Raw material / Day	Production / day	Proposed Employment Generation
1	**Garment Manufacturing**	**122**	23	8,10,493 Meters Fabric / Day	4,36,000 Pieces / Day	65595
2	**Processing Zone**	**44**	8	5,57,345 Meters / Day **	4,05,246 Meters / Day	3534
3	**Weaving / Knitting**	**123**	23	3,31,679 Kilograms Yarns / Day	5,57,345 Meters / Day	2444
4	**Spinning**	**84.22**	16	4,55,146 Kilograms Fibre / Day	3,31,679 Kilograms Yarns / Day	3602
5	**Technical Textile/Non-Woven**	**37.32**	7	1,83,043 Kilograms Fibres, polymers, PP / Day	1,57,000 Kilograms / Day	521
6	**Carpet Industry**	**27.00**	5	RM & Production requirements calculation in the proposed area		1670

7	**Khadi, Handlooms & Regional specialization**	**26.32**	5	would be solely based on Expected production Goals and Product Range	
8	**Technical M/Cs manufacturing**	**16.00**	3		504
9	**Warehousing and Storage**	**53.32**	10		3021
Total		**533.18**			**80891**

Source: Consultant

- ** Processing industry has given the 50% of weightage followed by weaving and spinning industry as per the raw material requirements of garment sector
- Above requirement is based on the proposed production of 4,36,000 Pieces of Garment on Daily basis.

2.6.3 PRODUCTION PROCESSES OF TEXTILE VALUE CHAIN INDUSTRIES:

The textile industry encompasses a vast value chain that involves the production of raw materials, processing, and the manufacturing of various textile products. Here's an overview of the production process starts with Spinning, Weaving / Knitting, Processing, and then Garment Manufacturing and other special process and finally finishing & packing. The proposed production process in brief is described below of the entire textile value chain, from raw materials to finished products.

Process Flow Chart of Textile Manufacturing

Spinning
↓
Weaving
↓
Dyeing +Printing+ Finishing
↓
Garments Manufacturing

TABLE 2-16: SECTOR WISE DESCRIPTION OF TEXTILE VALUE CHAIN INDUSTRIES

Flow Process	Description
Spinning	Spinning is a crucial process in the textile industry where fibers, either natural or synthetic, are transformed into yarn. Yarn serves as the primary raw material for fabric or textile production, making the spinning process a fundamental step in the textile value chain. The spinning process can vary depending on the type of fiber, the desired characteristics of the yarn, and the type of spinning equipment used. There are different methods of spinning, including ring spinning, open-end spinning, and rotor spinning, each with its own advantages and disadvantages.
Weaving / Knitting	Weaving and knitting are two distinct but closely related processes in the textile industry, both of which play a fundamental role in transforming yarn into fabrics or textiles. These processes determine the structure and characteristics of the resulting material. Here's an overview of weaving and knitting in the textile industry:
Dyeing + Finishing	Processing and dyeing are essential processes in the textile industry that transform raw materials into finished textiles with desired colours, textures, and characteristics. Both processing and dyeing are highly specialized processes in the textile industry, and the choice of methods and chemicals depends on the type of fibers, fabrics, and end products. These processes are essential for achieving the desired appearance, colour, and performance of textiles.
Printing	Printing involves applying designs, patterns, and colours to fabrics, enhancing their aesthetic appeal. Textile printing is used to create a wide range of textiles, from clothing and home textiles to industrial and technical textiles. Textile printing is a versatile process that allows for creativity in textile design, enabling various industries to produce fabrics with unique and customized patterns and colours.
Garment Manufacturing	Garment manufacturing is a critical component of the textile industry, responsible for the transformation of fabric into clothing and other textile products. The process involves various steps, from design and pattern making to sewing, quality control, and packaging. The garment manufacturing process is highly labour-intensive and can vary significantly depending on the type of clothing produced, the materials used, and the scale of production. It

	requires skilled labour, precision, and adherence to quality control standards to produce garments that meet market demands and consumer expectations.

2.7 FIBRE PRODUCTION SCENARIO IN INDIA

2.7.1 COTTON

The Indian Textile Industry consumes a diverse range of fibres and yarns and the ratio of use of cotton to non - cotton fibres in India is around 60:40 whereas it is 30:70 in the rest of the world. India is the only country which grows all four species of cotton G. Arboreum & G. Herbaceum (Asian cotton), G. Barbadense (Egyptian cotton) and G. Hirsutum (American Upland cotton). G. Hirsutum represents 90% of the hybrid cotton production in India and all the current Bt cotton hybrids are G. Hirsutuim.

In India, majority of cotton production comes from 9 major cotton growing states, which are grouped into three diverse agro-ecological zones, as under: -

i) Northern Zone - Punjab, Haryana and Rajasthan

ii) Central Zone - Gujarat, Maharashtra and Madhya Pradesh

iii) Southern Zone - Telangana, Andhra Pradesh and Karnataka.

Apart from the above the cotton is also grown in the state of Odisha and Tamil Nadu.

TABLE 2-17: STATE WISE NO OF GINNING INDUSTRIES[21]

S.No	State	No. of Ginning Industries
1	Gujrat	324
2	Maharashtra	309
3	Telangana	247
4	Andhra Pradesh	53
5	Madhya Pradesh	43
6	Karnataka	41
7	Odisha	11
8	Haryana	3
9	Punjab	3
	Total	1034

2.7.1.1 Expected Logistic Cost from Lucknow

When detailing the logistics costs associated with transporting cotton to a textile park, it's essential to offer a comprehensive breakdown of the expenses involved in this process. The following are key components to be included in the logistic arrangement:

[21] *www.newclothmarketonline.com*

1. **Cotton Sourcing:** Explain the sources of cotton, specifying the regions from which it is procured. This information provides insight into the distances covered during transportation.
2. **Transportation Modes:** Elaborate on the various transportation methods employed for delivering cotton, encompassing road, rail, sea, or air. Provide the rationale behind the selection of each mode and its role within the logistics chain.

3. **Route Planning:** Discuss the chosen routes, taking into account factors like the shortest distance, the quality of infrastructure, and potential logistical challenges.

4. **Cost Components:** Break down the cost components, which include:
    a) **Freight Charges:** Expenses linked to moving cotton from the source to the textile park, encompassing transportation fees, fuel costs, and tolls.
    b) **Handling and Storage Costs**: Costs related to loading and unloading, along with any temporary storage expenses if applicable.
    c) **Customs and Duties:** Any customs duties or taxes incurred during cross-border transportation. **Packaging Costs:** Expenditures for packaging materials necessary to ensure the secure transportation of cotton.
    d) **Insurance:** Costs tied to insuring the cotton shipment against potential risks during transportation.
    e) **Labour Costs:** Expenses related to personnel involved in loading, unloading, and overseeing the transportation process.
    f) **Overheads:** Administrative and operational overhead costs incurred throughout the transportation process.
5. **Transportation Service Providers:** Specify the names of transportation service providers, such as shipping companies or logistics firms, and provide an overview of the services they offer.
6. **Cost Allocation:** Describe how costs are distributed among different parties in the supply chain, including the cotton supplier, textile park operator, and any intermediaries.
7. **Cost Comparison:** If applicable, compare logistics costs across different transportation modes, routes, or service providers, and identify opportunities for cost savings.

State	Location	Logistic cost in Rs/ Bale @0.008Rs/kg/KM
Gujarat	RAJKOT	1903
	MEHSANA	1627
	BHAVNAGAR	1826
Maharashtra	BEED	1760
	JALGAON	1482
	PARBHANI	1590
Telangana	ADILABAD	1327
	WARANGAL	1689

FIGURE 2-7: TOP SOURCING CENTERS W.R.T COTTON PRODUCTION & LOGISTIC COST FROM LUCKNOW

2.7.2 MANMADE FIBRE[22]

Man-made fibres (MMF) are mainly of two types viz., synthetic and cellulosic. Synthetic fibres are produced from crude oil and cellulosic fibres are from wood pulp. The main varieties of synthetic staple fibres are polyester, acrylic and polypropylene. Cellulosic fibre is viscose fibre, modal, etc. Textiles made out of these synthetic and cellulosic fibres are called man-made fibre textiles. However, besides pure man-made fibre textiles, presently the man-made fibre and natural fibre mainly cotton blends are more popular.

2.7.2.1 Indian Fibre Production Scenario

- India is the second largest manufacturer of MMF in the world with China being the largest manufacturer in the world with 45.70 mn MT production followed by India with 5.48mn MT, USA with 1.99 mn MT, Taiwan with 1.90 mn MT and South Korea with 1.37mn MT.

- India has the peculiar advantage of having both forward and backward linkages to the MMF industry. India is a leading manufacturer of PTA (Purified Terapthalic Acid), MEG (Mono Ethylene Glycol), the basic raw material used by MMF industry for production of fibre and filament Page 172 524 294230/2021/Economic Division in the value chain with production of 6.53 mn MT & 1.71 mn MT in 2018 respectively.

- The production of these raw materials being derived from petroleum industry refining is mostly concentrated in the hands of few players like Reliance Industries Limited (RIL), Indian Oil Corporation, MCC PTA India Corporation Pvt. Ltd., SVC Super Chem Ltd., SM Dyechem Ltd., JBP industry, etc. The production and availability and costing of the basic raw material influences the entire MMF textile value chain.

[22] *Indian Manmade textile Industry – Ministry of Textiles*

• China with a production of 36.21mn MT of PTA and 6.79 mn MT of MEG is the leading player in the world whereas Saudi Arabia is a leading manufacturer of MEG with 6.90 mn MT production in 2018.

• In the forward linkage of MMF TVC, India's production of yarn, fabrics have grown from 2013-14 to 2017-18 as given below:

TABLE 2-18: PRODUCTION OF MMF & MM FILAMENT YARN * PRODUCTION IN MILLION KG23

Year	Manmade Fibre	Manmade filament yarn
2018-19	1442	1160
2019-20	1898	1688
2020-21	1618	1326
2021-22	2160	2016
2022-23	2152	1904
2023-24(P)	2044	1800

- **PTA - Purified Terephthalic Acid (PTA) & MEG - Mono Ethylene Glycol**
- Overall PFY demand is projected to witness 15-20% growth in fiscal 2022. Overall PSF demand is projected to witness a growth of 14-19%.
- **India has the peculiar advantage of having both forward and backward linkages to the MMF industry. India is a leading manufacturer of PTA (Purified Terephthalic Acid), MEG (Mono Ethylene Glycol)**

[23] *Annual Report – 2022-23 Ministry of Textile & Report on Estimated production of man-made fibre, filament yarn*

TABLE 2-19: PRODUCTION LOCATION (MMF)

Sl.No	State	Total Production %
1	GUJARAT	49
2	MAHARASHTRA	19
3	MADHYA PRADESH	12
4	PUNJAB	10
5	UTTAR PRADESH	5
6	OTHERS	5

77.5%

POLYESTER SHARE IN MMF

16.5%

VISCOSE SHARE IN MMF

3.7% GROWTH IN MMF PRODUCTION (Y.O.Y)

2.7.2.2 Global Scenario

Demand for man-made fibre (MMF) textiles all over the world is increasing as a substitute for cotton amid changes in global fashion trends. Currently MMF dominates global textile fibre consumption with 72: 28 ratio i.e., MMF 72% and 28% is Natural fibre. The share of MMF has been steadily increasing due to the inherent limitations of growth of cotton and other natural fibres.

According to the Textiles Intelligence Report on Forecasts of Regional and Global end-use, demand for man-made fibres is projected to increase by 3.4% in 2017 whereas end-use demand for cotton is projected to increase by only 0.5%. As a result of these trends, the share of manmade fibres in global end-use demand will grow from 72.5% to 73.0% but the share of cotton will fall to 25.7% of which most of the overall growth will take place in developing countries and most of this growth will be in Asia.

2.8 MANPOWER SUPPLY

2.8.1 INTRODUCTION

The success of any textile park hinges on a dynamic, skilled, and efficient workforce that forms the backbone of its operations. Manpower is not merely a resource but a driving force that propels innovation, productivity, and growth within the textile industry. To harness this potential and chart the path to sustainable success, a comprehensive Manpower Assessment is both imperative and enlightening.

2.8.2 STATE POPULATION UTTAR PRADESH[24]

One-sixth of India's population lives in Uttar Pradesh, is located in the north central part of India and has the highest population in India. Uttar Pradesh population in 2023 is estimated to be 236 million (23.6 Crores). By May 2023 Uttar Pradesh population is projected to be 23.56 crores (235.68 million) as per Unique Identification Aadhar India, updated 31, May 2023.

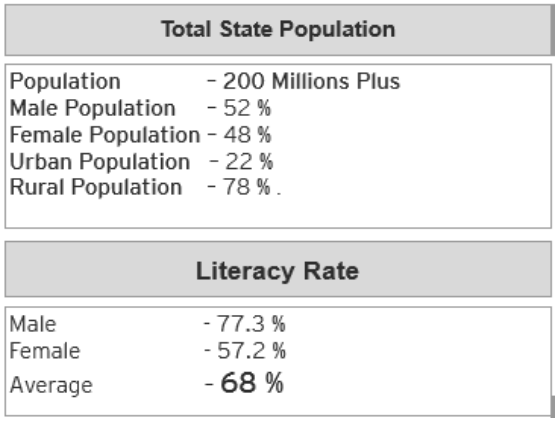


FIGURE 2-8: POPULATION BIFURCATION & LITERACY RATE

2.8.3 UTTAR PRADESH WORKING POPULATION - CENSUS 2011

In Uttar Pradesh out of total population, 65,814,715 were engaged in work activities. 67.8% of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 32.2% were involved in Marginal activity providing livelihood for less than 6 months. Of 65,814,715 workers engaged in Main Work, 15,576,415 were cultivators (owner or co-owner) while 9,749,915 were Agricultural labourer. Figure 2.6 shows the Population bifurcation & literacy rate.

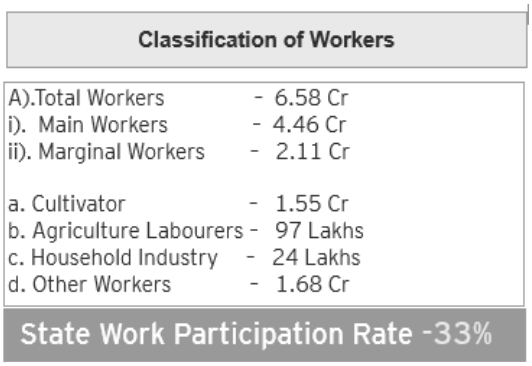


FIGURE 2-9: WORK PARTICIPATION RATE

TABLE 2-20: UTTAR PRADSH WORKING POPULATION

Type	Total	Male	Female
Main Workers	44,635,492	37,420,299	7,215,193
-Cultivators	15,576,415	13,727,429	1,848,986
-Agriculture Labourer	9,749,915	7,777,577	1,972,338
-Household Industries	2,409,436	1,669,471	739,965
-Other Workers	16,899,726	16,899,726	2,653,904
Marginal Workers	21,179,223	12,426,463	12,426,463

Source: Census 2011

2.8.4 AGE WISE POPULATION

As per the state population data the average population in between 20-40 age group is 29% which is also best suitable age criteria to suitably considerable for working pollution[25].

[24] https://www.populationu.com/in/uttar-pradesh-population
[25] UTTAR PRADESH AT A GLANCE 2021 - updes.up.nic.in

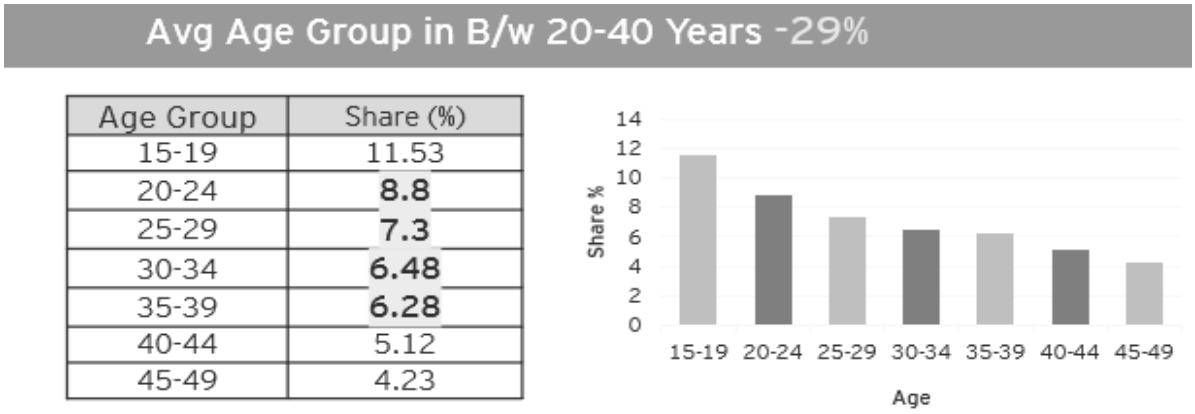


FIGURE 2-10: AVERAGE AGE GROUP (UP)

2.8.5 SKILLED MANPOWER AVAILABILITY IN TEXTILE SECTOR

The 'Scheme for Capacity Building in Textile Sector (SCBTS)' shall be known by the name Samarth, signifying the broad objective of the scheme to skill the youth for gainful and sustainable employment in the textile sector.

2.8.5.1 Objectives

i. To provide demand driven, placement oriented National Skills Qualifications Framework (NSQF) compliant skilling programmes to incentivize and supplement the efforts of the industry in creating jobs in the organized textile and related sectors, covering the entire value chain of textile, excluding Spinning and Weaving.
ii. To promote skilling and skill upgradation in the traditional sectors of handlooms, handicrafts, sericulture and jute.
iii. To enable provision of sustainable livelihood either by wage or self-employment to all sections of the society across the country.

2.8.5.2 (UP)| Sector wise status of Trained under Samarth-2018-23

Total Number of Trainees whose training has been completed under Samarth Scheme by latest is 28,679 in the multiple sectors where the training under Garment sector holds the 58% share of total Trained manpower [26]. Previously Integrated Skill development scheme (ISDS) – a centrally sponsored scheme is successfully running in the state addressed the skilled manpower of the textile industry. Around 1,16,677 people have been trained and 75,238 have been placed under this scheme in the state.

Sector	Share %	No of Trained
Garment Sector	58	14917
Handicraft & Carpet	30	7696
Textile & Handloom	10	2648
Silk	2	471
Jute	0	41
Processing	0	8

FIGURE 2-11: SECTOR WISE TRAINED FIGURE UNDER SAMARTH

[26] *https://samarth-textiles.gov.in/public_dashboard*

2.8.6 AN OVERVIEW OF OUT-MIGRATION FROM UTTAR PRADESH USING CENSUS 2011[27]

Regional imbalances, very high level of unemployment and widespread poverty are well-established characteristics of the state. Uttar Pradesh has become one of the largest migrants sending states in India.

