FIGURE

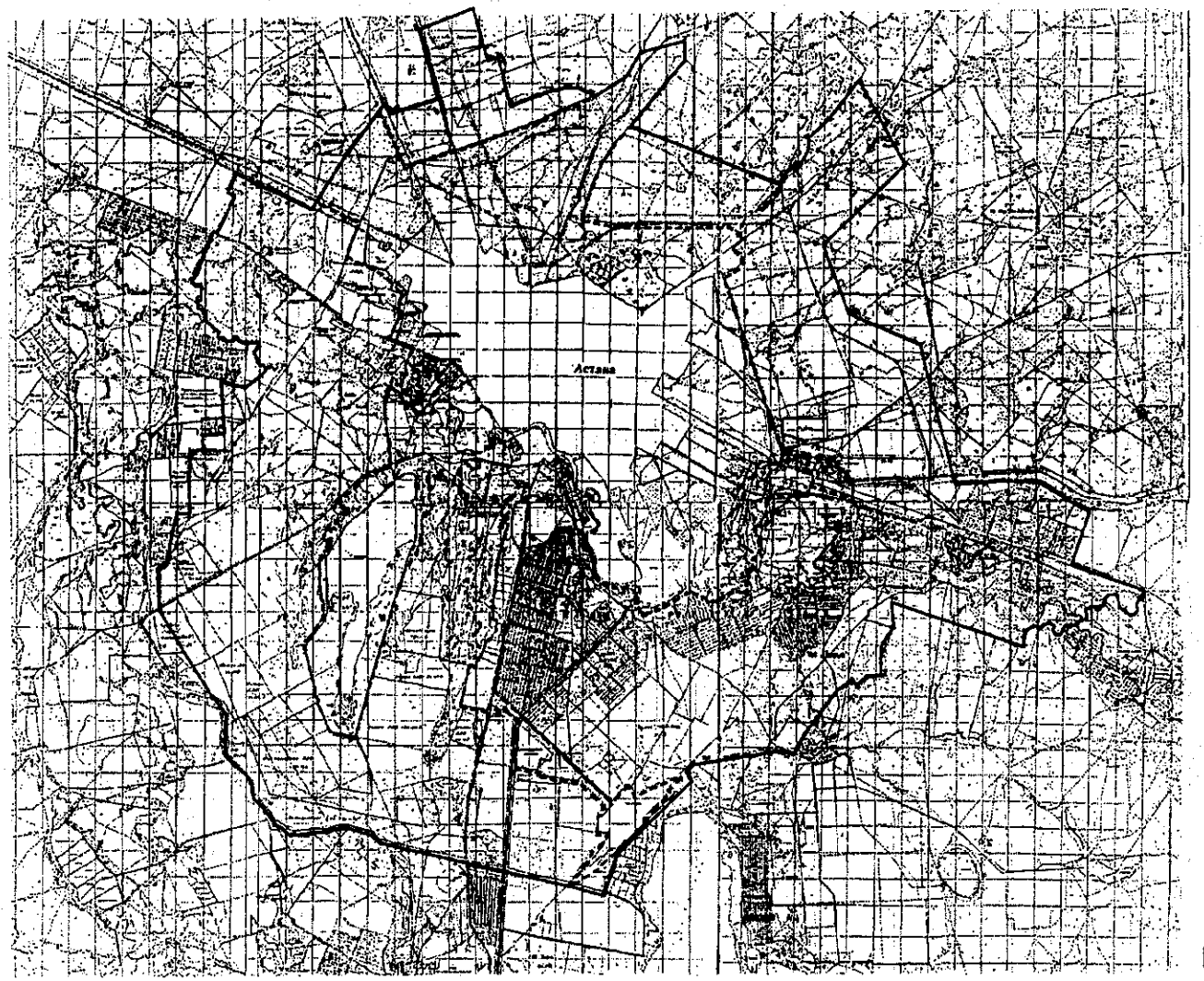


Figure 1.4.1 Study Area

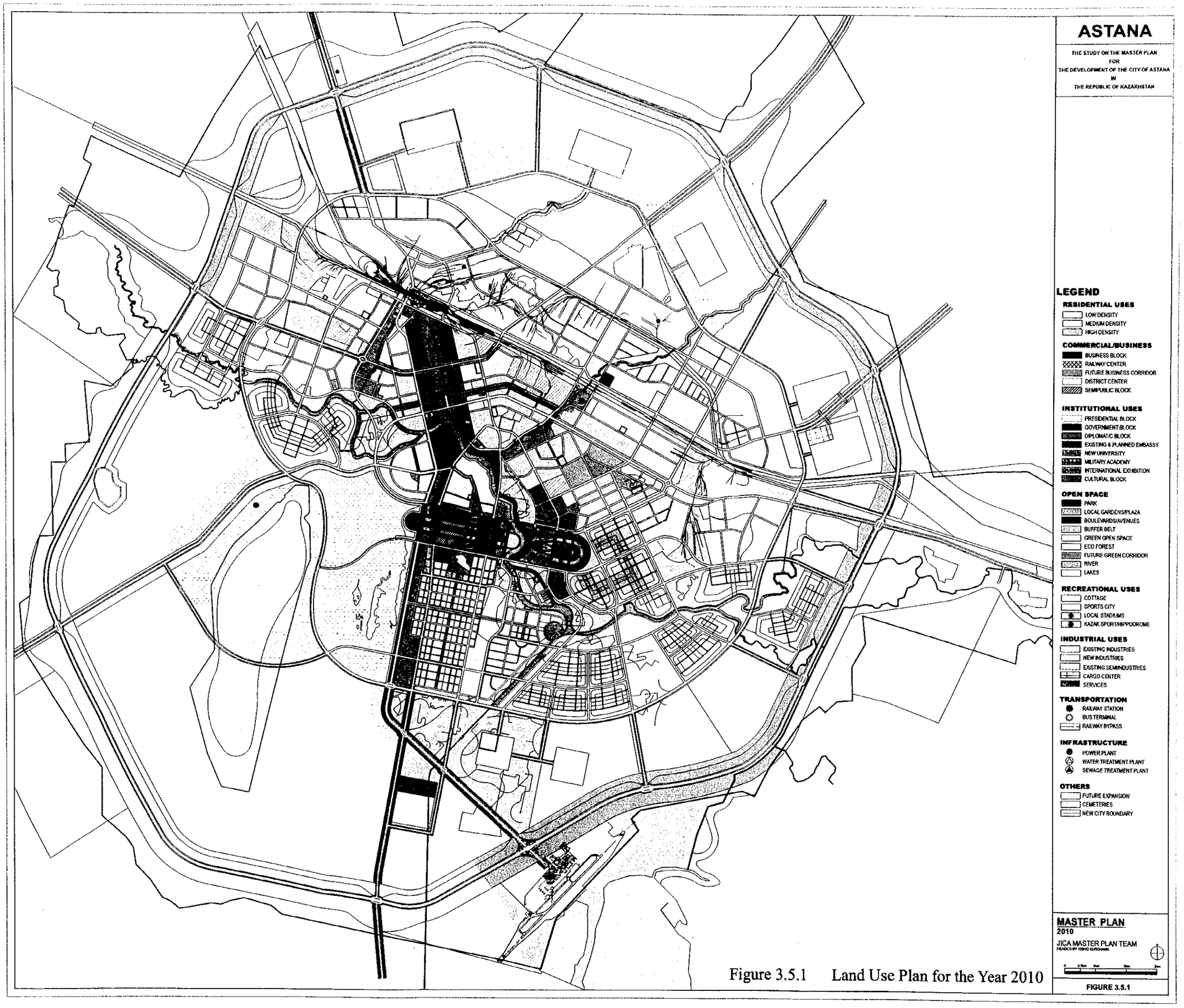