Among Indian states, it has the largest number of inter-state outmigrants – 12.32 million. The state also has around 52 million internal migrants. Of these, 66.92 per cent, i.e., 34.80 million are intra district migrants and 33.08 per cent, i.e., 17.20 million are inter-district migrants (Census 2011).

Migration Report Uttar Pradesh

Out State Migrants
Total State Population - 200 Millions Plus
inter-state outmigrants - 12.32 Millions

Inter state Migrants
Total Migrants - 52 Millions
Intra District - 34.80 Millions
Inter District - 17.20 Millions\

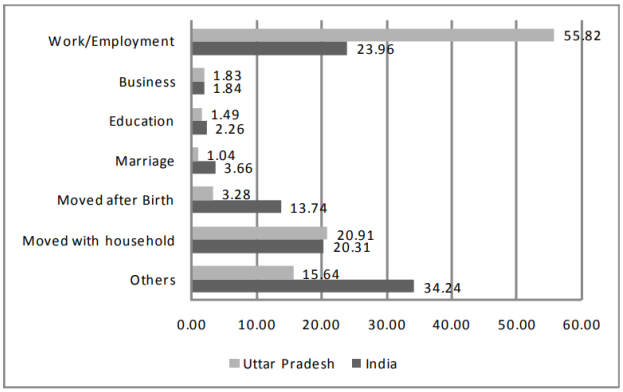
Reason for migration
Male - Work/Employment - 55.82 %
Female - Marriage - 49.51 %

2.8.6.1 Reasons for Migration

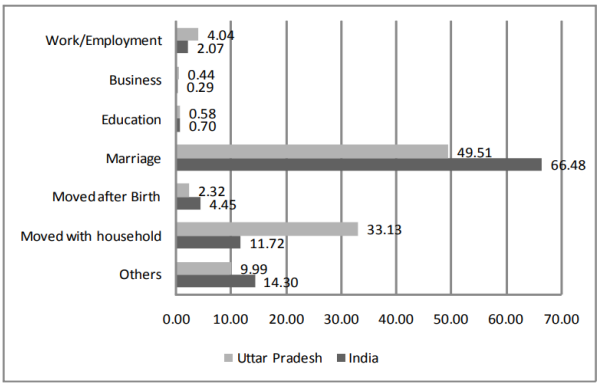
Recent migration-centric literature in the Indian context suggests that the likelihood of out migration for employment-related reasons is highest among the EAG (Empowered Action Group) states where it has become a livelihood strategy for many. The Census 2011 D-series data also confirms this pattern, suggesting that employment-related out-migration is more prevalent among the lower-income states such as Uttar Pradesh and Bihar.

In this section, the reasons for migration from Uttar Pradesh are compared with all-India figures. The reasons for migration are analysed separately for male and female migrants because male migration is mostly dominated by employment-related reasons, whereas female migration occurs due to combined effects of employment and marriage. An aggregate analysis in this regard may give biased results.

Graph-1: Reason for migration among Male migrants for India and Uttar Pradesh



Graph-2: Reason for migration among Female migrants for India and Uttar Pradesh



[27] *Journal of Migration Affairs Vol. II(2): 58-66, March 2020*

2.9 CASE STUDIES

2.9.1 INTRODUCTION

This Chapter details out some of the successful domestic or global Textile & Apparel Parks which has evolved and established themselves as globally renowned names in manufacturing of Textile & Apparel.

In the realm of economic development and industrial growth, few sectors hold as much sway as the textile and apparel industry. It's a world where tradition meets innovation, where cultural heritage intertwines with cutting-edge technology, and where the artistry of craftsmanship converges with the demands of global commerce. As we embark on this chapter, we venture into a landscape where textile and apparel parks stand as beacons of progress and transformation.

Each case study is a mosaic of experiences, blending the entrepreneurial spirit of industry leaders, the resilience of local communities, and the vision of policymakers. Together, they paint a vivid portrait of how these parks have not only weathered the storms of global competition but have also set new standards for sustainability, efficiency, and socio-economic impact.

2.9.2 CASE STUDIES OF FEW GLOBAL TEXTILE MANUFACTURING CLUSTERS

2.9.2.1 Macrolotto Industrial Area, Prato, Italy[28]

Macrolotto No. 1 is a privately owned industrial area developed in 1975 in Prato, Italy with an area of 150 hectares. The industrial area is managed by "CONSER", a consortium of 240 companies located in the area. There are about 350 companies in the industrial area employing

around 3,500 workers. The industrial area comprises of the textile sector companies, 50% of which are involved in activities like raw material trading, spinning, weaving, knitting, etc. and rest are involved in wet processes like dyeing, washing, printing, etc.

Common facilities Various facilities are provided by CONSER to the units that help reduce cost and increase competitiveness of the companies located in the area. There are also a number of service specific consortia in charge of delivering certain services like"

[28] *Study Report- Review of the Scheme for Integrated Textile Parks (SITP) by Wazir & Submitted to Ministry of Textiles*

a. "IDRA" for industrial water delivery treatment and recycling

b. "Energia Libera" for production of energy and electricity.

These consortia are owned and run by the companies in the park that need the specific services. Following common facilities are provided in the Macrolotto industrial area:

- Waste water recycling plant
- Power
- Commercial centres
- Banks
- Administrative offices
- Logistics services
- R&D Assistance
- Tele-communication services
- Transportation services for employees

The Macrolotto industrial area is well recognized as an Eco-innovation park due to its focus on the environmental compliances. CONSER implemented Eco-Management and Audit System (EMAS) in the late 1990's in the area. EMAS comprises of wastewater treatment plant and water filtration plant with a capacity of treating around 5,000,000 m3/year for the treatment of wastewater and around 1,500,000 m3/year for fresh water, allowing for an overall production of around 6,500,000 m3/year of water for industrial, fire and services purposes.

1. **Government Support**

▸ During the development of the industrial area, local authorities played a key role by supporting in coordination and secretariat activities. Although there are no subsidies provided for the companies inside the park, but the administrative management of the park are covered by yearly contribution from the Italian Government of about 0.175 pounds per sq.m. i.e. 262500 pounds per annum (approx. Rs. 26 lakhs)

▸ CONSER had an agreement with the Municipality of Prato in 2004 which provided 12 electric and 3 methane powered vehicles which are used by the workers for commuting within the industrial area through carpooling.

▸ The park has a contract with the Italian Post Office for a centralized mail service

2. **Success Factors**

The major reasons for the success of the Macrolotto industrial area can be attributed to collective management of the area by the member companies which allows them to act according to their needs and interest. The joining up of companies also helped to pool public investment and private co-funding of the projects. Due to collective management, the companies gained competitive advantage over the firms located outside the area by saving huge costs. This has served as a major reason for attracting a number of companies in the area.

2.9.2.2 Datang Socks City, China

Overview Datang Sock Cluster, located in Zhuji city of Zhejiang Province, is known as "Capital of Socks" as the city officials claim that it produces one in every three pair of socks worn in the world. The cluster produces 13.5 billion pairs of socks every year and its annual output was US$ 5.3 billion in 2013 (latest data available).

Phases of Development
The town was earlier a small rice farming village. It was in late 1970's that around 1,000 people in the town gathered in small groups and stitched socks together at home and then sold them in baskets along the Hangzhou-Jinhua highway. Gradually, the locality and nearby areas experienced an expansion in capacity over different locations. A number of trading centres with different specializations viz. textile raw material, socks manufacturing equipment and logistics services also came up in the area. The township Government realized that the activities were scattered in different pockets which was causing increase in logistics cost. So, they decided to encourage consolidation of trading activity at one location. The specialized trading centres in different areas were brought together to create Datang sock city as a comprehensive pan-industry trading city. The development of sock city enabled the growth of local sock cluster and played an important role in facilitating the expansion of the cluster as a whole.

1. **Government Support**

The Government followed following model for development of Datang sock city:

Development Phase Activity undertaken Expansion Consolidation of raw material traders and establishment of Datang raw material market Adjustment Technology up gradation of sock manufacturers and market expansion for increasing sales Upgradation Targeting international markets

The Government further supported the cluster by providing Government-financed market place for socks, providing land, giving tax benefits and developing infrastructure and transportation network needed to move products quickly to the market. The real edge of the Datang is the presence of the total value chain of socks business. The cluster comprises of around 2,500 socks manufacturing firms, 550 raw material firms, 312 hem stitching factories, 5 printing & dyeing plants, 305 packing factories, 208 mechanical fitting suppliers, 635 socks dealers and 103 shipment service firms.
It also has around 1,600 shops to sell the socks. Such value chain and production specialization has reduced overall operating costs and has greatly enhanced productivity and efficiency of all business activities in the cluster. Clustering and networking has helped small and medium enterprises to enhance their competitiveness by being more specialized. As the firms are closely related, they benefit by sharing technological and marketing knowledge, and learning effects may be easier to achieve because it is easier to monitor what the neighbours do and learn from their successes and mistakes.

The cluster has around 30,000 local people and 130,000 migrant workers earning their living through making socks. The firms here have trained their workers to specialize in doing different procedure for examples workers specialized in binding pair of socks with metal clips. The clusterization has significantly improved the lives of the local people. Many people started from making socks at home and later on became owners of their own firms.

In order to market its products, the cluster organizes an annual socks festival that attracts more than 100,000 buyers every year. Datang is decorated with balloons and flags for its annual sock fair. Banners and signs are put everywhere to attract the visitors.

2.9.2.3 Benefits extended by other countries to Textile Parks (Case Study Ethiopia)[29]

To boost investments in the textile sector, various countries extend special benefits to investors for example

- Finance availability at subsidized rate
- Attractive tax break policies
- Ease of engaging expatriate workers

Providing land, ready factory sheds and other infrastructure at nominal rates

- Availability of power and water at factory gate
- Well established connectivity with ports
- Development of complete manufacturing eco-system within the textile park

A detailed case study of Ethiopia and some of the textiles parks i:e Bole Lemi, Hwassa & Mekele Industrial Zone is given ahead:

1. **Case Study- Ethiopia**

Ethiopia, an East African country, is one of those nations which is actively promoting its investment in the textiles sector by establishing textile parks like Bole Lemi and Hawassa Textile Park. Some of the park's infrastructure related to textile and apparels details & incentives provided by Ethiopian government for investments in textile parks given below:

2. **Key Anchor Principles**

- **Specialized Parks:** Enhancing economy of scale and efficiency through the development of specialized/clustered Industrial Parks that are dedicated to priority sectors such as Apparel and Textile, Leather and Leather Products, Pharmaceuticals, Agro processing etc
- **Export oriented:** Government provision of Industrial Park incentives and support measures targeted at increased export performance and competitiveness.
- **Technology transfer, Skills development and competitiveness:** Creating and developing a pool of trained industrial work force & enabling environment for skills attraction & retention which will lead to enterprise competitiveness.
- Vertical integration: Enhancing backward and forward linkages in the economy.

[29] *Study Report- Review of the Scheme for Integrated Textile Parks (SITP) by Wazir & Submitted to Ministry of Textiles*

▸ **Sustainability:** Maintaining high environmental standards through the utilization of environment friendly technologies, zero liquid discharge systems and other socially sustainable facilities such as housing accommodations for staff through various schemes and arrangements, etc.

2.9.2.4 Quick facts about some textile and apparel industrial Parks (Ethiopia)[30].

Parameter	BOLE LEMI I AND II INDUSTRIAL PARKS	HAWASSA INDUSTRIAL PARK	MEKELE INDUSTRIAL PARK
Park infrastructure	Land size ▸ Phase I: 156 Ha ▸ Phase II: 171 ha	Land Size Phase I and Phase II: Total 300 ha Area for Phase 1 - (140ha)	Land size ▸ Phase I: 75 Ha
Specialization	Textile, garment, and Leather	Textile and Apparel	Textile and Apparel
Industrial spaces overview	▸ Phase I: 20 sheds in total; 10 (5,500) and 10 (11,000) Sq.m. ▸ Phase II: a total of 107 ha serviced ready to be used for Industrial purposes	52 sheds in total; 37 (5,500) and 15 (11,000) Sq.m	15 sheds in total; 4 (3,000), 6 (5,500) and 5 (11,000) Sq.m
Sustainability facilities	- Effluent Treatment Plant - Logistics overview: Located in the Capital of Ethiopia with proximity to Bole International Airport	- Zero Liquid Discharge (ZLD) - Logistics overview: Located in the Sothern part of Ethiopia and will soon have a multimodal logistics service provided by DHL and Ethiopian Airlines	- Advanced Conventional Effluent Treatment Plant - Logistics overview: Located in the Northern part of Ethiopia with proximity to the port of Assab and Massawa
Park occupancy	▸ Phase I: Fully occupied ▸ Phase II: 85 ha serviced land is available ▸ Sheds occupied: 20	▸ Number of companies: 22 ▸ Fully occupied	▸Number of companies:10 ▸ Sheds occupied: 13

[30] *www.ipdc.gov.et*






3. Govt Support

i. Fiscal Support

- 100% exemption from the payment of customs duties
- Zero customs duty against exports on raw material and trims
- Tax holiday privileges between 6 to 8 years for 100% export-oriented units.
- Exemption from the payment of income tax for additional 2 years for investor exporting more than 60% of the products.

‣ An income tax deduction of 30% for 3 consecutive years.
‣ Tax holiday for 2 years for employees
‣ 50% loan in dollars by EIB (Ethiopian Investment Bank) for FDI and 75% loan in dollars for local entrepreneurs
‣ Interest rate- 9%
‣ Duties and other taxes levied on imported and locally purchased raw materials used in the production of export goods are drawn back 100 percent at the time of the export of the finished goods
‣ Exporters are allowed to retain and deposit in a bank account up to 20% of their foreign exchange earnings for future use in the operation of their enterprises and no export price control is imposed

ii. Plug and Play infrastructure support
‣ Factory buildings are provided on rental basis
‣ Power and water are provided at factory gate

iii. Support for competitive manufacturing
‣ Low power cost - as low as 3 cents
‣ Economical labour (USD 50 per month per person)

iv. Others
‣ Free Trade Agreement (FTA) with key markets like US and Europe under AGOA (African growth and Opportunity Act) and EBA (Everything-But-Arms Initiative), respectively
‣ Organizations like UN, World Bank etc. promote investments in Ethiopia
‣ High level political and bureaucracy support to fast forward the process of approvals and clearances
‣ Foreign investors are entitled to make the following remittance out of Ethiopia in convertible foreign currency.

- Profit and dividends
- Principals and interest payments on external loans
- Payments related to technology transfer agreements
- Proceeds from the sale or liquidation of an enterprise
- Compensation paid to an investor o Proceeds from the sale or transfer of shares or partial ownership of an enterprise to a domestic investor

2.9.2.5 Key Learnings from Global Clusters/Parks

There are two types of clusters - a) the ones which had a heritage of manufacturing or natural clusters; and b) the ones which were developed by authorities from scratch or artificial clusters. In natural clusters, the Government has helped existing small and medium scale industry model to evolve into large scale, organized model. While in artificially developed clusters, authorities focused on developing a strategically located region, mostly near the coast, to develop specific set of industry and services. An in-depth analysis of successful clusters globally reveals that there are following 5 common aspects in them.

1. Large scale of operations - Most of the clusters have units which are large in scale to leverage economies of scale for sourcing, utility consumption, overheads, and marketing.

Definition of "large scale" may be relative, depending on the size of country, size of sector or both. However, the vision of policy makers supporting clusterization has always been to mass produce items and capture a significant market share in specific domains.

2. Presence of integrated value chain and support services - Taking example of textile clusters, it is observed that clusters aim to have manufacturing units across the value chain, starting from fibre to finished goods. The idea has been to develop a self-sufficient zone which has all the support services such as financial institutions, capital goods, logistics providers, accessories, approving authorities, etc. within the zone itself.
3. Well-developed common infrastructure - One of the foremost steps to develop a cluster is to provide reliable common infrastructure to the user industry. This covers well developed connectivity to ports & express ways, uninterrupted power and water supply, dormitories, residential complexes, wastewater treatment plants, public transportation, telecommunication, ready to use factory sheds, exhibition halls, security, testing labs, R&D centres, business centres, training and education centres, medical facilities, welfare infrastructure and social infrastructure.
4. Ease of doing business - To attract investments, Governments provide more flexible rules and regulations along with special attention to businesses operating in these zones for example green channel customs clearances, easier business approvals, single window clearances, support in mobilizing workforce, support for business registration, liberal work permit policy, fully convertible currency, easier financing options, etc.
5. Special fiscal incentives - In many of the clusters, businesses are exempted from various local taxes and import duties. Some even provide partial or full exemption from corporate and individual income taxes. Utility costs and user fee for common infrastructure may also be subsidized to bring them to a nominal level

2.9.3 CASE STUDIES OF FEW DOMESTIC TEXTILE MANUFACTURING CLUSTERS

2.9.3.1 Gujarat Eco Textile Park

Gujarat Eco Textile Park Ltd (GETPL) is a Special Purpose Vehicle (SPV) formed under Scheme of Integrated Textile Scheme (SITP) of Ministry of Textile, GoI. It has its own 8.5 MW Group Captive Power Plant, 60 MLD Common Effluent Treatment Plant (CETP) and infrastructure facilities like road, storm water drainage, compound wall, Centre of Excellence building to house training centre, workers canteen, bank, hospital etc. for common usage of its members.

The power plant is supplied by Rolls Royce and CETP is designed using C-Tech technology of SFC Inc, Austria. All the work of cabling and Piping is done underground.

Park has 33 operational units like Dyeing & Printing, technical textiles, weaving etc. and 6 units are under construction. GETP cater power requirement of member industries as well as treat Water waste generated by member industries. This is one of the first eco textile park in india with specific focus on environmental issues.

FIGURE 2-12: LAYOUT PLAN OF GETP

1. **Location –**
   The Gujrat Eco textile park is located in Charan, NH-48, Palsana, Gujrat

2. **Site details**

Total Area	- 80 Acres
Industrial Plots	- 67.05 %
Common Amenity	- 5.5 %
Open Space	- 8.8 %
Roads	- 17.88 %

2.9.3.2 Kerala International Apparel Parks Ltd[31]

KINFRA International Apparel Parks Ltd. (KIAP) is a company incorporated in 1995, registered under the Companies Act 1956 by the Government of Kerala, to provide infrastructure for garments and related industries. It is located in Menamkulam, Kazhakkutom, Thiruvananthapuram, and is the first establishment of KINFRA. The Park was established aiming to provide regular employment to woman.

FIGURE 2-13: LAYOUT PLAN AND SITE PHOTOGRAPHS OF KIAPL

1. **Infrastructure**

Land	KIAP has 95.83 acres of land leased to entrepreneurs at a premium rate of Rs:1,74,100* per cent at KIAP Thiruvananthapuram for 30 years, renewable up to 90 years. Each plot is well divided and has road access.

[31] *https://www.kinfraiii.org/*

Common Effluent Treatment Plant	KIAP has Common Effluent Treatment Plant of 650 m3/day capacity. Treated water is used for landscaping purpose.
Standard Design Factory Buildings and Built-up space:	KIAP has 5 Standard Design Factory buildings suitable for running production unit and ready to occupy built up space for running small scale firms, which are occupied at present.
Internal roads and boundary walls:	Closed boundary wall within the premises of the park with a single entry/exit Well maintained internal roads with access to all plots within the park.
Power distribution system	KIAP has a dedicated 11 KV power distribution system with 9 internal substations inside the park for serving LT/HT connections, which aims in offering quality power supply in industrial tariff to all the business production units functioning here. Supply is through underground cables or overhead lines.
Water distribution system:	Apparel Park has its own internal source of water with open wells inside the park, with the water being treated in 1 MLD water treatment plant and pumped to overhead tank. The treated water is further distributed to each business unit through well laid pipelines. KIAP also has a dedicated water supply line from Kerala Water Authority offering 1.5 mld of water supply for all business units.

2. **Features and other facilities**

1. A well-connected location: KIAP Thumba is well connected with all modes of transportation. National Highway is 2.5 kms away at Kazhakkutom.

2. Trivandrum International Airport is 15 kms away from the park.

3. Nearest railway stations of Kazhakkutom is 2 kms away, Kochuveli is 9.3 kms, and Trivandrum central railway station is 18 kms away.

4. Nearest port is the upcoming Vizhinjam International Container Transhipment Terminal which is 29 kms away. Other transhipment ports of Cochin and Tuticorin are at well accessible distance.

Facilities in the park	Employee / Social Facilities
➢ Street Lighting System ➢ VEEM software-based entry/exit system ➢ CCTV Surveillance System ➢ Website linked industry promotion ➢ ATM and banking facilities ➢ Park layout map ➢ Round the clock security ➢ Internet and telecommunication connectivity	➢ Common Crèche ➢ Canteen ➢ Working Women's Hostel ➢ Subsidized transportation by companies. ➢ Studio apartment by Bhavanam foundation for guest workers. ➢ AWAS Health Insurance Card for guest workers ➢ Changathi – Malayalam learning program

2.9.3.3 Brandix India Apparel City Private Ltd (BIAC), Vishakhapatnam, Andhra Pradesh[32]

BIAC is one of the largest dedicated apparel and textile manufacturing parks in Asia, bringing together world-class apparel supply chain partners to collaborate and co-create Inspired Solutions for renowned global brands. The 1000-acre world-class park is strategically located in the coastal city of Visakhapatnam, Andhra Pradesh offering a one-stop, industry-specific hub, creating a 'plug-n-play' production environment for global partners.

1. **Infrastructure**

EFFLUENT TREATMENT PLANT	The park's common effluent treatment plant meets the stringent environmental standards and is capable of treating **56 million litres** of effluent discharge per day which is then piped 9kms and discharged offshore via the park's **$7.5 million-dollar** marine outfall pipeline.
Water Treatment Facility	The Godavari River and a Combined 500 million litres rainwater harvesting ponds provide the park with an ample supply of water. The ultra-modern water treatment facility in the park is capable of treating **60 million litres** of raw water per day
Power	There is continuous stable supply of power to all operating units with a dedicated **200MW power** substation. Power is obtained from three different sources to minimise interruptions. It offers **33KV** of ready to use power right to doorstep of each operating unit.
Internal Road Network	The internal road system is an **8 km** long, 36 meter wide fully carpeted, four lane main road with sidewalks and roadside greening including **5.1 km of 24-meter-wide** secondary roads and 8-meter-wide service roads along the perimeter
Water Tanks	**2 Overhead** Water towers with a capacity of 1 ML, each
Non-Processing Zone	Over **250 acres** of land dedicated to non-processing facilities including a **120-acre** green belt, housing, hotel rooms, recreation facilities, meeting spaces and fine dining options.
Telecommunication Tower	Dedicated ICT facilities Available

2. **Unit Operational Status**

The Park houses 17 units (14 already operational) covering spinning, yarn processing (dyeing, weaving preparatory etc), fabric processing, apparel manufacturing etc and currently employs

[32] *www.brandixapparelcity.com*

19000 people and has a potential to employ 60,000. The Park has a turnover of about Rs 1400 Crore annually and has the potential to achieve about Rs 4800 Crore turn over

Sustainability

At Brandix, environmental sustainability is sewn into the very fabric of our business. Our 1000-acre apparel park has been caring for the environment and contributing towards a sustainable future for our people, the communities in which we serve, and the planet, since its inception. It is embedded into our day-to-day operations by focusing on three major pillars.

TABLE 2-21: LEADING THE WAY IN SUSTAINABILITY

Water	Energy	Waste	Chemicals	Community
Harvesting Rainwater, Recycling & Reusing Wastewater	Moving towards clean Energy	Reusing waste for Alternative Fuel for cement, Industries Zero Landfill Apparel Park	Alimenting Hazardous from all processes	Empowering the rural Women

2.9.3.4 Conclusion

1) Setting up such Textile & Apparel Parks plays an important role in developing the upward/ forward linkage of a typical textile value chain and aids in economic development of a region. A well planned and managed industrial Park facilitates development of more competitive and cleaner industrial sector especially when there is effective integration of environmental and industrial development policies. Location, selection of industries, environmental management systems and synergies between environmental and industrial policies are some of the crucial factors to be considered while establishing an industrial

(2) The units located in the industrial park enjoy a wide range of benefits apart from lower operating costs. The users of the park generally have economies of scale through centralised buying and selling. Due to economies of agglomeration, they enjoy benefits such as availability of Raw material, skilled labour, presence of repair, maintenance and service facilities, availability of components and presence of Skill development & financial institutions with all the basic infrastructure and support facilities in place, the unit's operating in the park can focus on their business and concentrate on development

(3) Establishment of similar Textile & Apparel Manufacturing Parks helps in creation of employment opportunities and can contribute towards development of backward areas through establishment of social infrastructure.

3 REQUIREMENT FORMULATION

3.1 INTRODUCTION

A Textile Park is a collection of textile businesses that use the same facilities and infrastructure for manufacturing and marketing. One of the oldest and largest industries in India is the textile sector, and textile parks are created to offer top-notch infrastructure and support services to this sector. The competitiveness, quality, and efficiency of the textile industry can all be improved with the aid of textile parks, which can also increase employment possibilities and exports.

It involves manufacturing, processing, freight transportation, warehousing product handling, marketing, forecasting and other value-added services.

In India, there are many distinct kinds of Textile Parks, including technical textile parks, integrated textile parks, and mega textile parks. The focus of each type of park is on a particular area or group of products within the textile value chain, such as yarn, fabric, apparel, home textiles, etc. We will focus on the prestigious mega textile scheme of Government of India i.e., PM-MITRA Park under Ministry of Textile.

3.2 INFRASTRUCTURE FACILITIES WITHIN PM-MITRA PARK

The facilities in the park have been designed considering the activities and capacities of the proposed units being set up in the park. The list of facilities planned in the park is given below:

TABLE 3-1: LIST OF FACILITIES PROPOSED FOR THE PARK

S.No.	Infrastructure	Components
1	Basic Infrastructure	• Road network including Footpaths, Cycle Track & Utility Corridors • Storm Water Drainage System • Domestic & Industrial Water Supply System • Environmentally Complaint Sewerage & Effluent Collection &Treatment System • Waste Management facility. • Electrical Distribution System and Street Lighting • Telecommunications • Truck Parking, Gate complex & Weighbridge
2	Common Facilities	• Administrative Block including Product Display Centre • Office spaces and Petrol Pump • Parking for passenger as well as commercial vehicles

		• Skill Development Centre • Community Centre & Recreational areas • Convention & Exhibition Centre • Yarn and other finished product Warehouses • Testing Laboratory, R & D centre, Incubation Lab, Start-Up Centre, Centre of Excellence and Water Retention Tank • Fire and Police station • Textile Museum
3	Social Infrastructure	• Workers' Hostel and Housing Zone • Creche & Pink Toilet, Medical Facility • Primary School • Hotels, Lodging & Dhaba • Commercial Centre, Recreational Centre, etc.
4	Built up Infrastructure	• Standard Plug n Play Factory sheds and buildings

3.3 INDUSTRIAL AREA

3.3.1 ASSUMPTIONS

While planning an industrial area within a textile park, several key assumptions need to be considered to ensure effective urban planning. These assumptions help in creating a framework that supports the growth and sustainability of textile industries while also addressing environmental and social concerns. Here are some common assumptions considered during the urban planning of industrial areas in a textile park:

- **Zoning Regulations:** Assume the implementation of zoning regulations that separate industrial areas from residential and commercial zones. This helps in preventing conflicts between industrial activities and other land uses.
- **Infrastructure Availability:** Assume the availability of basic infrastructure such as roads, electricity, water supply, and sewage systems to support industrial operations. Adequate infrastructure is crucial for the functioning of industries.
- **Environmental Regulations:** Assume compliance with environmental regulations. Textile industries often involve the use of chemicals and large amounts of water. Assure that the industries comply with environmental standards to minimize pollution and other ecological impacts.
- **Waste Management:** Assume the implementation of proper waste management systems. Textile industries generate a significant amount of waste, including hazardous materials. Planning should include provisions for safe disposal and recycling of industrial waste.
- **Workforce:** Assume the availability of skilled and unskilled labour. A steady workforce is essential for the functioning of industries. This includes provisions for housing and other amenities for the labour force if needed.
- **Transportation:** Assume good transportation links. Industries require efficient transportation for the import of raw materials and the export of finished products. Access

to highways, ports, and railways is vital.

- **Amenities and Services:** Assume provision for amenities such as healthcare, educational institutions, and recreational facilities for the employees and their families. A well-rounded living environment contributes to the overall well-being of the workforce.
- **Land Use Efficiency:** Assume optimal land use planning. Efficient use of land ensures that space is utilized effectively without wastage, allowing for the accommodation of more industries and businesses.
- **Safety Measures:** Assume the incorporation of safety measures. Textile industries involve machinery and processes that can be hazardous. Safety regulations and measures should be integrated into the planning to prevent accidents and ensure the well-being of workers.
- **Flexibility for Future Expansion:** Assume the need for future expansion. The plan should be flexible enough to allow for the growth of existing industries and the establishment of new ones, accommodating changing market demands.
- **Community Engagement:** Assume active community engagement. Engaging with the local community and addressing their concerns is vital. Public opinion and local insights should be considered in the planning process to foster positive relationships.

These assumptions serve as a foundation for urban planning in industrial areas within textile parks, ensuring that the development is sustainable, environmentally friendly, and socially responsible.

3.4 WAREHOUSING AREA

3.4.1 ASSUMPTIONS

The PM-MITRA Park will have Covered Warehouses for raw materials and finished products storage.

The primary activities will be:

- Product Stockpiling

Apart from the storage function, the PM-MITRA Park will also house the following additional facilities:

- **Value Added Services:** The Value-added services provided by the PM-MITRA Park facility will be an important function in the service portfolio to establish its competitive advantage in the market. A few of the value-added services offered include Inventory Management, Planning for cost control, etc.

3.5 TRUCK PARKING

3.5.1 ASSUMPTIONS

By its very nature, a Textile Park involves handling of raw products like cotton, silk, etc. and finished goods, and it will be pertinent to provide space for trucks in the premises. The need for truck terminals arises from the fact that in its absence, trucks are parked on the roads creating congestion on the roads. Further, the truck parking can also be used to give parking space to other ideal trucks which are waiting for their next transportation duty at the park. The Truck

terminal will provide parking space for the trucks carrying bulk commodities and containers with support infrastructure for the trucking industry like dedicated parking bays, lodging facilities for drivers, rest rooms, workshops, etc.

Following assumptions taken for the planning of the Truck Terminal:

- 100% of the Trucks destined for the PM-MITRA Park will use the facility.
- Average dwell time in the Terminal Parking is considered as 6 hours.
- All inbound / outbound trucks will pass over the weigh bridges.

3.6 SUPPORT AND SOCIAL INFRASTRUCTURE FACILITIES

The support and social infrastructure facilities include both essential infrastructure facilities for the effective functioning of the Textile Park and other facilities that address the Social, Environmental and Land Use Regulations within the Park.

3.6.1 SUPPORT INFRASTRUCTURE

The facilities such as the Central Administration Building, Office Spaces and Amenities, Power Transmission & Distribution network, Power back-up, Water Treatment & Storage, Sewerage Treatment Plant, Recycled Water Networks, Storm Water together with Rainwater Harvesting Management, Solid Waste Management, Telecom & ICT network, etc. are necessary for the effective functioning of the Textile Park. Integrating facilities like the Fire Station, Police Station, Weigh Bridges, and Fuel Stations within the PM-MITRA Park boundaries will contribute to the overall efficiency of the facility.

3.6.2 SOCIAL INFRASTRUCTURE

The Social Infrastructure facilities of the PM-MITRA Park have been planned to cater to the various users with a mix of Residential tenements, Dormitories/Hostels, Commercial and Office Complexes together with Restaurants and Recreational facilities. The PM-MITRA Park will have adequate Green Areas to provide the interface between the Operational and Social Components.

3.7 OTHER FACILITIES

3.7.1 ENTRY AND EXIT GATES:

It regulates the entry and exit of vehicles through the PM-MITRA Park, where security-check and document verification and weighing are done. This will help in recording revenues and also will help to maintain record, discipline, security complex.

3.7.2 ADMIN OFFICE

An office building will be designed near gate. This building's ground floor will be dedicated for Admin Office spaces and Upper office spaces of various sizes will be for park management, intelligent security management, security office, staff canteen, fresh rooms, creche, etc.

3.7.3 WEIGHBRIDGE

Other than entry gate weigh bridges, general commercial Weigh Bridge is designed for about 150 MT capacity which can accommodate a full-length trailer with ingress and egress facilities as per the standards. A cabin operator will monitor weighing machine in pit with metallic sheet cover will be provided.

3.7.4 FUEL STATION

Fuel station will have a capacity to accommodate 16 m long trailers, space for four pumps for fuelling & serve 8 vehicles at a time. Other provisions that will be given are, ATM, toilet facilities, small store, spare parts shop, etc. Approx.5000-10,000 Sq.mt. land area is required.

3.7.5 FIRE STATION

As a utility - Fire station is located at important location to have easy & fast access and will be designed with due reference to exclusive fire and safety regulations. Plot will be one but number of fire tenders' canopy, office space for attendant will be incremental as per phases. There will be a control room for disaster of any kind /hazard handling system and expert office with room for first aid.

3.7.6 POLICE STATION

A police station is strategically situated for convenient access and designed to meet the specific needs of law enforcement. The police station comprises a control room for emergency management and coordination, an expert office to address specialized cases, and a first aid room to provide immediate medical assistance. The station's infrastructure can be expanded gradually to accommodate additional offices for administrative tasks. Robust security measures are implemented to ensure the safety and well-being of all individuals within the textile park. The police station is an integral part of the textile park's infrastructure, ensuring a secure environment for all stakeholders.

3.7.7 COMMERCIAL BUILDING

Added facilities include major commercial activities like- shops, banks and related offices, with social infrastructure facilities like restrooms, ATMs, communication centre, offices for clearing and forwarding agents/transporters, and related businesses. Waiting rooms, first aid, restrooms etc. will be included. The functions will be segregated by floor wise built-up area. This land use is for commercial and supportive business offices.

3.7.8 SAFETY AND SECURITY

E-security system will be installed throughout the PM-MITRA Park for constant monitoring of activities. A central monitoring room will be provided in the administration building to ensure safe and secure functioning of the PM-MITRA Park.

3.7.9 TRUCK REPAIR WORKSHOP

It is necessity to have a repair workshop for damaged trucks during loading on & off, etc. 5% land area of Transportation hub area is considered for workshop with 1 person/100sq.mt. assigned for operations.

3.7.10 UTILITIES

Other supportive infrastructure as utilities includes power back-up, power transmission and distribution network, water storage and treatment plant, common effluent treatment plant with zero liquid discharge, telecommunication network, rainwater harvesting wells, provision of solar energy, provision of creche and pink toilet, etc.

4 MASTER PLAN

4.1 MASTER PLANNING AND DESIGN

The PM MITRA Scheme is inspired by the 5F Vision of Hon'ble Prime Minister of India – Farm to Fibre to Factory to Fashion to Foreign, and this park will be designed on the same concept to meet the core objectives of PM MITRA scheme. The PM-MITRA Park Lucknow has been conceived to provide organized textile facility and other logistics related services in order to make the industry more efficient in the region. The core objective of this scheme is:

- Provide opportunity to create an Integrated Textiles Value Chain right from spinning, weaving, processing/dyeing, printing and garment manufacturing at one location to reduce logistics cost of Industry.
- Develop integrated large scale and modern industrial infrastructure facilities for entire value chain of the textile industry.
- Reduce logistics costs and improve competitiveness of Indian Textiles
- Help India in attracting investments, boosting employment generation, and position itself strongly in the global textile market.
- Enhance the competitiveness of the textiles industry by helping it to achieve economies of scale and will create huge job opportunities.

The PM-MITRA Park shall be planned as an integrated textile Park covering all the trades of textile viz from yarn to finished product with all requisite infrastructure facilities to provide a conducive working environment to the units in the park and also to the workforce. The Park shall be an environment friendly eco-system comprising of physical and common infrastructure components interwoven with green spaces. The Master Plan shall follow the principles of an eco-industrial park by maximizing green space and open spaces, provision of green belts around pollution and/or dust generating facilities viz., waste storage and disposal facility and contain polluting effects.

The master plan for the park shall be design philosophy would revolve around prioritizing various aspects viz., circulation, land suitability, environmental sustainability and topography to optimize various land uses. The Master Plan is based on modern planning concepts of providing good and efficient internal movement with supporting infrastructure and facilities in an aesthetic environment.

Since, the park has been proposed to be developed on a PPP Model, therefore, the plans and designs should ideally be left to the developer, so that the developer can configure the design that is best suited for his business plans.