Figure 3.5.1 Land Use Plan for the Year 2010

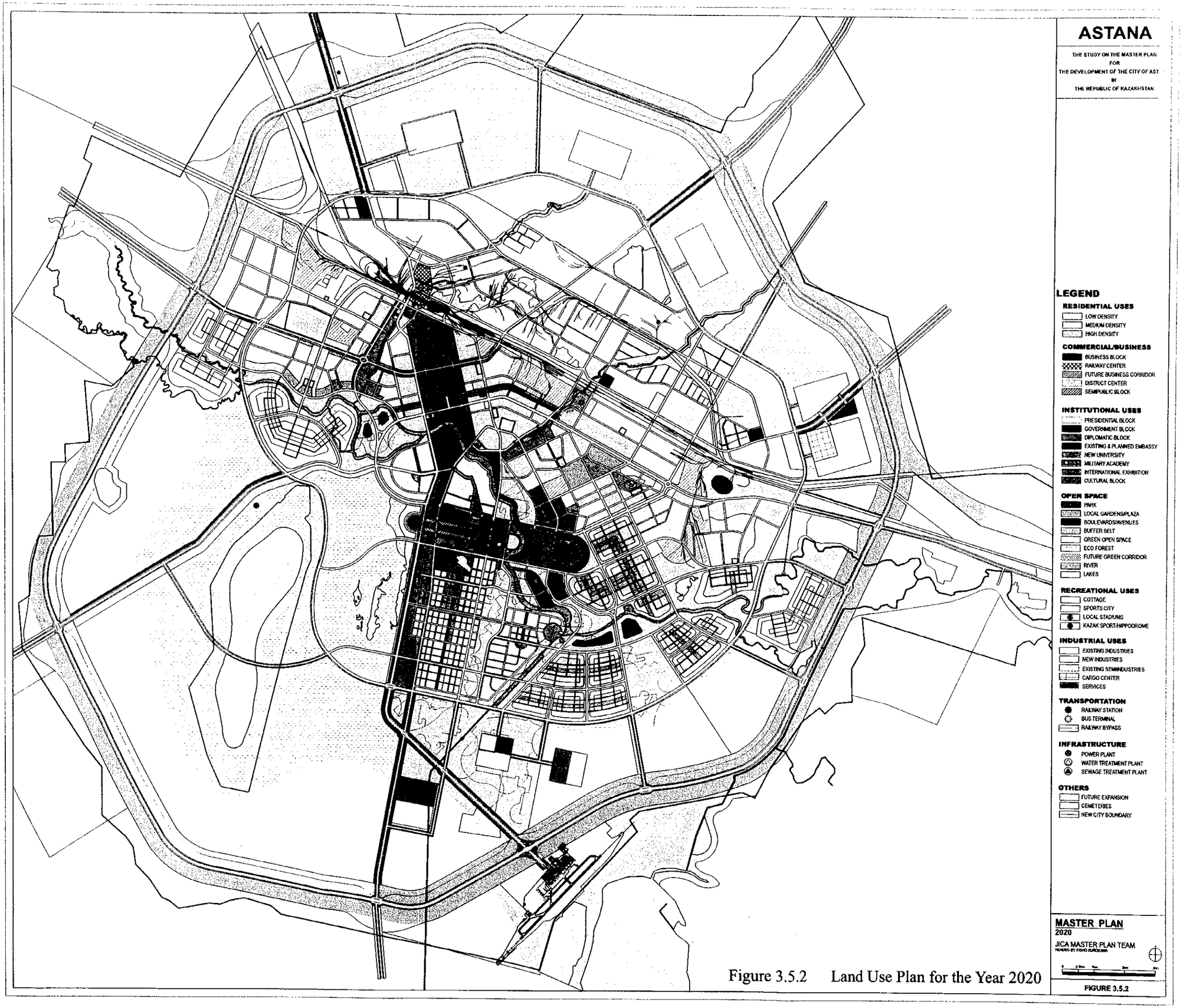


Figure 3.5.2 Land Use