4.2 GENERAL CONCEPT FOR PM-MITRA PARK DESIGN

The proposed park's master plan is designed to meet the needs of entrepreneurs and incorporate self-contained facilities. It is based on modern planning concepts to ensure efficient internal movement, supported by infrastructure and facilities in an attractive environment. The primary goal

is to enable easy and continuous access to all parts of the textile park. The design ensures functional and accessible workplaces by incorporating thoughtful and scientific planning principles.

The master plan also complies with the guidelines issued by Department of Town and Country Planning, Government of Uttar Pradesh as well as the Ministry of Environment and Forests (MoEF). In order to achieve a Master Plan responsive to the site conditions and to the requirement of the textile and garment industry, inferences were drawn from the primary information and also from critical analysis, through primary and secondary sources, of various other parks/ theme-based parks in India.

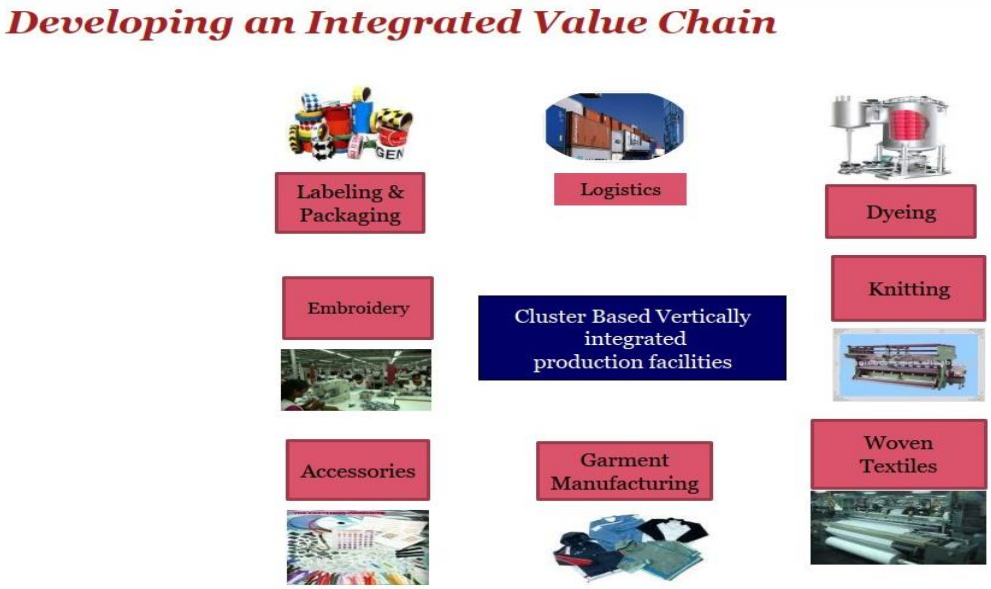


FIGURE 4-1: DEVELOPMENT OF INTEGRATED VALUE CHAIN IN A TEXTILE INDUSTRY
Source: textilelearner.net

The guiding principles utilized for preparation of Master Plan include:

I. INTEGRATION

Integration of aesthetics, environmental concerns, functional requirements and technological innovation with various attributes of planning like land use distribution, zoning, transportation, infrastructure, design, building guidelines & regulations were given due consideration. The interdependence and at the same time, individuality of the units was also kept in focus.

II. FLEXIBILITY

The park's planning has been designed with flexibility in mind to accommodate the ever-changing business landscape. The Master Plan allows for programmed or functional re-arrangements and redistributions of plot sizes, infrastructure networks, and distribution of open spaces, among other elements.

III. ZONING

The master plan follows the zoning concept for meeting the statutory norms of planning, to minimize the impact of pollution if any on resident population in and around the park and to attain the economics of design by consolidating scarce and costly resources for shared access.

IV. ACCESS & GREENS

Common facilities have been planned for ease of access to the users of the park. Another guiding principle of the Master Plan is to incorporate the principles of eco-industrial park by maximizing green and open spaces, and provision of green belts. The design envisages functional road design and simplified accessibility through green spaces to workplaces.

The green space envisaged for the park would include:

- Green area to mitigate the various types of pollution.
- Large open spaces for maintaining the green cover.
- Small Quality green spaces for recreation.
- Linear plantations to provide relief during movement.
- Small aesthetic greens for forming vistas, etc.
- Retain and create new water bodies in the site for ground water recharge.

The Park shall strive to balance between the infrastructure requirements for establishing textile park with common facilitates and social infrastructure required to support such large developments.

4.3 MASTER PLAN

Considering the nature of the business within the PM-MITRA Park, it is proposed that the PM-MITRA Park would be a gated complex with controlled access points. Support facilities such as commercial, health, school facilities, lodging & boarding activities, etc. will be common and accessible to all.

4.3.1 INDUSTRIAL AREA

A master plan plays a crucial role in the development of a thriving textile industrial area that can drive the growth and progress of India's textile industry. By offering top-notch infrastructure and facilities, a textile industrial area can elevate the competitiveness, quality, and efficiency of the textile sector, while also generating employment opportunities and bolstering exports. Additionally, a master plan aids in the realization of social and environmental objectives by ensuring adherence to labor standards, safety regulations, and pollution control measures. Therefore, a master plan serves as a pivotal instrument to enhance the competitiveness and sustainability of the textile industry.

4.3.2 WAREHOUSING AREA

The warehousing area within the textile park serves the purpose of providing storage space for raw materials, finished products, and other necessary supplies. These warehouses also facilitate the efficient movement and distribution of goods both within and outside the park. In a textile park, warehouses may vary in terms of functions and features, depending on factors such as the park's size and type and market demand. To cater to specific requirements, the warehouses are categorized based on the type of commodity they store, with options available such as closed warehouses and open warehouses.

4.3.3 ACCESS ROAD & ENTRY POINTS

The integrated PM-MITRA Park complex has one access-controlled entry/ exit point on the south-eastern edge of the site from 6m wide MDR-74C. The entry to the site will be through proposed 45 M wide road. The proposed 45M wide road will act as both entry and exit to the site. Another entry/exit has been proposed on the eastern side of the MDR-74C where the PM-MITRA Park Staff Housing plot is located.

4.3.4 INTERNAL CIRCULATION

The road hierarchy followed within the PM-MITRA Park is as follows: -

- 45 m RoW: Main Road
- 30 m RoW: Connecting Road
- 24 m & 18 m RoW: Local Road

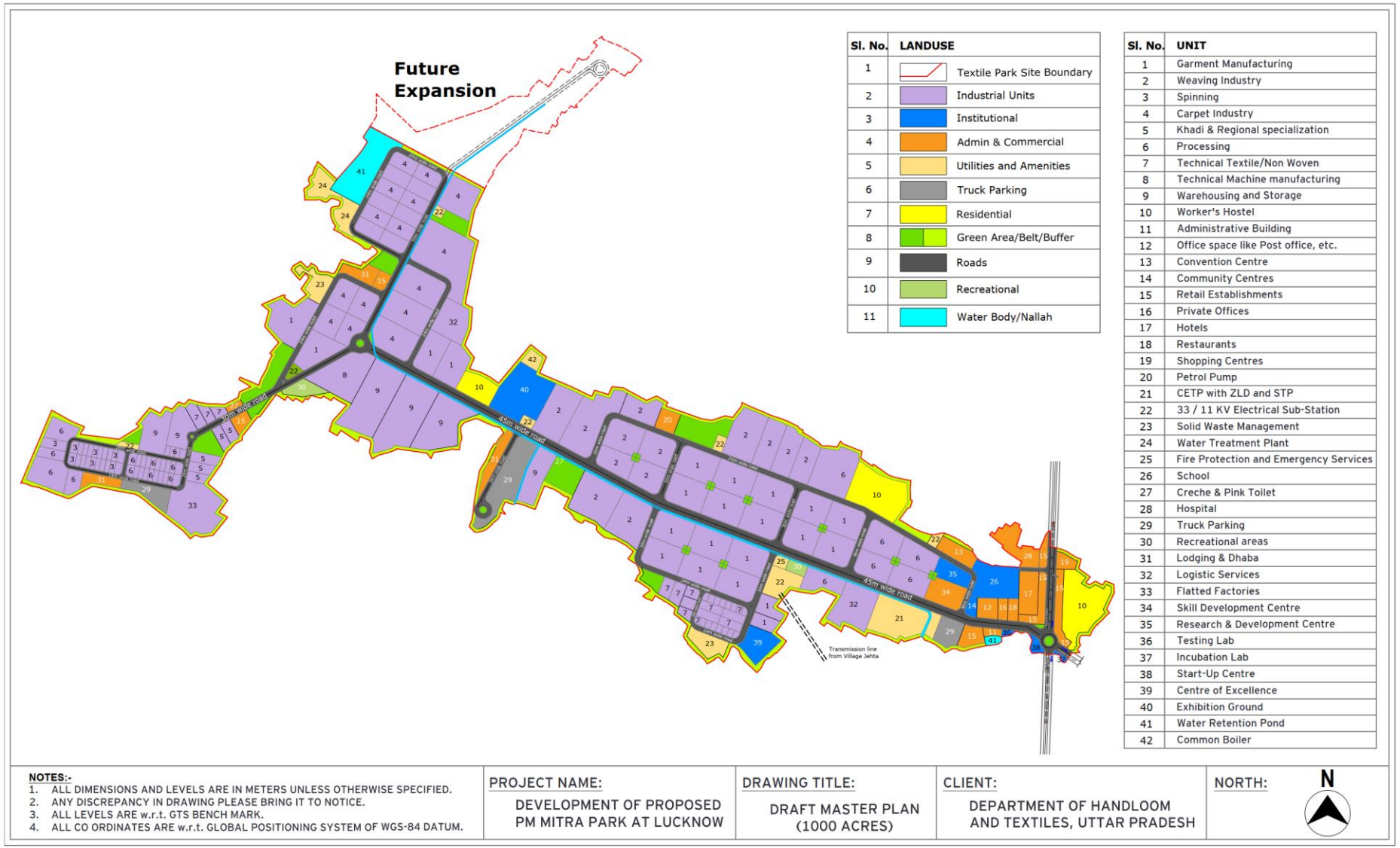
4.3.5 LAND USE AREA BREAK-UP

One crucial aspect of a master plan is the land use area break-up, which delineates how different areas within the planned area will be utilized. The specific allocation of land for each category depends on factors such as population density, economic activities, environmental considerations, and the overall vision for the development. The land use area break-up aims to create a harmonious and sustainable urban environment that accommodates the needs of the residents, businesses, and the natural ecosystem.

TABLE 4-1: PROPOSED LAND USE AREA BREAK-UP

Sl. No	Landuse	Area		Percentage %
		Sq.mt.	Acre	
1	**Industrial**	22,23,890	549.5	55.0
2	**Residential**	1,23,861	30.6	3.1
3	**Admin. & Commercial**	2,29,444	56.7	5.7
4	**Recreational**	18,249	4.5	0.5
5	**Institutional**	1,52,107	37.6	3.8
6	**Transport Hub**	83,230	20.6	2.1
7	**Utilities and Amenities**	1,65,543	40.9	4.1
8	**Green & Fruit Plantation**	4,53,564	112.1	11.2
9	**Proposed Road**	5,10,736	126.2	12.6
10	**Existing Road**	3,508	0.9	0.1
11	**Nallah and Water Reservior**	82,693	20.4	2.0
12	**Total**	40,46,825	1,000	100.0

Source – Consultant



Sl. No.	LANDUSE
1	Textile Park Site Boundary
2	Industrial Units
3	Institutional
4	Admin & Commercial
5	Utilities and Amenities
6	Truck Parking
7	Residential
8	Green Area/Belt/Buffer
9	Roads
10	Recreational
11	Water Body/Nallah

Sl. No.	UNIT
1	Garment Manufacturing
2	Weaving Industry
3	Spinning
4	Carpet Industry
5	Khadi & Regional specialization
6	Processing
7	Technical Textile/Non Woven
8	Technical Machine manufacturing
9	Warehousing and Storage
10	Worker's Hostel
11	Administrative Building
12	Office space like Post office, etc.
13	Convention Centre
14	Community Centres
15	Retail Establishments
16	Private Offices
17	Hotels
18	Restaurants
19	Shopping Centres
20	Petrol Pump
21	CETP with ZLD and STP
22	33 / 11 KV Electrical Sub-Station
23	Solid Waste Management
24	Water Treatment Plant
25	Fire Protection and Emergency Services
26	School
27	Creche & Pink Toilet
28	Hospital
29	Truck Parking
30	Recreational areas
31	Lodging & Dhaba
32	Logistic Services
33	Flatted Factories
34	Skill Development Centre
35	Research & Development Centre
36	Testing Lab
37	Incubation Lab
38	Start-Up Centre
39	Centre of Excellence
40	Exhibition Ground
41	Water Retention Pond
42	Common Boiler

FIGURE 4-2: PROPOSED MASTER PLAN OF PM-MITRA PARK AT LUCKNOW

Source - Consultant

The road network has been designed keeping in mind smooth flow of traffic within the PM-MITRA Park. IRC codes will be followed while designing the junctions and road widths. The roads have been proposed keeping in mind the existing contour and site topography. The slope has been kept at maximum of 2.5% for ease of truck movement. All the roads are bi-directional with segregated movement space for pedestrian and NMT traffic.

4.3.6 SUPPORT LOGISTICS FACILITIES

The support logistics functions have been strategically placed to cater to its specific user group. The facilities such as School, Hotel and Hospital has been proposed along the MDR-74C as they would be used by people not necessarily working in the PM-MITRA Park and can be used by the general public also. The skill development centre has been proposed along the main internal spine road within the PM-MITRA Park. Some uses like lodging and boarding have been kept near the truck Parking as the main user group for it will be truck drivers. Petrol Pump is proposed adjacent to the parallel main spine road with possibility to de-congest the main internal spine road traffic and shall be considered for increase in viability and facility of Park. The Fire and Police Station has been proposed on the main spine road of the PM-MITRA Park and close to MDR-74C, so that the response time at the time of an emergency is at the minimum and its services are available to the general public also.

4.3.7 ADMINISTRATIVE AND COMMERCIAL FACILITIES

The Administrative and other offices like office of Industries, transporters and logistic service providers, private offices have been provided near the main entrance in order to effectively monitor the operations of the PM-MITRA Park. Weigh in Motion and Weigh Bridge facility has been provided for transport operations within the PM-MITRA Park.

The commercial facilities have been placed on the MDR-74C close to the residential area as well as inside the park along the 45 mt wide road, which will be along the main movement spine to support local consumer needs of the employees and workers in the site and villagers. These include retail shops, eating joints, bank and ATM and other related commercial services.

4.3.8 AMENITIES & UTILITIES

The amenities and other recreational facilities have been kept independent and are accessible from the main 45m RoW internal road so that it can be functional without disturbing the core PM-MITRA Park facilities.

The utilities such as water treatment plant, wastewater treatment plant, solid waste disposal, and electrical sub-stations have been placed according to their function in relation with the topography of the site and the adjoining land uses in such a way that they are self-sufficient in their respective phases.

4.3.9 TRUCK PARKING

Four decentralised Truck Parking has been promoted. One Parking space is on the main spine of 45m wide road. Other parking spaces are proposed equal distance with each other near to the industrial clusters which will act as the exchange area. Vehicle maintenance along with service & repair and dormitories for truckers have been allocated along with the space for Truck Parking.

4.3.10 GREEN SPACES

The objective is to establish green spaces that can serve as recreational areas for the users of the PM-MITRA Park. These landscaped greens are carefully planned to function as the "green lungs" of the PM-MITRA Park development, contributing to an improved quality of life for textile park workers. To ensure separation from surrounding land uses, a 15-meter buffer zone has been designated along the site boundaries of the PM-MITRA Park plot. Additionally, a 5-meter buffer area along the road has been allocated. Rainwater harvesting and storage are also integrated into the park's design, with a pond proposed to collect rainwater for various purposes.

4.3.11 LAND USE

Considering the quantum of textile materials and the area required for the various facilities in the PM-MITRA Park, 100% of the total site (1000 acres) is being developed up to the next 6 years. Of the 1000 acres of land under development, about 54.95% (549.5 acres) of total area is reserved for core Textile facilities comprising of Industrial units, Warehouses, etc. Internal roads, existing road and Truck parking covers an area of about 14.76% (147.64 acres). The Administration, Commercial and Amenities covers an area of about 10.21% (102.11 acres) of total site area and Institutional covers 3.76% (37.59acres) area. A total of 3.06% (30.61 acres) of land has been reserved for Staff Housing within the project site whereas Nallah & Water Reservoir took 2.04% (20.43 acres) of total site area.

Around 11.21% (112.08 acres) of the total site area has been preserved as open green space with buffer. The proposed land use plan has been presented in FIGURE 4-2.

TABLE 4-2: PROPOSED LAND USE DISTRIBUTION

Sl. No.	Activities	Area (acres)	Percentage	Percentage Allotted
1	**Core Industrial Facilities**			
A	Garment Manufacturing	126.39	12.65%	549.5 acres (54.95%)
B	Weaving Industry	126.39	12.65%	
C	Spinning	87.93	8.80%	
D	Carpet Industry	27.48	2.75%	
E	Khadi, Handlooms & Regional specialization	27.48	2.75%	
F	Processing	43.96	4.40%	
G	Technical Textile/Non-Woven	38.47	3.85%	
H	Technical Machine manufacturing	16.49	1.65%	
I	Warehousing and Storage	54.95	5.50%	
2	**Administration, Commercial and Amenities**			
A	Admin building, Commercial Complex, Office, etc.	56.70	5.67%	102.11 acres (10.21%)
B	Recreational	4.51	0.45%	
C	Utilities	40.91	4.09%	
3	**Green and Open Spaces**			
A	Green Spaces	44.83	4.49%	

Sl. No.	Activities	Area (acres)	Percentage	Percentage Allotted
B	Green-Belt	67.25	6.73%	112.08 acres (11.21%)
4	**Road and Transportation**			
A	Road	126.21	12.63%	147.64 acres (14.76%)
B	Transport Hub	20.57	2.06%	
C	Existing Road	0.9	0.10%	
5	**Staff Housing**			
A	Staff Housing	30.61	3.06%	30.61 acres (3.06%)
6	**Institutional**			
A	School, R & D Centre, etc.	37.59	3.76%	37.59acres (3.76%)
7	**Water Body**			
A	Nallah and Water Reservoir	20.43	2.04%	20.43acres (2.04%)
	Total Area	**1000.00**	**100.00%**	
6	**Future Expansion**	**68.00**	**6.80%**	
	Grand Total	**1068.00**		

Source – Consultant

4.3.12 Rehabilitation and Resettlement (R&R) Plan

There are no habitations within the project site and therefore there is no rehabilitation or resettlement envisaged.

4.4 DEVELOPMENT PHASING

The PM-MITRA Park is proposed to be developed in a single phase over a period of 6 years. The development and operations may be carried out simultaneously. Such as, the spine road and common facilities in initial period may be developed and allotted to industries for operations. The CETP (with ZLD), Water Treatment Plant etc. may be constructed on modular basis.

- Phase: 2025 – 2075

4.4.1 PHASE : 2025-2075

During this development, the PM-MITRA Park will undergo comprehensive development to become a fully operational hub for the textile industry and related services. In this construction phase, the internal road connectivity will be fully developed and operational as they are vital for the successful operation of the PM-MITRA Park with 55-60% Industrial area allocation. Also, commercial, offices and other institutional area will be developed, staff housing, power & water supply will be made available to the project site on the date of COD. The developer will also be on board during this phase and start the construction of buildings along with laying of internal infrastructure during this phase.

The administrative building will be developed in the first phase. This phase will cater to the textile industries, warehousing, amenities, etc. The required support facilities such as Staff Hostels, Truck Parking, Dhaba, Hotels, Skill Development Centre, Convention centre, Exhibition Ground, remaining Staff Housing, etc., along with all the required infrastructure facilities like WTP, CETP, SWM and MRSS will be developed in this phase also. Fire and Police station will also be developed in this phase.

4.4.2 Construction Period

The Master developer will start the construction on the Appointed Date which is when the financial closure is achieved by the Master Developer.

The internal road connectivity will be fully developed and operational as they are vital for the successful operation of the PM-MITRA Park. The commercial, staff housing, power & water supply will be made available to the project site on the date of COD. However, 100% of the activities as per the approved Master Plan must be completed before the end of the 6th year or the completion date of the project.

4.4.3 Commercial Operation

The Master developer is allowed to start monetizing the assets from the date of the Appointed Date. The schedule completion of all construction activity will be as per the Approved Master Plan submitted by the Master Developer.

This should be noted that all the common areas and common utilities will be constructed and maintained by the Master Developer at all times until the termination of the agreement.

4.4.4 Construction Schedule and Type

The Construction of the project will be completed in 6 years.

Year	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6
Construction Schedule (%)	15%	15%	15%	15%	15%	15%

The project will have following type of assets.

Sr. No.	Asset Class	Area (Sq. mt.)
1	Flatted Factories	19,914
2	Plug and Play Sheds	4,04,600
3	Industrial Plots	17,33,157
4	Residential Buildings	14,863
5	Residential Plots	1,08,998
6	Commercial Buildings	20,000
7	Commercial Plots	2,06,403
8	Administrative Building	3,000
9	Skill Development Centre	7,500
10	Product Development and Testing Centre	4,000
11	Common Canteen	600
12	Recreational	31,193
13	Institutional	1,65,627
14	Transport Offices	300
15	Parking	53,852
16	Warehousing Plots	53,852
17	Utilities and Amenities	1,30,596
18	Green area	5,44,497
19	Road	4,88,995
20	Nallah and Water Body	54,755
	Total	**40,46,701**

4.4.5 Construction Cost

The total construction cost of the project as per the layout plan and land use mentioned in clause 4.3 stands at INR 1,680 Crore. The construction cost includes all civil costs, costs of setting up of all common utilities and other machineries.

The Construction of the project will be completed in 6 years.

TABLE 4-3: CONSTRUCT SCHEDULE

Sr. No.	Activities	Amount (Rs. Cr)
A	**Civil work and Site development**	
1	Internal Road with WMM & Bituminous top	87.64
2	Foot Path with PCC and Paver Block	19.40
3	Filtered Water Supply Line Main	3.62

Sr. No.	Activities	Amount (Rs. Cr)
4	Filtered Water Supply Line Distribution (50 MM Dia)	1.55
5	Raw water Supply Line (600 MM Dia)	0.61
6	Water Treatment Plant	3.50
7	Elevated Service Reservoir	14.40
8	Underground Sump	7.36
9	Industrial Effulent Drain / External Sewerage Line (760 MM Dia)	3.78
10	CETP+ZLD	335.00
11	STP	10.00
12	Total Water Storage (Raw water, Treated Water, Boiler Water, etc.)	28.00
13	Filtered Water Supply Line for Process water - Main	6.91
14	Storm Water Drain (1m x 1m x 1.2 m)	26.31
15	Construction of Pond used as a rainwater harvesting and excess water storage (15 Acre)	5.46
16	Site Development/ Levelling	5.13
17	Gate Complex with beautification and Weigh Bridge	3.00
18	Boundary Wall	20.15
19	Trenches for Services	12.11
20	CCTV System	4.00
21	Boomer Barrier	0.03
22	33/11KV construction of 2x10 MVA s/s of 6 nos. (cost approx.), U/G line (double circuit) and Civil work	64.25
23	DG Set	11.56
24	Solar Panelling	57.76
25	Street lighting + Highmast	2.38
26	Horticulture Work + Plantation	5.10
27	Driver face and automatic number plate recording system/recognition system	0.15
28	Door frame metal detector	0.15
29	LAN System	0.62
30	Common Boiler	40.00
31	Steam Piping	14.40
32	Condensate Recovery Line	7.20
33	Boiler Instrumentation	3.00
34	Solid and Hazardous Waste Management	17.00
35	Environmental Monitoring during Construction and Operation Phase	0.12
36	Getting certified complaince reports from Integrated Regional Office (IRO), MOEFCC, Lucknow	0.05
37	Disaster Management Plan and others with Fire fighting services inside the park	5.76
38	**Total Infrastructure Cost**	**827.46**
B	**Buildings**	
39	Administrative Building	9.25
40	Skill Development Centre	23.12
41	Equipment for Skill Development Centre	3.00
42	Product Development and Testing Centre	12.33
43	Equipment for Product Development and Testing Centre	10.00
44	Central AC Plant	2.98
45	Access Control System	0.13
46	Common Canteen	1.85

Sr. No.	Activities	Amount (Rs. Cr)
47	Residential Dev. R.C.C. Framed structure	34.97
48	Basic Home Security for Residential area	0.33
49	Truck Terminal Building	0.92
50	Truck Terminal Paved area	10.67
51	Flatted Factories	61.37
52	Commercial Area	61.64
53	Design and constructions complying with Green Building Standards (IGBC)	0.05
54	Various Signages inside and outside the park	0.40
55	Plug and Play Sheds	566.59
56	**Total Building Cost**	**799.60**
57	**Total Development Cost**	**1627.05**
58	Architectural PMC & Consultation	8.14
59	Development Charges (Building Permits, etc.)	12.20
60	Miscellaneous & Contingencies	32.54
61	**Total Other Cost**	**52.90**
	Total Project Construction Cost	**1,679.93**

Source: Consultant

Please note that project costs, such as constructing the residential block, shopping mall, school, and hospital, are not included in the cost analysis. These elements have been designated for the Master developer to either construct in the open market or lease the land to educational institutions, hospitals, and other facilities.

5 TRANSPORTATION

5.1 ROAD CLASSIFICATION

Four categories of roads are provided in table below:

TABLE 5-1: CATEGORIES OF ROAD

Type of Roads	ROW
Boulevard Road	45m
Arterial Road	30m
Collector Road	24m
Local Road	18m

Source: Consultant

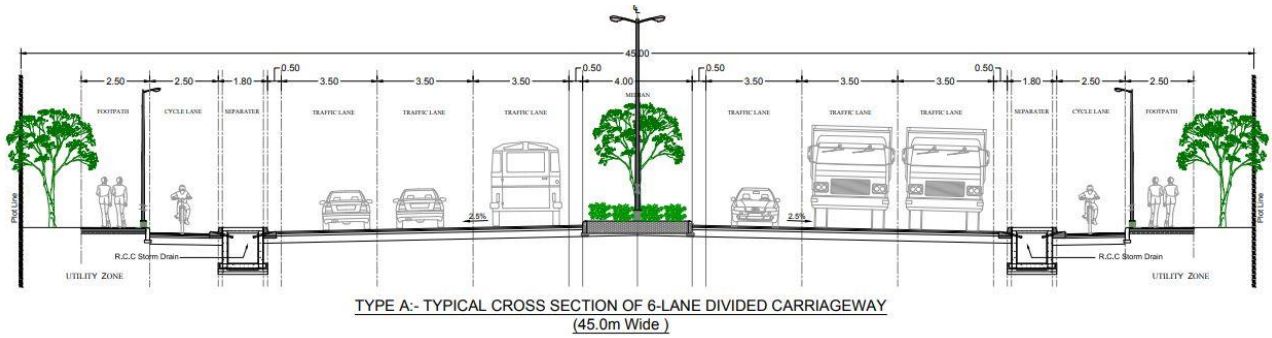
5.2 TYPICAL ROAD CROSS SECTION

Typical cross section for various types of roads are proposed adhering to IRC standards and shown in Figure 5-1, Figure 5-3, Figure 5-3 and Figure 5-3. The above road width is tentative for the conceptual master plan. The traffic will be computed for the PM-MITRA Park cluster and width of the carriageways are decided accordingly after in depth traffic survey and analysis.

The Commercial parcels have been strategically planned along the 45-meter wide road and MDR-74C to capture significant traffic flow and generate maximum revenue for the commercial plots. Additionally, administrative services have been positioned on this road to maintain control over the entire industrial area. To ensure smooth traffic flow, the road has been designated free of high-traffic activities, minimizing hindrances along the primary route. This road will be a six-lane divided carriageway with footpaths on both sides, considering the substantial usage of non-motorized transportation by the majority of the industrial workforce.

The 30-meter road, acting as a secondary link between the main road, will feature a divided 4-lane carriageway with footpaths on both sides, accommodating the significant use of non-motorized transportation by textile industry workers. The road's alignment follows the natural contours of the site and is designed to maintain balanced cut and fill areas.

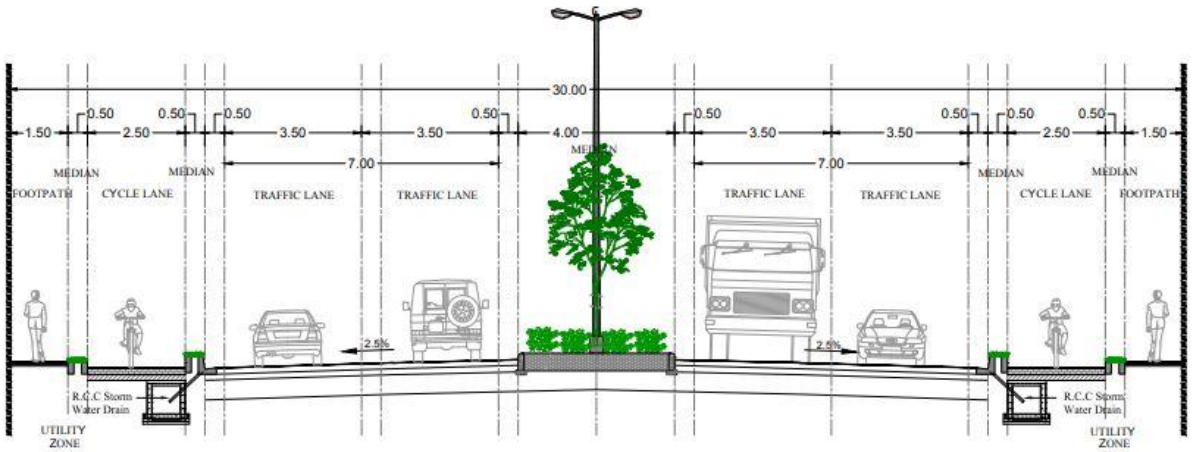
The 24-meter and 18-meter roads serve as collector and local roads, connecting links between the main roads. These roads will have undivided 2-lane carriageways with footpaths on both sides. The alignment of these roads is also guided by the natural site contours and designed to achieve a balanced cut and fill area.



TYPE A:- TYPICAL CROSS SECTION OF 6-LANE DIVIDED CARRIAGEWAY
(45.0m Wide)

FIGURE 5-1: CROSS-SECTION FOR SIX LANE- 45.0 M ROW

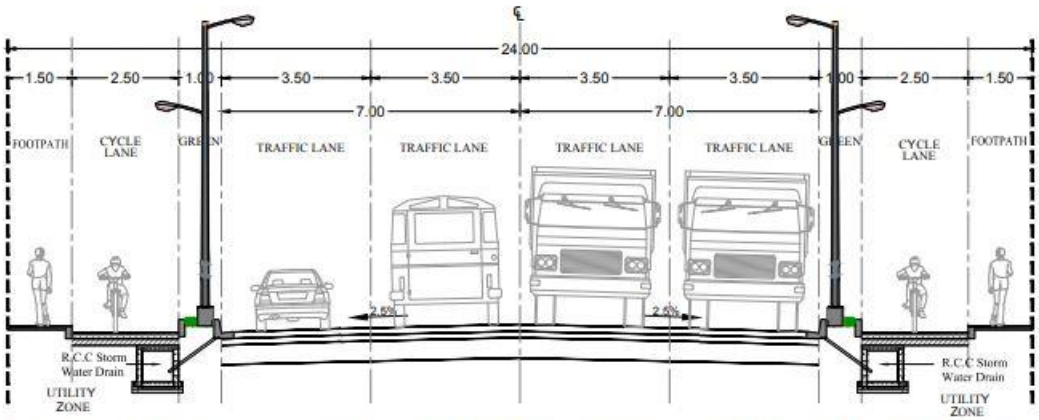
Source: Consultant



TYPE B:- TYPICAL CROSS SECTION OF 6-LANE DIVIDED CARRIAGEWAY
(30.0m Wide)

FIGURE 5-2: CROSS-SECTION FOR FOUR LANE 30.0 M ROW

Source: Consultant



TYPE C:- TYPICAL CROSS SECTION OF 2-LANE UNDIVIDED ROAD WITH BOTH SIDE PARKING SPACE
(24.0m Wide Two way)

FIGURE 5-3: CROSS-SECTION FOR TWO LANE 24.0 M ROW

Source: Consultant

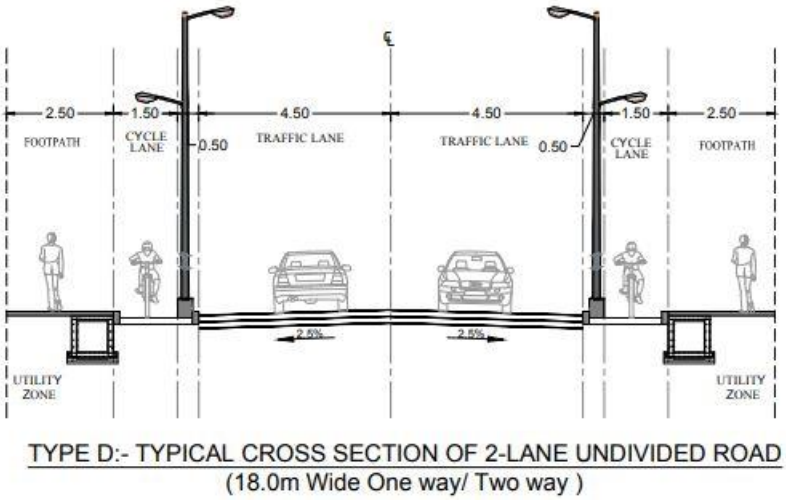


FIGURE 5-4: CROSS-SECTION FOR TWO LANE 18.0 M ROW

Source: Consultant

5.3 TRUCK TERMINALS

To accommodate the parking needs of commercial vehicles, the Textile Park has allocated four truck parking lots. These parking areas are complemented by vehicle maintenance and other necessary facilities. The placement of utilities within the park has been carefully determined based on their function, considering the site's topography and surrounding land uses. This ensures that the utilities are strategically located and self-sufficient within their respective areas.

As per the conceptual design and land use allocation, the total area of 2.06% (20.57 acres) have been allocated for Truck Parking which will accommodate about 640 trucks. Refer below Table 5-2 for the same.

TABLE 5-2: TRUCK PARKING WITHIN THE PM-MITRA PARK

S. No.	Name	Area (Sq. Mt)	Area (Acre)	No of Parking
1	Truck Parking- 1	48840.61	12.07	376
2	Truck Parking- 2	16775.26	4.15	129
3	Truck Parking- 3	17,614.54	4.35	135
	Total	**83,230.41**	**20.57**	**640**

Source: Consultant

6 UTILITY & INFRASTRUCTURE

6.1 LEVELLING AND GRADING

The main objective of the proposed study is to analyse the current land levelling of the project area and suitably design for effective and economic site grading and levelling work by undertaking technical, economic details of the project area.

- Analyse the current direction of stormwater flow.
- Develop a design that incorporates optimal site grading, considering the existing and proposed road levels, plot levels, drainage systems, utilities, and future developments.
- Implement strategies to mitigate flooding by raising the ground level in low-lying areas.
- Prioritize gravity-based stormwater drainage and sewage flow in the proposed design.
- Minimize the need for importing earth materials from external sources by achieving a balance between cutting and filling on site.

The site levelling and grading plan will be implemented to achieve a balanced cut and fill approach, minimizing the need to source earth materials from outside the site. It is estimated that approximately 0.5m to 1m of cutting and filling will be necessary to create a site with a suitable and developable slope. Additionally, at locations with significant level differences, a 2:1 (horizontal to vertical) slope will be maintained in embankments. This strategy aims to optimize the use of existing materials and reduce the environmental impact of earth movement.

6.2 POTABLE WATER SUPPLY SYSTEM

6.2.1 INTRODUCTION

A potable water supply system is a mechanism designed to provide communities or individual customers with safe and hygienic drinking water. Its primary objective is to ensure that water is handled, stored, and distributed in a manner that meets the established requirements for human consumption. The system is crucial in delivering water that is free from impurities and contaminants, ensuring the health and well-being of the users.

Wastewater generated from the development will be treated to the desired level and supplied for non-potable purposes through a separate distribution system. Part of the non-potable water demand of site area shall be met by re-cycled water generated from CETP with ZLD and the rest of the demand shall be met by supplying potable water from Irrigation department/ Jal Nigam. Recycling of wastewater will reduce freshwater demand of the development, considerably.

6.2.2 POTABLE WATER DEMAND

Water supply demand is estimated based on the proposed land use, built-up area and the population densities proposed in the master plan. The estimated water demand is segregated into potable and non-potable water demand.

The wastewater generated from the development shall be treated and reused for non-potable purposes. The total non-potable water demand includes flushing of toilets, horticulture, district cooling and washing/ cleaning shall be met from the recycled wastewater.