Plan for the Year 2020

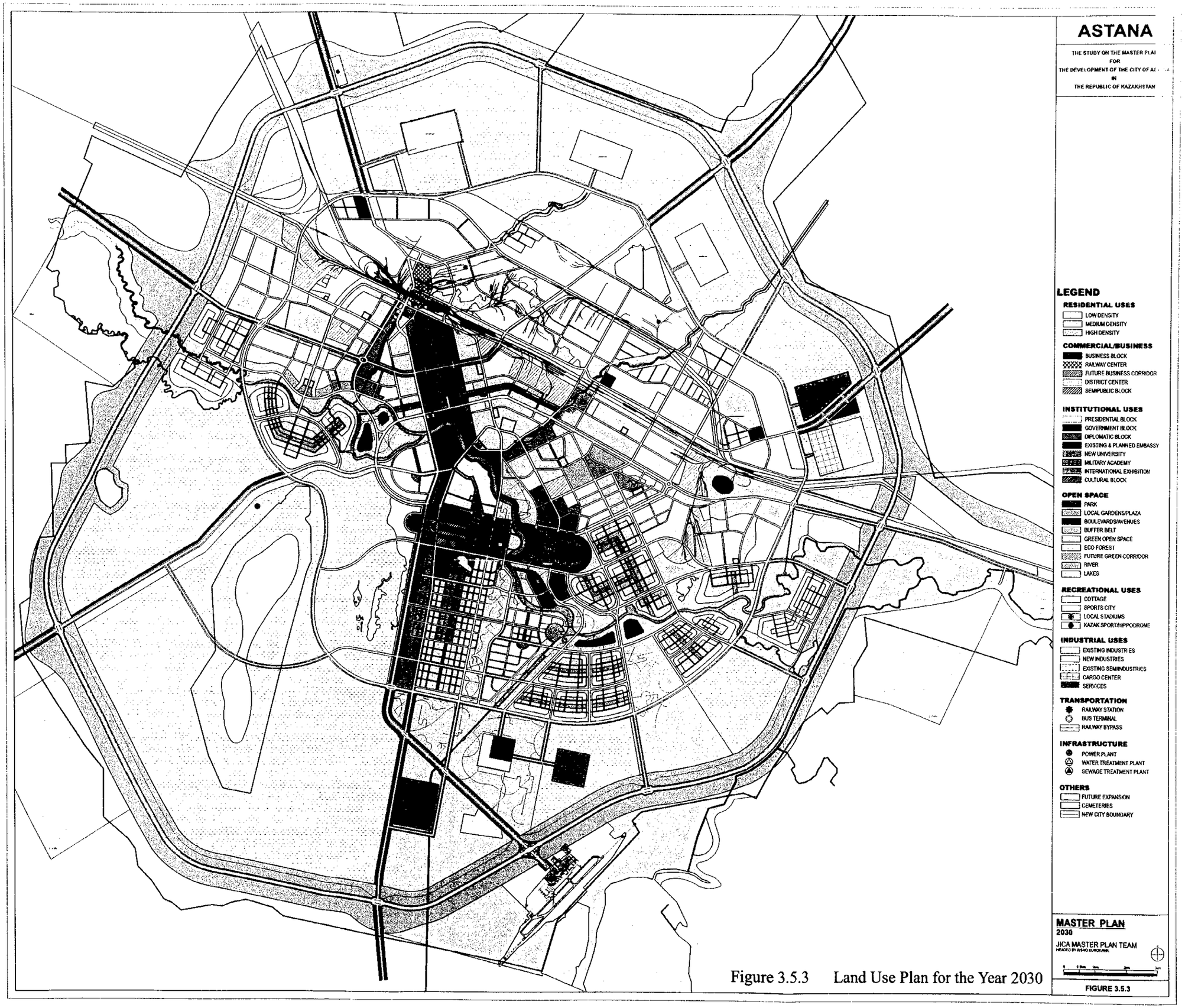
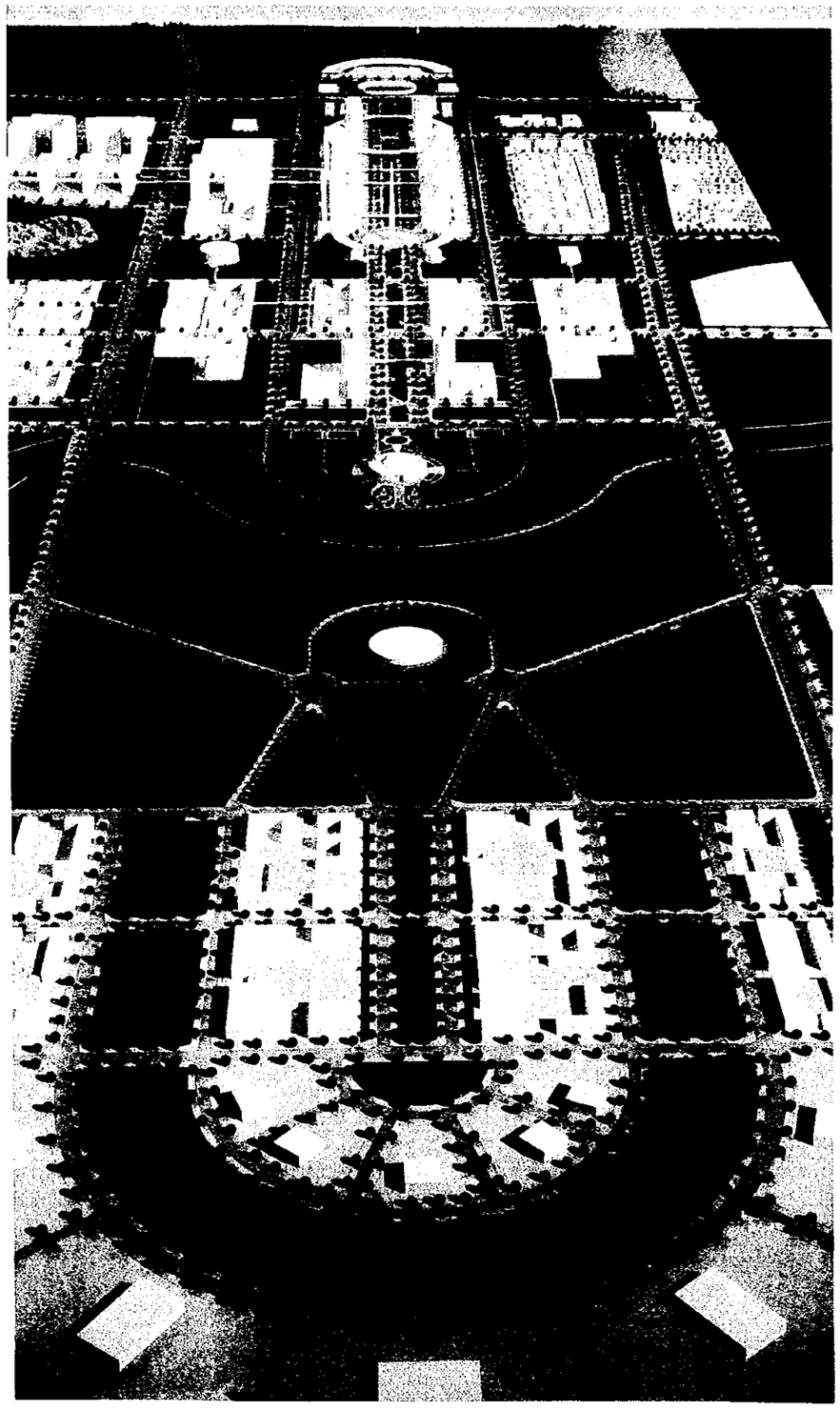