It is assumed that the potable water source is reliable, and the required treated water will be supplied to the premises of the PM-MITRA Park project area. Refer to the following table for the total potable and non-potable water demand within PM-MITRA Park.

TABLE 6-1: WATER DEMAND

S. No.	Activities	Plot Area	Plot Area	Process water	Domestic Water	AC Cooling	Horticulture
*	Type of Industry	(Sq.mt.)	(Acre)	KLD	KLD	KLD	KLD
1	Garment Manufacturing	5,11,494.70	126.39	3159.85	3437.28	716.09	204.60
2	Weaving Industry	5,11,494.70	126.39	3159.85	171.90	716.09	204.60
3	Spinning	3,55,822.40	87.93	1318.89	239.15	498.15	142.33
4	Carpet Industry	1,11,194.50	27.48	824.31	41.52	155.67	44.48
5	Khadi, Handlooms & Regional specialization	1,11,194.50	27.48	329.72	62.31	155.67	44.48
6	Processing	1,77,911.20	43.96	8792.63	239.145	249.08	71.16
7	Technical Textile/Non-Woven	1,55,672.30	38.47	3846.78	83.72	217.94	62.27
8	Technical Machine manufacturing	66,716.70	16.49	164.86	24.92	93.40	26.69
9	Warehousing and Storage	2,22,389.00	54.95	659.45	149.48	311.34	88.96
10	Transport Hub	83,230.41	20.57	0.00	9.60	0.00	16.65
11	Recreational	18,249.06	4.51	0.00	2.12	21.90	7.30
12	Institutional	1,52,107.05	37.59	0.00	21.95	182.53	60.84
13	Commercial	2,29,443.65	56.70	0.00	165.23	1032.50	275
14	Residential						
14.1	Staff Housing (80%)	95,373.10	23.57	0.00	987.12	143.06	0.00
14.1	Expat Housing (20%)	3,715.84	0.92	0.00	25.68	5.57	0.00
14.1	Green	12,386.12	3.06	0.00	0.00	0.00	49.54
14.1	Utility	2,477.22	0.61	0.00	1.94	0.00	0.00
14.1	Facility	3,715.84	0.92	0.00	2.76	0.00	0.00
14.1	Road	6,193.06	1.53	0.00	0.00	0.00	0.00
15	UT-1 (Water Works)	49,662.82	12.27	0.00	0.96	0.00	29.80
16	UT-2 (CETP)	33,108.55	8.18	0.00	0.68	0.00	39.73
17	UT-3 (SWM)	74,494.23	18.41	0.00	0.96	0.00	59.60
18	UT-4	8,277.14	2.05	0.00	0.35	0.00	6.62

S. No.	Activities	Plot Area	Plot Area	Process water	Domestic Water	AC Cooling	Horticulture
19	Parks	36,285.11	8.97	0.00	0.00	0.00	123.37
20	Open Green/ Fruit Plantation	1,45,140.45	35.87	0.00	0.00	0.00	116.11
21	Buffer Green (15m wide)	2,72,138.34	67.25	0.00	0.00	0.00	108.86
22	Nallah and Water Reservoir	82,692.93	20.43	-	-	-	-
23	Road	5,14,243.85	127.07	-	-	-	-
24	Total	**40,46,825**	**1,000**	**22,256.35**	**5,668.73**	**4,499.00**	**1,783.30**
25	Grand Total	-	-	**34.21 MLD**			**(P+D+AC+H)**
26	Loss @ 5%	-	-	1.71 MLD			
27	Total Demand	-	-	35.92 MLD			
28	Fire Demand	-	-	1.09 MLD			
29	Total Demand	-	-	**37.00 MLD**			

Source: Consultant

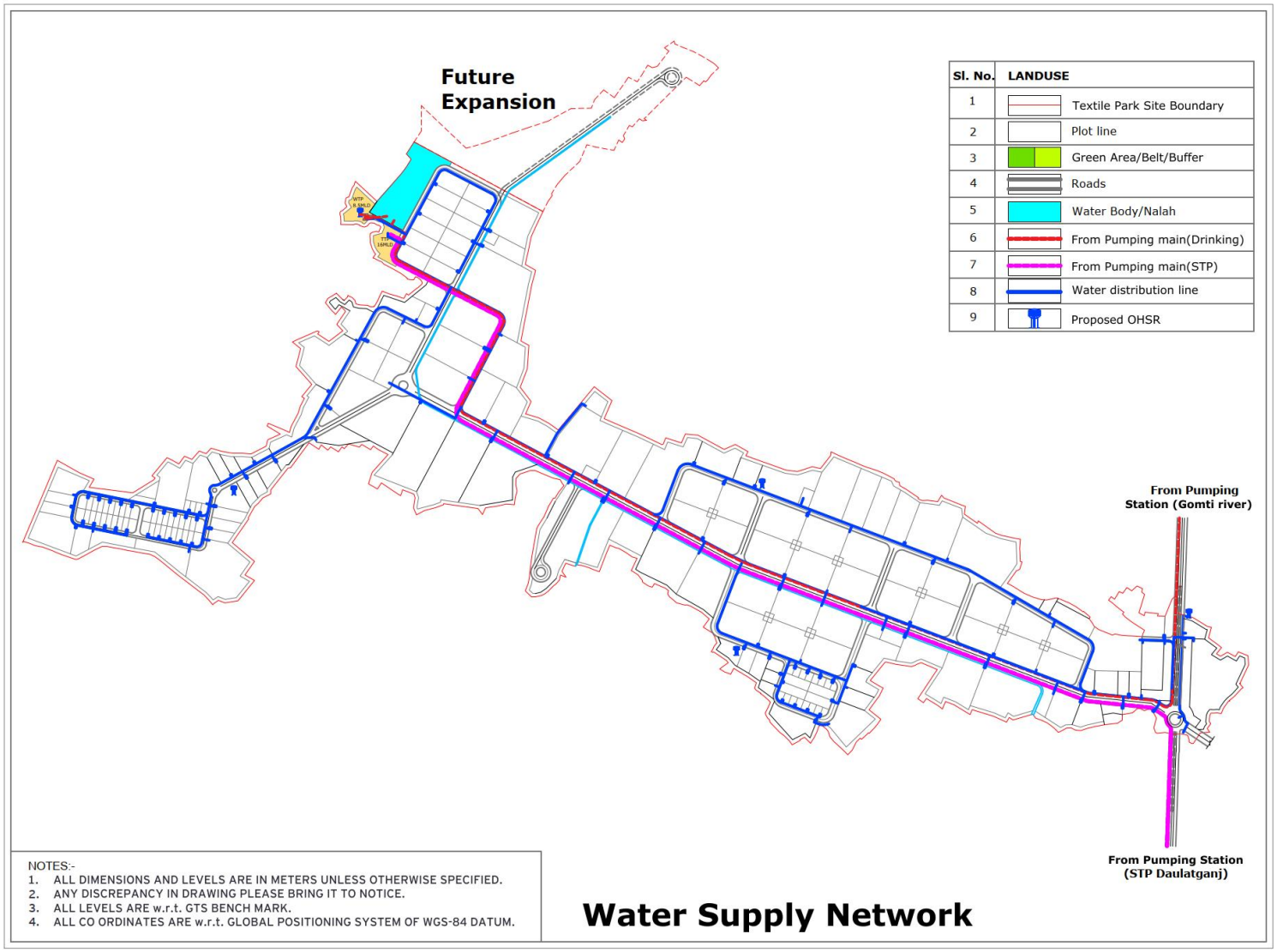


FIGURE 6-1: PROPOSED WATER SUPPLY NETWORK OF PM-MITRA PARK AT LUCKNOW

Source - Consultant

6.2.3 PROPOSED WATER SUPPLY NETWORK

The proposed water supply system components are as follows:

- Raw water for drinking purposes will be collected from Gomti river to the project gate which will be constructed and operated by Jal Nigam.
- From Intake well at Gomti river, the raw water will be pumped to WTP.
- WTP of 7 MLD (in two phases) is proposed inside the project for treating raw water. After treatment of water, the water will flow by gravity to clear water sumps at WTP premises and distributed to the industries.
- Secondary treated water for Industrial purposes will be collected from an existing STP Daulatganj at Lucknow which is 33km away from the site. A tertiary treatment plant will be constructed and operated by Jal Nigam inside the park of 16 MLD capacity (in two phases), which will be used by Textile Industries.
- Decentralized distribution system adopted to ensure equalization of supply water throughout the area.

6.2.4 POPULATION

The land use of the Master Plan, the proposed BUA, density of development dictates the estimation of population in the proposed development. This is further segregated into working population, resident population and floating population based on which the demand assessment for all infrastructure requirements has been prepared. The demand assessment of main power receiving, water supply system, sewerage system, etc. has arrived on the basis of the estimated population and land use. The total projected population as per the town planning assumptions is coming around 1,17,946 persons.

6.2.5 INFRASTRUCTURE DEMAND ESTIMATIONS

The potable water demand for PM-MITRA Park Lucknow area is estimated based on proposed land uses, built-up area, the population proposed and process water demand.

The non-potable demand comprising of horticulture demand, commercial cooling and washing/ cleaning. The water demand for the Non-Processing Area has been calculated separately due to variation in standards and requirements. The portion of horticulture demand, washing/cleaning and A.C cooling demand will be fed through potable water. The detailed water balance is furnished in the below table:

TABLE 6-2: WATER BALANCE OF PROPOSED PM-MITRA PARK

S. No.	Total Water Demand (including the fire demand)	=	37.00	MLD
1	Total Fresh Water Demand (including 5%)	=	5.95	MLD
2	Total Fire Demand	=	1.09	MLD
3	Process Water (including 5%)	=	23.37	MLD
4	Total Water Required for Cooling & other Demand (including 5%)	=	4.72	MLD
5	Total Water Required for Gardening (including 5%)	=	1.87	MLD

6	**Total Recycled Water Demand**	=	29.97	MLD
7	**Total Wastewater Generated**	=	20.11	MLD
8	Total Recycled Water Generated (90% of Total W/w Generated)	=	18.10	MLD
9	Deficit of Recycled Wastewater	=	10.79	MLD
10	**Water – (non-potable) required from external source**	=	10.79	MLD
11	**Water - Freshwater required + Fire Demand (Initially)**	=	7.04	MLD
12	**Total Storage (24 Hr) for Fresh Water**	=	17.83	MLD
13	**Capacity of CETP (Requiring Sec. + Tertiary Treatment)**	=	20.11	MLD

Source: Consultant

6.3 STORM WATER DRAINAGE

6.3.1 STORM WATER DRAINAGE SYSTEM

The site has been analysed in the context of pre and post development of land to achieve effective storm water management of rainwater. The aim of storm water management and all designed elements will be protection of the area from flooding during the monsoon period, conservation of the natural water courses and nallah from erosion and pollution, reduction of pollutant loads and enhancement of the ecology and environment of the project area.

6.3.2 RAIN WATER HARVESTING

The project area has been divided into three categories such as roof top area, paved area and unpaved area. The rainwater collected on the roof top can be used for gardening or domestic purposes. The rainwater infiltrates into the unpaved area. To store the rainwater falling on the paved surfaces, rainwater recharge pit is proposed.

Rainwater Harvesting is one of the best practices to be followed which results in improvement of the ground water levels and reduces the load on drains and there by minimizes the wastage of rainwater which is precious and use full for our daily needs. Hence, it is necessary to take up measures to conserve water resources. Ground water recharge by rainwater harvesting (RWH) is the simple and cost-effective way. Rainwater harvesting through constructing catch pits and rainwater harvesting structures will be proposed in the storm water drainage network.

6.4 FIRE WATER NETWORK

6.4.1 FIRE WATER SUPPLY SYSTEM

Fire Water network is proposed in the project area; to ensure the safety, the fire network is proposed along the roads in project area. The storage for water is provided in the clear water sump near treatment facilities to ensure availability of water round the clock.

6.4.2 FIRE DEMAND & FIRE HYDRANTS

Design process based on the CPHEEO Manual should be used to maintain the quality standards. Fire flow requirements shall be in accordance as per the Fire Protection.

6.5 RECYCLED WATER SYSTEM

Water Balance is achieved considering that re-cycled water demand comprising cooling water demand, horticulture demand and Washing/ Cleaning will be met from the re-cycled water generated from the Common Effluent Treatment Plant (CETP).

The recycled water supply distribution system will be designed as per the manual of Central Public Health and Environmental Engineering Organisation (CPHEEO).

6.5.1 PROPOSED RECYCLED WATER SUPPLY SYSTEM

The wastewater generated from the industries will be treated in CETP with ZLD facility which can be used for certain activities such as Process water reuse, Horticulture, A.C. Cooling and Flushing, etc. A water balance table has been generated to quantify the same. Using recycle water shall reduce the load on freshwater demand calculated above which would result in reduction in intake from the supply source. A separate network for recycle water is proposed within the industrial park road utility corridors. The treated storm water shall also be supplied in the recycle water line.

Total Water Demand calculated is 37.00 MLD out of which 29.97 MLD is the demand for Industrial use, Horticulture, A.C. Cooling and Flushing. The capacity of proposed CETP with ZLD is 20.1 MLD say 20 MLD. Balance water to be fulfilled from potable water source.

FIGURE 6-2 RECYCLE WATER SUPPLY SCHEMATIC PATTERN
Source: Consultant

6.6 SEWAGE PIPING NETWORK

6.6.1 STRATEGY OF DESIGN

Based on the topography of the site and quality of sewerage should be treated in a comprehensive method. The sewage generated from the plot shall be conveyed through a pipe to the main sewerage line by gravity. The gravity system is mainly considered because it gives better results and also incurs less capital and operational costs. The total sewage generation for the textile park as per the assumptions will be 20 MLD.

6.6.2 SEWER FLOW GENERATION

The wastewater generation has been considered as 80% of the per capita water consumption for potable water, 70% for processed water from Textile Industries and 100% water consumption for flushing water.

6.7 SOLID WASTE MANAGEMENT

6.7.1 STRATEGY OF DESIGN

The PM-MITRA park, Households, Commercial Establishments, Market, etc., generate solid waste on day-to-day basis. The waste should normally be stored at the source of waste generation till collection for disposal. The primary objective of solid waste management is minimization of waste to be sent to the landfill. This is achieved by a system of efficient segregation starting at consumer level, utilization of bio-degradable waste for composting or energy generation, and recycling of the non-biodegradable and industrial waste.

6.7.2 PRIMARY COLLECTION

Primary collection refers to the process of collecting waste from households, markets, institutions, and other commercial establishments and taking the waste to a storage depot or transfer station or directly to the disposal site. The vehicles used for door-to-door collections in general are tricycles/pushcarts, auto tippers, and sometimes small compactors depending on the area.

FIGURE 6-3: DOOR TO DOOR COLLECTION VEHICLE
Source: Google Image

6.7.3 SECONDARY COLLECTION

Secondary collection includes picking up waste from community bins, waste storage depots, or transfer stations and transporting it to waste processing sites or to the final disposal site.

6.7.4 QUANTITY OF WASTE

The total solid waste management quantity generated from plots is divided into two categories as facilities within PM-MITRA Park and facilities outside PM-MITRA Park. The quantity of waste expected to generate will be approximately 49.36 MT/day.

6.7.5 WASTE SEGREGATION, COLLECTION AND TRANSPORTATION

Waste should be stored at the source of waste generation until it is collected for disposal. It is essential to segregate waste into different fractions, commonly referred to as primary segregation. Segregation of Waste needs to be linked to primary collection of waste from the doorstep.

Waste should be segregated by waste generators into three fractions: wet (green container), dry (white container), and domestic hazardous waste. This is referred to as the three-bin system. Apart from these wastes horticulture waste and construction and demolition should be stored and collected separately. The wet fraction should preferably be used for composting; and the dry waste should be sent for recycling. Also, hazardous and E waste should be collected separately and deposited at the designated collection centres.

FIGURE 6-4: BINS FOR COLLECTION OF DRY, WET AND HAZARDOUS WASTE

Source: Google Image

6.7.5.1 Transportation System

Collection vehicles: Almost all collections are based on collector and collection crew, which move through the collection service area with a vehicle for collecting the waste material. The most commonly used collection vehicle is the dump truck fitted with a hydraulic lifting mechanism.

Non-compactor trucks: Non-compactor trucks are efficient and cost effective in small cities and in areas where wastes tend to be very dense and have little potential for compaction. Non-compactor trucks are generally used when labour cost is high. Controlling and operating cost is a deciding factor when collection routes are long and relatively sparsely populated.

FIGURE 6-5: NON COMPACTOR TRUCKS

Source: Google Image

6.7.6 SEGREGATION OF WASTES

Generated Solid waste can be categorized as Organic Waste, Reuse Waste (Metal, Card Boards, Plastics and Glass etc.), E Waste and Hazardous Waste (Hospital and Medical).

Facilities within PM-MITRA Park includes textile industries which generates organic waste, reuse waste, E-Waste, and Hazardous waste.

It also includes fire station with staff housing and PM-MITRA Park staff housing which also generates organic waste, reuse waste, E-Waste, and Hazardous waste.

6.8 ELECTRICAL TRANSMISSION AND DISTRIBUTION SYSTEM

6.8.1 GENERAL

Electrical system and supply are one of the most important infra services and plays an important role in attracting the prime developers. This document deals with the requirements of electrical power transmission and distribution, Illumination / Road Lighting, Telecommunication ducting system within PM-MITRA Park at Lucknow.

6.8.2 STUDY OF THE EXISTING POWER SYSTEM AROUND THE PROJECT AREA

Existing 33/11 KV electrical sub-station is available nearest to the project area at Mall town. The temporary power supply is proposed to feed from the available existing substation and distribution line near project area. A new receiving substation of 132 KV capacity is proposed inside the park of roughly 5 acres of land parcel that will be served by a nearby 400KV substation at Jehta which is around 26km away from the site.