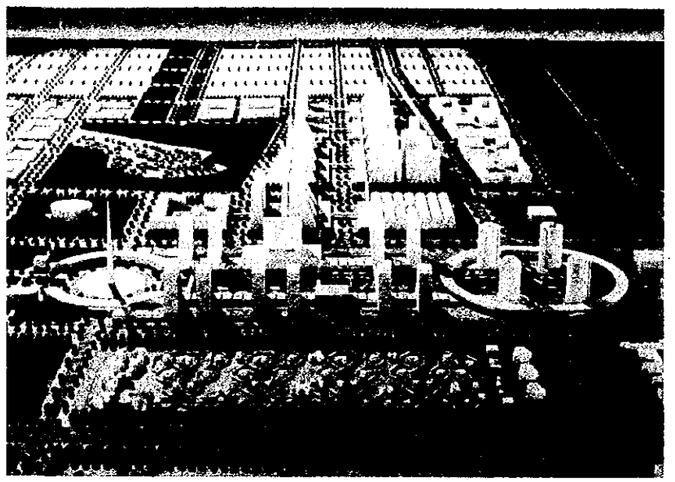
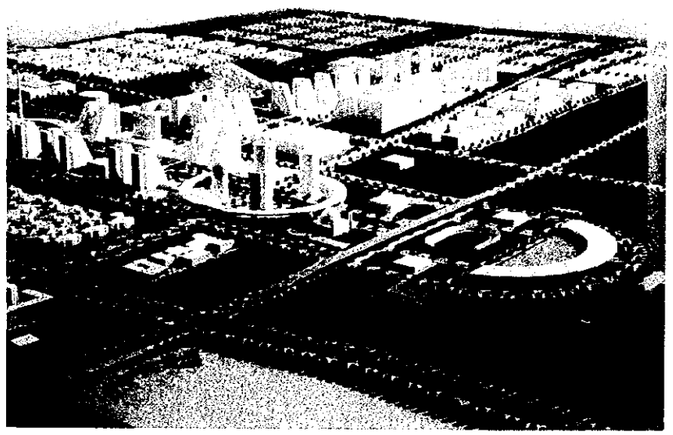
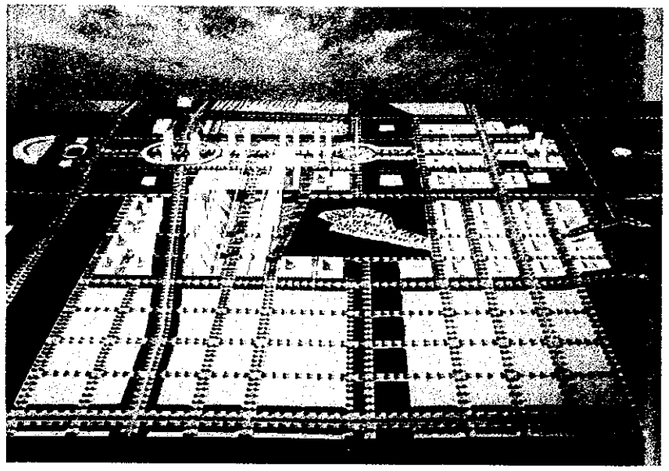