6.8.3 DESIGN ASSUMPTIONS

- The design and related documents will be based on the conceptual master plan of 1000 acre area.
- To calculate the total electrical load of the project area or capacity of Zonal Substation (ZSS) is to be finalized on the basis of sanction load of individual plot holder. But in the present scenario, the sanction load of individual plot holder is unavailable, therefore, to arrive the load norm the plot wise load has been derived according to their land-use/ production for Industries facility, Utility etc. The designs assumptions for several different types unit's area tabulated in brief hereunder: -

TABLE 6-3: DESIGN ASSUMPTIONS FOR INDUSTRIAL SECTORS

Sl. No.	Description		Power requirement
A	**Industries**		
1	Garment Manufacturing		120 KW/Acre
2	Weaving Industry		120 KW/Acre
3	Spinning		200 KW/Acre
4	Carpet Industry		120 KW/Acre
5	Khadi, Handlooms & Regional specialization		100 KW/Acre
6	Processing		150 KW/Acre

7	Technical Textile/Non-Woven		150 KW/Acre
8	Technical Machine manufacturing		80 KW/Acre
9	Warehousing and Storage		50 KW/Acre

Source: Consultant

For other Development Area, the following load norms are considered to get the total power demand of the development area:

TABLE -6-4: DESIGN ASSUMPTIONS FOR OTHER DEVELOPMENT AREA

Sl. No.	Description	Power Requirement
1	Utility	50 kW/Acre
2	Admin. & Commercial	600 kW/Acre
3	Transportation	50 kW/Acre
4	Recreational	80 kW/Acre
5	Institutional	100 kW/Acre
6	Residential	50 Watt/Sq.mt.
7	CETP/WTP	80 kW/Acre
8	Road	1.5 kW/Acre
9	Green/ Open Space	0.5 kW/Acre

Source: Consultant

- Approximately, a total load of the project area is 109.7 MVA. A new receiving substation of 132 KV capacity is proposed inside the park which will be served by a nearby 400KV at Jehta which is around 26km away from the site.
- Phase 1 demand load is to be feed from 3 Nos. of 33/11KV zonal sub-station inside the park or can be divided into parts depending upon the phasing of land.
- All Industrial and non-industrial plots will be fed by underground distribution network.
- Energy efficient LED lighting will be considering for entire park and all outdoor lighting system shall be connected to automatic controls. Automatic controls can be either time based or photo sensor based.

6.8.4 DESIGN CRITERIA

6.8.4.1 Power demand

Before the design, it is always necessary to assess the power requirement. Based upon load norms, the plot wise load is calculated. Accordingly, the connected and maximum load demand is worked out for substation which is projected above.

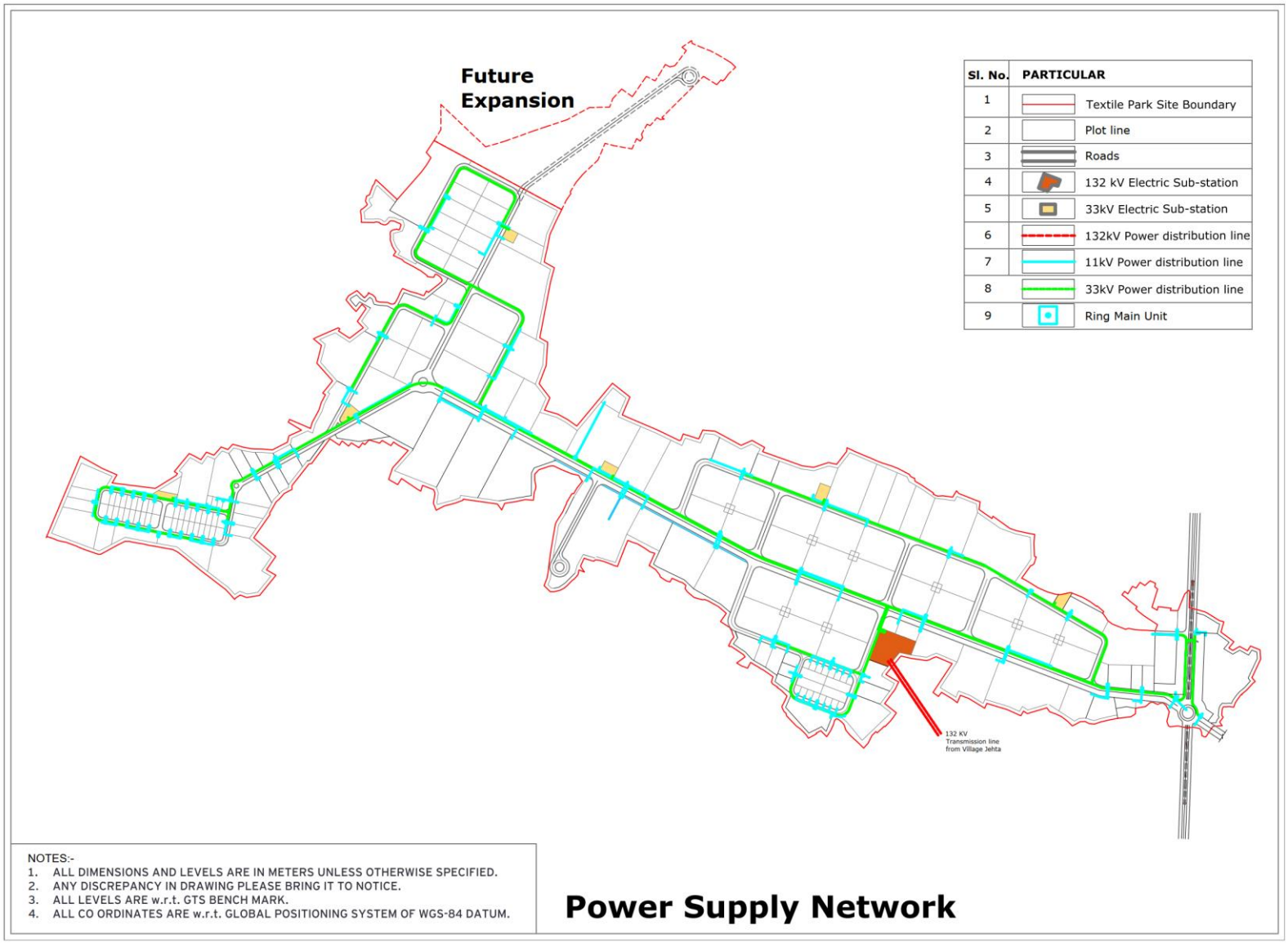


FIGURE 6-6: PROPOSED POWER SUPPLY NETWORK OF PM-MITRA PARK AT LUCKNOW

Source - Consultant

6.8.5 EXTERNAL ILLUMINATION SYSTEM

6.8.5.1 Design Criteria of Road Lighting

Roads of this PM-MITRA Park development area shall generally cater to: -

- Movement of goods/machinery/finished product through heavy vehicles.
- Movement of persons through light vehicles including cyclist/e-rickshaw/pedestrian. Other roads around shopping area and residential area/ parking area shall be considered for aesthetic and pleasing lighting systems.

Basic requirement of road, green area and periphery lighting proposed be as follows:

- Adequate level of illuminations for heavy vehicles/light vehicles/cyclist
- Uniform illumination level over carriage way with minimum glare
- Safety of movement
- Minimum disturbance during fog/dust conditions
- Use of high efficiency lighting fixtures with high lumen output and low power consumption
- Beautification and pleasing view

FIGURE 6-7: THEMATIC VIEW OF ROAD LIGHTING

Source: Google Image

6.8.6 TELE AND DATA COMMUNICATION SYSTEM

6.8.6.1 Telecommunication System

The implementation of Telecommunication system is very important for any development and its usage has become a necessity these days. As such telecommunication network is proposed to be provided in a manner so as to have connectivity by different service providers. Some of the telecom operators in Uttar Pradesh circle are as follows enabling users to select the services of service provider of their liking.

TABLE 6-5: TELE SERVICES

S. No.	SERVICES	OPERATOR
1	Wireless	Vodafone & IDEA cellular Ltd
		BSNL
2	Unified	Reliance Infocom
		Bharti Airtel Ltd

3	Wireline	BSNL

Source: Consultant

Telecom Services today are of the following types:

- Landline operations requiring a telecom Overhead Conductor & junction box space in utility corridor.
- Wireless services on GSM / CDMA platform requiring tower at stipulated radii.
- Broad band services requiring an Overhead Conductor corridor and distribution chambers.
- Short Coverage Wi-Fi networks.

To achieve it, Optical fiber is used to provide and connect various service providers for telecom as well as broadband services to the users through the optical fiber network. To run the cabling, the provision for laying the conduit & chamber in front of all the plots will be proposed in ROW planning.

7 LANDSCAPING DESIGN

7.1 GREEN STRATEGY

The 1000 Acres of the PM-MITRA Park at Lucknow is to be developed as an environment sensitive development. About 11.21% of the area i.e., about 112.08 acres have been dedicated to green and open spaces. The landscape strategies have been developed so as to ensure an environmentally viable development wherein the landscape will complement the industrial development. Landscaping has been undertaken under three heads:

- Road-side Plantation
- Buffer Areas
- Demarcated open areas and other landscaped areas including Roundabouts.

7.2 ROAD-SIDE LANDSCAPING

The Hierarchy of the roads defines its characteristic of landscape. Plantation on different streets have been done keeping this in mind.

7.2.1 MAIN ROAD- 45 M ROW

A combination of thick & thin canopy trees has been proposed on the plot edge and along the footpath. Also, shade providing trees like Flamboyant trees, Gulmohar trees have also been provided along the plot lines. Tall and evergreen Ashoka trees have been provided along the footpath.

The most ideal shrub for plantation on road, Bougainvillea has been suggested along with golden bell, Maulshree tree and Oleander. Bahia grass has been suggested for ground cover. Concrete curb of height 150mm is provided from road level of the median. Permeable range for paver blocks should be between 16% and 25%. Pole light has been provided in planting edges of about 6m above the ground level.

Single arm Pole lights of about 9m height above the ground level at 25 m c/c (single sided) for the footpath along both sides of the road with offset have been suggested to create a good ambience.

7.3 MAIN ENTRANCE PLANTING EDGE

- Implementation of ornamental/evergreen trees along the planting edge to provide shading for the pathway.
- Ground cover acts as an ornamental carpet which enhances visual aesthetics.
- Hedges (1M tall) can act as an edge element between plots and footpaths.

TABLE 7-1: PLANTING DETAIL

Sl. No.	Plant Type	Blooming Season	Height (Approx.)
1	Gulmohar (Royal Poinciana)	April-June	15-20 meters
2	Ashoka	Year-round	6-9 meters
3	Jacaranda	March-May	10-15 meters
4	Bougainvillea	Spring to Fall	1-3 meters
5	Hibiscus	Spring to Fall	2-3 meters
6	Oleander	Summer	2-5 meters
7	Marigold	Summer to Fall	0.3-1 meter
8	Petunia	Spring to Fall	0.3-0.6 meter
9	Pansies	Winter to Spring	0.15-0.3 meter

Source: Google

7.4 DEMARCATED OPEN AREAS AND OTHER LANDSCAPED AREAS

Roundabouts – Medium height shrubs has been suggested for the roundabouts and Bahia grass for ground cover. Central island of the roundabouts to be display local art or other gateway features in the form of dynamic sculptures. Dynamic Sculptures in roundabouts help to calm traffic and creates a sense of place.

FIGURE 7-1 : ROUNDABOUT WITH DYNAMIC SCULPTURES

Source: Google Image

7.5 MAIN ENTRANCE PUBLIC SIGNAGES

FIGURE 7-2: ROAD SIGNAGES
Source: Google Image

Public signages should be located at all high traffic pedestrian & vehicular zones. All informative and directional signages should be located near to the nodes and entrances of the main axial road and secondary roads. It should provide minimal and adequate information (with the use of symbols and infographics predominantly). It should not obstruct either pedestrian or vehicular movement.

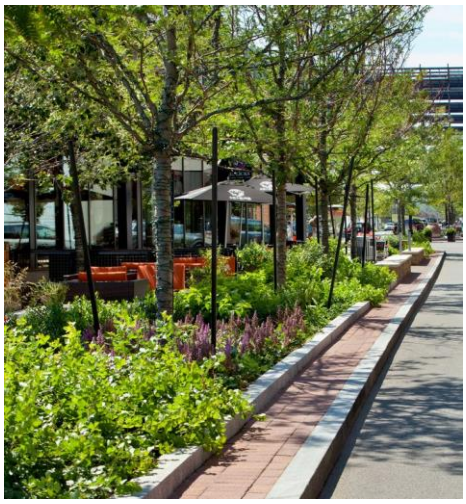
7.5.1 DEVELOPMENT OF GREEN BELT IN THE PROJECT SITE

Green belt will be developed in the project site which would help in controlling air pollution and act as a noise buffer. The green belt plantation includes the indigenous trees, fruit bearing trees, timber and medicinal plants. The green belt ensures the mixed type of vegetation so as to maintain the ecology of the area. List of green belt plantation is given below:

- Botanical name of plant - Common Name
  - i) Azadirachta indica - Neem
  - ii) Albizia Lebbeck - Shirish
  - iii) Mangifera indica - Mango
  - iv) Saraca asoka -Sita Ashok
  - v) Terminalia arjuna – Arjun
  - vi) Butea monosperma – Palas
  - vii) Ficus religiosa – Peepal
  - viii) Bauhinia racemosa - Apta
  - ix) Cassia fistula- Indian laburnum
  - x) Caryota urens - Fishtail palm
  - xi) Mimusops elengi - Bakul

7.5.2 LANDSCAPE

Landscaping will consist of creation of green belt area, parking area, tree line along boundary, avenue & gardens, etc. The total landscape area proposed for the proposed PM-MITRA Park project is 112.08 acres. While detailed designing, the soil character of each area along with the aesthetic requirements will be considered for selection of tree/shrub/herbs species. Urban design/ streetscape elements like benches, shades, pargolas, aesthetic elements, fountains, etc. will be provided to make this park a beautiful, environment friendly, liveable place.



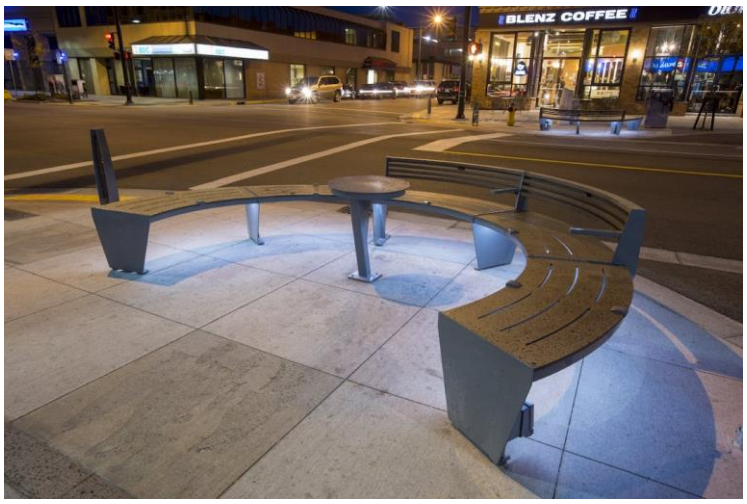

BLENZ COFFEE

FIGURE 7-3: URBAN DESIGN ELEMENTS LIKE LANDSCAPING, BENCHES, SHADES, PARGOLAS, AESTHETIC ELEMENTS, FOUNTAINS, ETC.

Source: Google Image

7.6 RENEWABLE ENERGY

7.6.1 INTRODUCTION

Innovation and sustainability are met in the idea of an integrated textile park. Our park, which is tucked away in an exquisite setting, serves as an example of eco-friendly construction and the use of renewable energy. There have been serious attempts to balance environmental responsibility and industrial advancement.

7.6.2 OBJECTIVE

Our Integrated Textile Park has a dual objective of producing high-quality textiles that adhere to international standards while also being environmentally friendly. Through energy efficiency, water conservation, waste management, and the use of renewable energy sources, great effort is made to reduce the ecological imprint. The effort to steer the textile industry toward a more environmentally friendly future is guided by ongoing research, innovation, and community engagement.

7.6.3 KEY FEATURES

Integration of renewable energy reduces dependency on non-renewable resources by harnessing the energy of the sun, wind, and organic waste. Advanced water management techniques ensure proper use, recycling, and treatment of this priceless resource, protecting it for future generations. Sustainable Raw Materials: Organic fibres and eco-friendly dyes are encouraged, fostering a supply chain that values biodiversity and the environment.

Innovation Centre: The park serves as a centre for research and development, enticing inventors and businesspeople to team up on environmentally friendly answers for the textile sector. Engagement in the Community: People believe in the power of knowledge and awareness. Communities are educated about sustainable living and environmental conservation through outreach programs.

Creating an eco-friendly integrated textile park involves implementing sustainable practices at every stage of the textile production process, from raw material sourcing to manufacturing and distribution. Additionally, incorporating renewable energy sources can significantly reduce the carbon footprint of the park. Here are steps you can take to make your integrated textile park eco-friendly and promote renewable energy development:

7.6.3.1 Energy Efficiency Measures:

- Energy Audit: Conduct an energy audit to identify areas where energy efficiency can be improved.
- LED Lighting: Replace traditional lighting with energy-efficient LED lights to reduce electricity consumption.
- Machinery Upgrades: Invest in modern, energy-efficient machinery that reduces energy and water usage.

7.6.3.2 Renewable Energy Sources:

- Solar Power: Install solar panels on rooftops to generate electricity. Solar energy can be used to power machines and lighting.
- Biomass Energy: Can explore biomass energy options, such as using agricultural or organic waste to generate bioenergy.

7.6.3.3 Water Conservation:

- Rainwater Harvesting: Implement rainwater harvesting systems to collect and store rainwater for various uses within the park.
- Water Recycling: Treat and recycle water used in textile processes to minimize water wastage.
- Low-Flow Fixtures: Install low-flow faucets and toilets to reduce water usage in restrooms and other facilities.

7.6.3.4 Waste Management:

- Common Effluent Treatment Plants (CETP): Set up CETP with ZLD to treat industrial effluents to re-cycle maximum water for re-use.
- Solid Waste Management: Implement recycling programs for paper, plastic, and other solid wastes generated within the park.
- Composting: Compost organic waste to produce natural fertilizers for landscaping purposes.

7.6.3.5 Sustainable Raw Materials:

- Organic Fibers: Encourage the use of organic cotton and other sustainable fibres that are grown without harmful pesticides and chemicals.
- Environmentally Friendly Dyes: Use eco-friendly and non-toxic dyes for colouring textiles.

7.6.3.6 Green Building Design:

- LEED Certification: If constructing new buildings, aim for Leadership in Energy and Environmental Design (LEED) certification, ensuring environmentally friendly construction practices.

7.6.3.7 Promote Research and Innovation:

- Investment in Research: Fund research and development initiatives focused on sustainable textile production technologies.
- Innovation Challenges: Organize innovation challenges to encourage start-ups and researchers to develop eco-friendly solutions for the textile industry.

7.6.3.8 Public Awareness and Education:

- Employee Training: Educate employees about the importance of eco-friendly practices and train them to adopt sustainable methods.
- Community Outreach: Conduct awareness programs in neighbouring communities to promote environmental consciousness.

7.6.3.9 Certifications and Standards:

- Certifications: Obtain certifications such as Global Organic Textile Standard (GOTS) to showcase your commitment to eco-friendly practices.
- Adherence to Standards: Adhere to local and international environmental standards and regulations.

7.6.3.10 Monitoring and Improvement:

- Regular Monitoring: Monitor energy and water usage, waste generation, and emissions regularly to identify areas for improvement.
- Continuous Improvement: Continuously upgrade technologies and processes to align with the latest eco-friendly innovations.

Annexure

Sl. No.	LANDUSE
1	Textile Park Site Boundary
2	Industrial Units
3	Institutional
4	Admin & Commercial
5	Utilities and Amenities
6	Truck Parking
7	Residential
8	Green Area/Belt/Buffer
9	Roads
10	Recreational
11	Water Body/Nallah

Sl. No.	UNIT
1	Garment Manufacturing
2	Weaving Industry
3	Spinning
4	Carpet Industry
5	Khadi & Regional specialization
6	Processing
7	Technical Textile/Non Woven
8	Technical Machine manufacturing
9	Warehousing and Storage
10	Worker's Hostel
11	Administrative Building
12	Office space like Post office, etc.
13	Convention Centre
14	Community Centres
15	Retail Establishments
16	Private Offices
17	Hotels
18	Restaurants
19	Shopping Centres
20	Petrol Pump
21	CETP with ZLD and STP
22	33 / 11 KV Electrical Sub-Station
23	Solid Waste Management
24	Water Treatment Plant
25	Fire Protection and Emergency Services
26	School
27	Creche & Pink Toilet
28	Hospital
29	Truck Parking
30	Recreational areas
31	Lodging & Dhaba
32	Logistic Services
33	Flatted Factories
34	Skill Development Centre
35	Research & Development Centre
36	Testing Lab
37	Incubation Lab
38	Start-Up Centre
39	Centre of Excellence
40	Exhibition Ground
41	Water Retention Pond
42	Common Boiler

NOTES:-

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
2. ANY DISCREPANCY IN DRAWING PLEASE BRING IT TO NOTICE.
3. ALL LEVELS ARE w.r.t. GTS BENCH MARK.
4. ALL CO ORDINATES ARE w.r.t. GLOBAL POSITIONING SYSTEM OF WGS-84 DATUM.

PROJECT NAME:

DEVELOPMENT OF PROPOSED PM MITRA PARK AT LUCKNOW

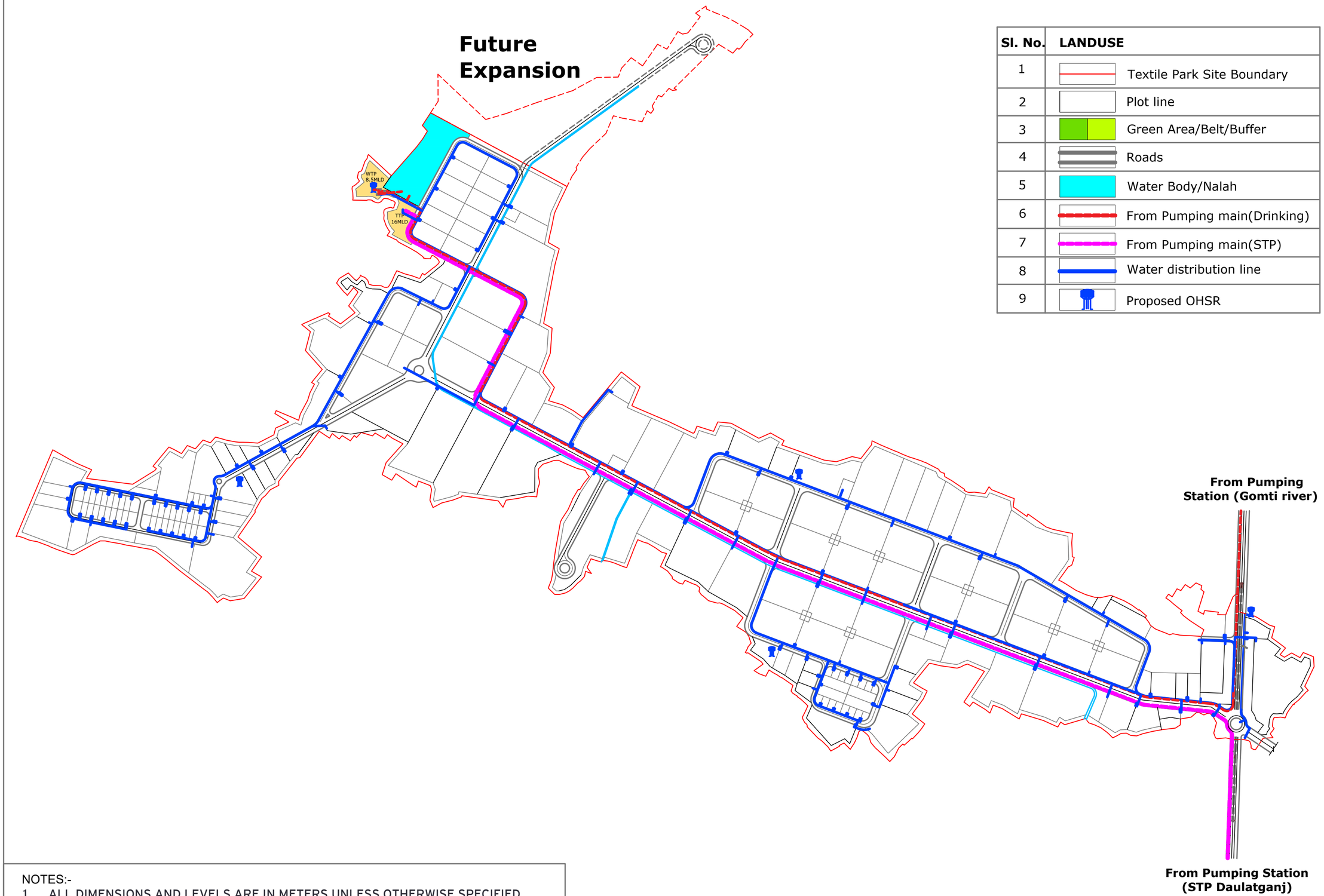
DRAWING TITLE:

DRAFT MASTER PLAN (1000 ACRES)

CLIENT:

DEPARTMENT OF HANDLOOM AND TEXTILES, UTTAR PRADESH

NORTH: N



Sl. No.	LANDUSE
1	Textile Park Site Boundary
2	Plot line
3	Green Area/Belt/Buffer
4	Roads
5	Water Body/Nalah
6	From Pumping main(Drinking)
7	From Pumping main(STP)
8	Water distribution line
9	Proposed OHSR

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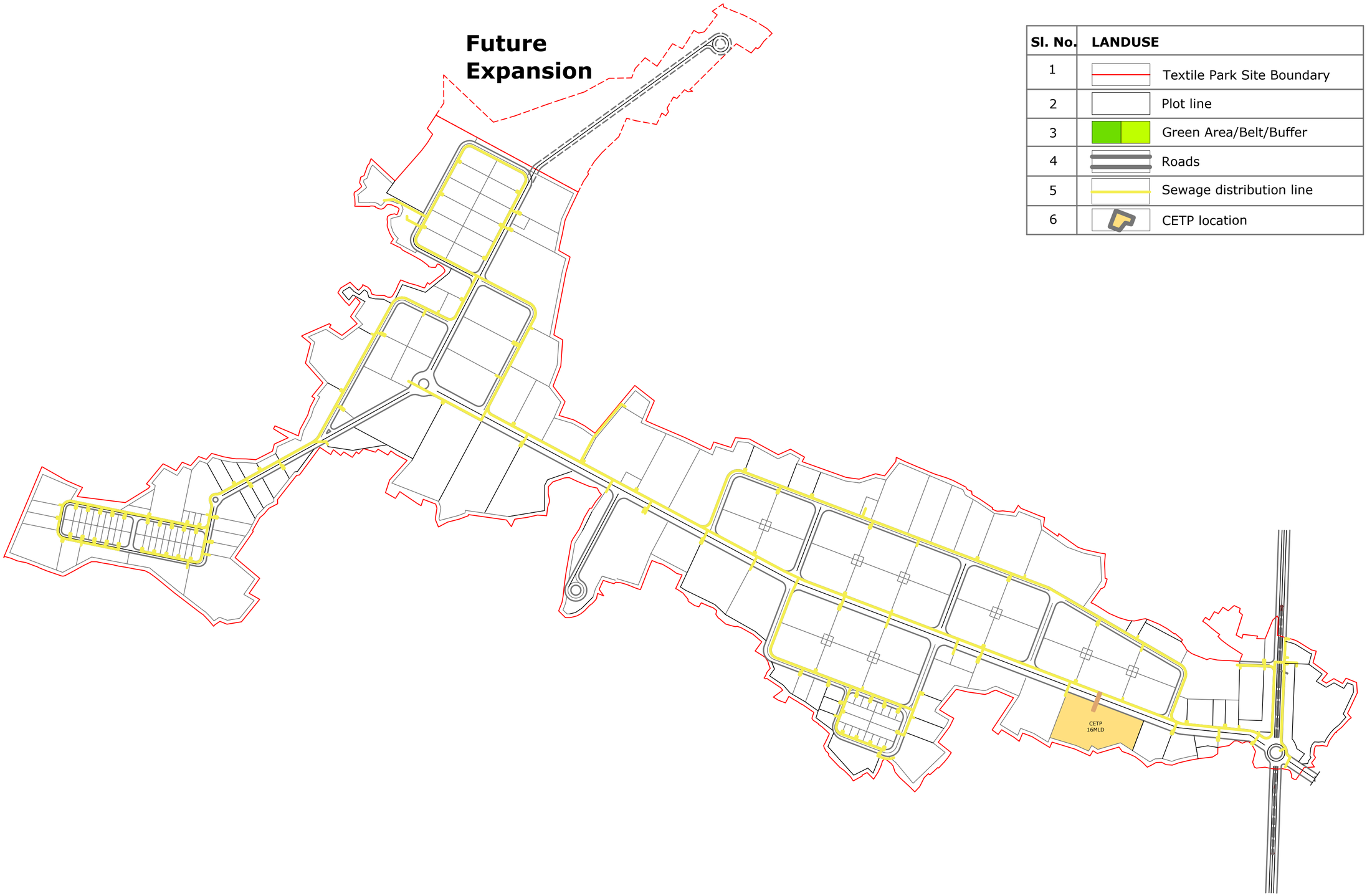
Water Supply Network



Sl. No.	LANDUSE
1	Textile Park Site Boundary
2	Plot line
3	Green Area/Belt/Buffer
4	Roads
5	Sewage distribution line
6	CETP location

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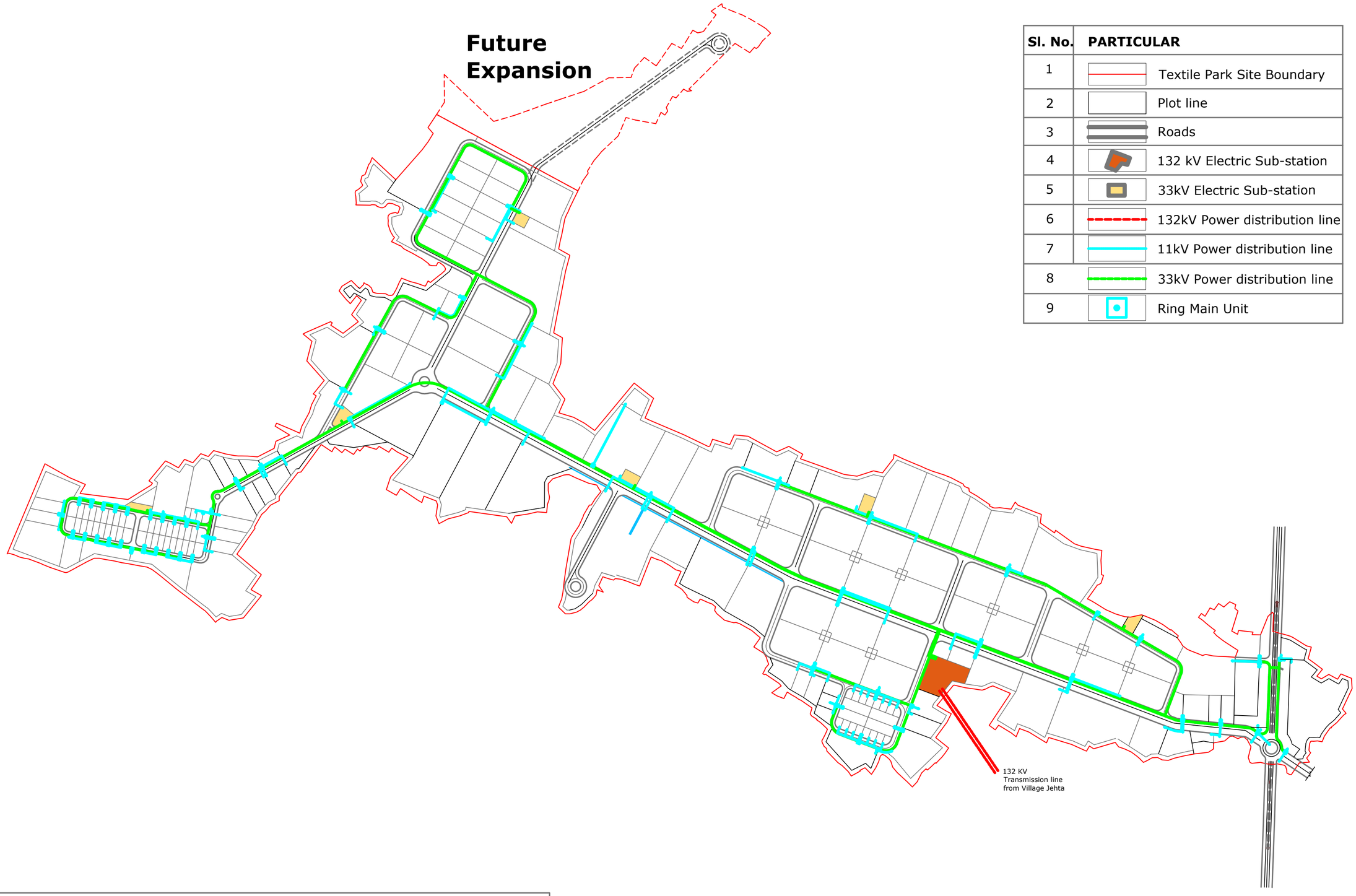
Sewage Water Network



Sl. No.	PARTICULAR
1	Textile Park Site Boundary
2	Plot line
3	Roads
4	132 kV Electric Sub-station
5	33kV Electric Sub-station
6	132kV Power distribution line
7	11kV Power distribution line
8	33kV Power distribution line
9	Ring Main Unit

NOTES:-

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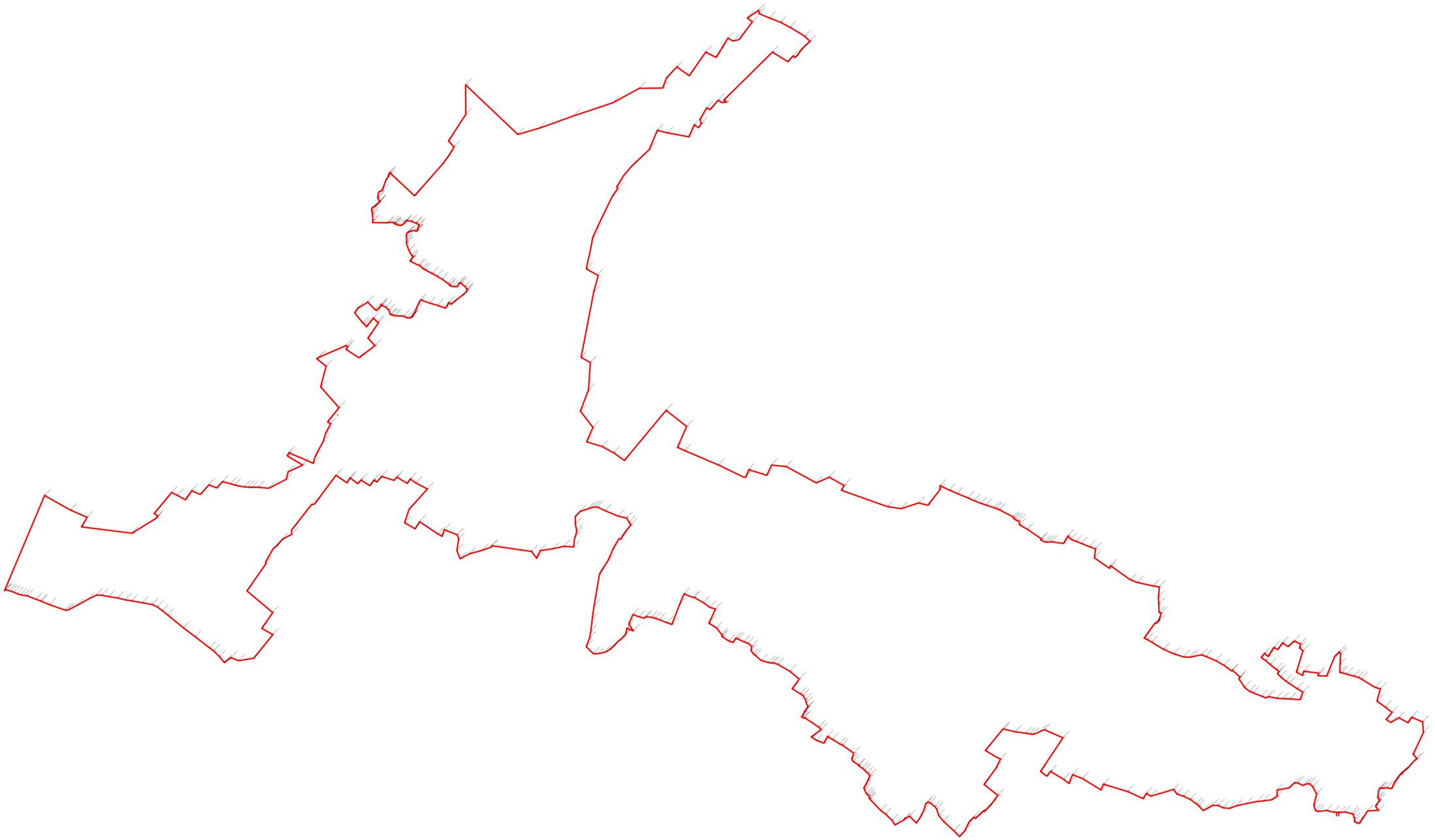
Power Supply Network



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Site Coordinate Points