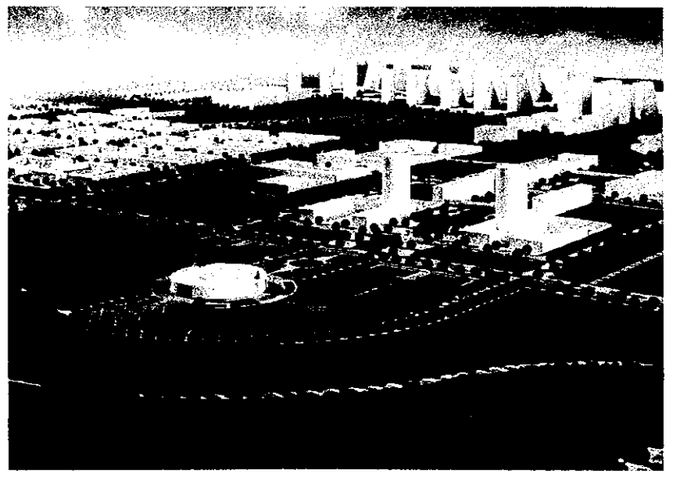
Figure 3.5.3 Land Use Plan for the Year 2030

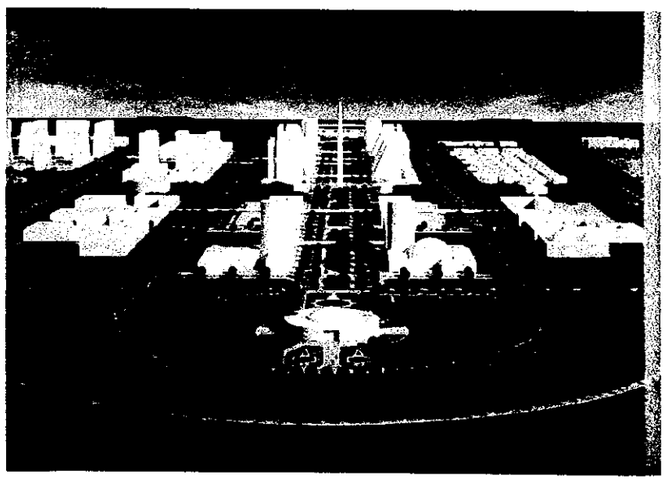










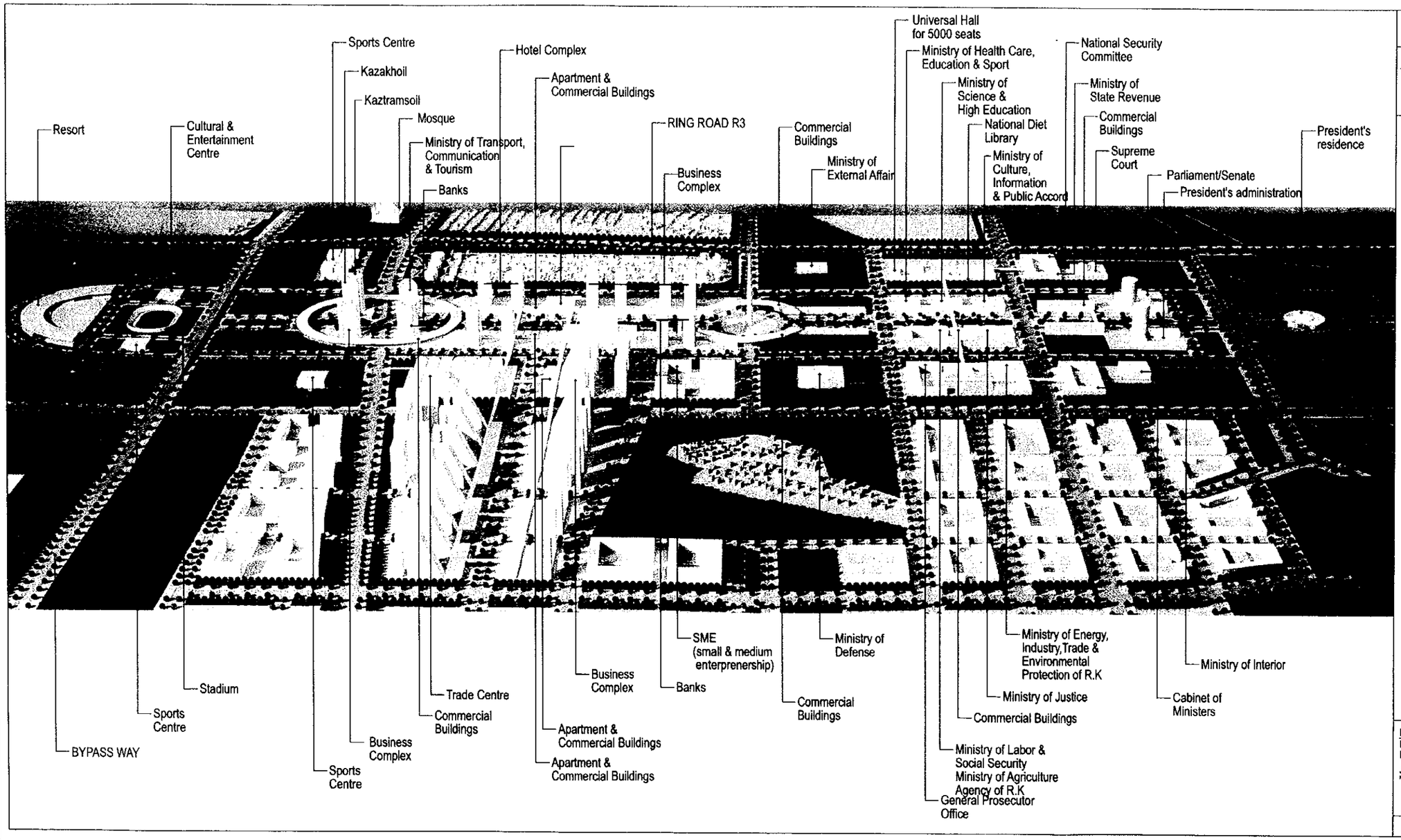


ASTANA CITY THE REPUBLIC OF KAZAKHSTAN | THE IMAGE OF NEW CITY CENTER AREA | JICA MASTER PLAN TEAM / HEADED BY KISHO KUROKAWA

FIGURE 3.7.1

ASTANA

THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN



NEW CITY CENTER
PERSPECTIVE VIEW OF MAIN FACILITIES

JICA MASTER PLAN TEAM
HEADED BY KIMIO KUROKAWA

N

FIGURE 3.7.2

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

ROAD

- EXISTING
- 2010
- 2020
- 2030

LRT

- 2010
- 2020
- 2030

TERMINAL

- MULTI-MODAL TERMINAL (2010)
- MULTI-MODAL TERMINAL (2020)
- MULTI-MODAL TERMINAL (2030)
- CITY AIR TERMINAL
- LRT STATION

STAGED PLAN OF ROAD & LRT
CONSTRUCTION/IMPROVEMENT
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY ISAMU KUROKAWA

0 1km 2km 5km

FIGURE 3.9.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- MAIN STREET OF CITY IMPORTANCE (ARTERIAL ROAD)
- MAIN STREET OF CITY IMPORTANCE (PRIMARY ROAD)
- MAIN STREET OF REGIONAL IMPORTANCE (SECONDARY ROAD)
- STREET and ROAD OF LOCAL IMPORTANCE (TERTIARY ROAD)
- SPECIAL ROAD
- MAIN ROAD

ROAD HIERARCHY
2010,2020,2030

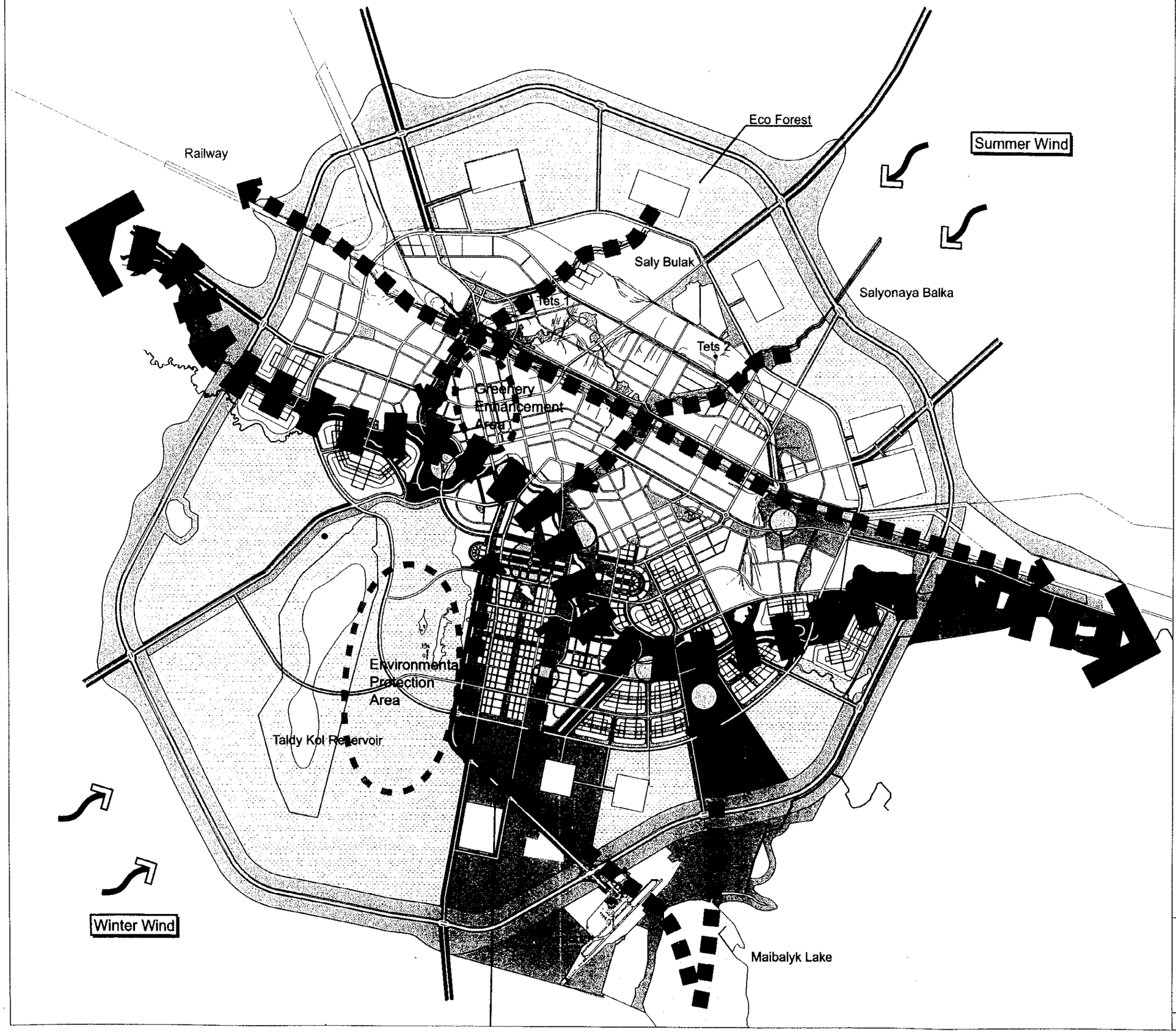
JICA MASTER PLAN TEAM
HEADED BY KIYHO KUROKAWA

0 1km 2km 5km

FIGURE 3.9.2

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN



LEGEND

- MAIN GREENERY AXIS
- MINOR GREENERY AXIS
- CORE GREENERY (CITY PARK)
- ECO FOREST
- BUFFER BELT

PLAN FOR GREEN NETWORK
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY KEIKO KOBOKAWA

0 1km 2km 4km

FIGURE 3.10.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- WATER SUPPLY SERVICE AREA (EXISTING)
- WATER SUPPLY SERVICE AREA (2010)
- WATER SUPPLY SERVICE AREA (2020)
- WATER SUPPLY SERVICE AREA (2030)
- MAJOR WATER SUPPLY PIPELINE (EXISTING)
- MAJOR WATRE SUPPLY PIPELINE (2010)
- MAJOR WATRE SUPPLY PIPELINE (2020)
- MAJOR WATRE SUPPLY PIPELINE (2030)
- (W) WATER TREATMENT PLANT (EXISTING)
- (W) WATER TREATMENT PLANT 100,000m3/d (2010)
- (W) WATER TREATMENT PLANT 120,000m3/d (2020)
- (W) WATER SUPPLY TREATMENT PLANT 100,000m3/d (2030)
- (I) EXISTING INTAKE PUMPING STATION
- (P) EXISTING DISTRIBUTION PUMPING STATION

WATER SUPPLY DEVELOPMENT PLAN
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY KEIKO KUROKAWA

SCALE 1:60,000

0 1km 2km 5km

FIGURE 4.3.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- SEWER PIPE (EXISTING)
- SEWER PIPE (2010)
- SEWER PIPE (2020)
- SEWER PIPE (2030)
- SEWAGE TREATMENT PLANT
- MAJOR PUMPING SYSTEM (EXISTIG)
- MAJOR PUMPING SYSTEM (2010)
- MAJOR PUMPING SYSTEM (2020)

KHC-6
KHC-4
KHC-7
KHC-50
Sewage Treatment Plant
KHC-51
KHC-53

PLAN FOR SEWER PIPE SYSTEM
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY MIMO KUROKAWA

SCALE 1:60,000

0 10km 20km 30km

FIGURE 4.4.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- EXISTING SWITCHING SUBSTATION
- SUBSTATION (EXISTING)
- SUBSTATION (2010)
- SUBSTATION (2020)
- SUBSTATION (2030)
- 110kV T.LINE (EXISTING)
- 110kV T.LINE (2010)
- 110kV T.LINE (2020)
- 110kV T.LINE (2030)

PLAN OF 110kV TRANSMISSION LINES,
SWITCHYARDS AND SUBSTATIONS
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY KENKO KUROKAWA

SCALE 1:60,000

0 1km 2km 5km

FIGURE 4.5.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

TETs-1

TETs-2

HC-11
(2030)

HC-1
(2010)

HC-3
(2010)

HC-4
(2020)

HC-2
(2010)

HC-6
(2020)

HC-5
(2020)

LEGEND

- HEAT STATION (TETs-1,TETs-2)
- HEAT CENTER (HC-1,2,3,4,5,6,11)
- HEAT PIPE-LINE (EXISTING)
- HEAT PIPE-LINE (2010)
- HEAT PIPE-LINE (2020)
- HEAT PIPE-LINE (2030)

Note;

1. The year in Parenthesis below heat center (HC-) shows the time period of heat center in service.
2. The heat pipeline (2010) in the legend means the time period of the completion of the entire pipeline construction works.

LAYOUT OF MAJOR DISTRICT HEAT PIPING AND HEAT CENTER 2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY ISHIO KUSUNOKI

SCALE 1:60,000

0 1km 2km 3km

FIGURE 4.5.2

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

From ISHIM

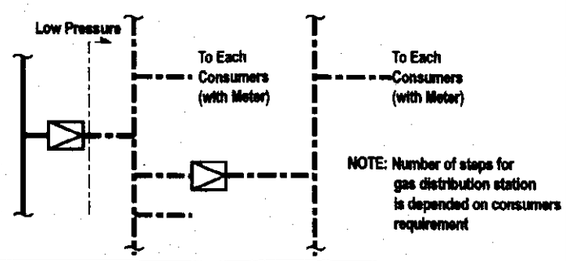
To KARAGANDA

PRESSURE REREGULATING STATION

LEGEND

- INTERNATIONAL GAS PIPELINE (BY OTHERS)
- HIGH PRESSURE NETWORK(1.2MPa) (2010)
- HIGH PRESSURE NETWORK(1.2MPa) (2020)
- HIGH PRESSURE NETWORK(1.2MPa) (2030)
- LOW PRESSURE NET WORK (BELOW 0.6MPa)
- STORAGE & PEAK SAVING FACILIYT
- HEAT CENTER (HC-1,2,3,4,5,6,11)
- GAS DISTRIBUTION STATION

Low Pressure Network (Typical)



NOTE: Number of steps for gas distribution station is depended on consumers requirement

PLAN FOR CITY GAS NETWORK
2010,2020,2030

JICA MASTER PLAN TEAM
REVISED BY ISSEI KANOGAWA

SCALE 1:60,000

FIGURE 4.6.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- SERVICE AREA (EXISTING)
- SERVICE AREA (2010)
- SERVICE AREA (2020)
- SERVICE AREA (2030)
- TELECOMMUNICATION CENTER IN A NEW DISTRICT (HOST)
- TELECOMMUNICATION CENTER IN A NEW DISTRICT (RSU)
- TELECOMMUNICATION CENTER IN AN EXISTING DISTRICT (HOST)
- TELECOMMUNICATION CENTER SERVICE AREA

ATC-1
ATC-32
ATC-21
ATC-36
ATC-C
ATC-A
ATC-B
ATC-E
ATC-D

LOCATION PLAN OF TELECOMMUNICATION CENTER AND SERVICE AREA
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY ######## ########

SCALE 1:60,000

0 1km 2km 5km

FIGURE 4.7.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- LANDFILL (EXISTING) + LANDFILL-1 (2010)
- LANDFILL-2 (2020)
- ALTERNATIVE CANDIDATE AREA FOR LANDFILL-2 (2020)
- HAZARDOUS HOSPITAL WASTE INCINERATOR (2010)
- PILOT SCALE MSW INTERMEDIATE TREATMENT PLANT (2020)
- *REFUSE DERIVED FUEL (RDF) PLANT or ENERGY RECOVERY INCINERATOR*
- RECYCLING CENTER FOR NEW CITY CENTER (2020)
- TRANSFER STATION (2030)
- COLLECTION SERVICE AREA (EXISTING)
- COLLECTION SERVICE AREA (2010)
- COLLECTION SERVICE AREA (2020)
- COLLECTION SERVICE AREA (2030)
- TRANSPORT ROUTE DIRECTION (EXISTING)
- TRANSPORT ROUTE DIRECTION (2010)
- TRANSPORT ROUTE DIRECTION (2020)
- TRANSPORT ROUTE DIRECTION (2030)
- WASTE COLLECTION AREA DIVISION

Nouth-Astana Waste Collection Area

South-Astana Waste Collection Area

Nouth-Astana Waste Collection Area

South-Astana Waste Collection Area

PLAN FOR SOLID WASTE DISPOSAL
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY KIMIO KUROKAWA

SCALE 1:50,000

0 1km 2km 5km

FIGURE 4.8.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- RIVER
- DIKE
- G GATE
- W WEIR
- 2010 RIVER
- 2020 RIVER
- 2030 RIVER

Flood Regulation Basin

Kalinina

GL360m
(Contour Line)

PLAN FOR FLOOD PROTECTION
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY ISAMU YAMASHINA

SCALE 1:50,000

0 1km 2km 5km

FIGURE 5.1.1

ASTANA

THE STUDY ON THE MASTER PLAN
FOR
THE DEVELOPMENT OF THE CITY OF ASTANA
IN
THE REPUBLIC OF KAZAKHSTAN

LEGEND

- PIPE LINE (EXISTING)
- PIPE LINE (2010)
- PIPE LINE (2020)
- PIPE LINE (2030)
- PUMP STATION WITH TREATMENT FACILITIES (EXISTING)
- PUMP STATION WITH TREATMENT FACILITIES (2010)
- PUMP STATION WITH TREATMENT FACILITIES (2020)
- PUMP STATION WITH TREATMENT FACILITIES (2030)

PLAN FOR STORM WATER DRAINAGE
2010,2020,2030

JICA MASTER PLAN TEAM
HEADED BY KENJI KUROKAWA

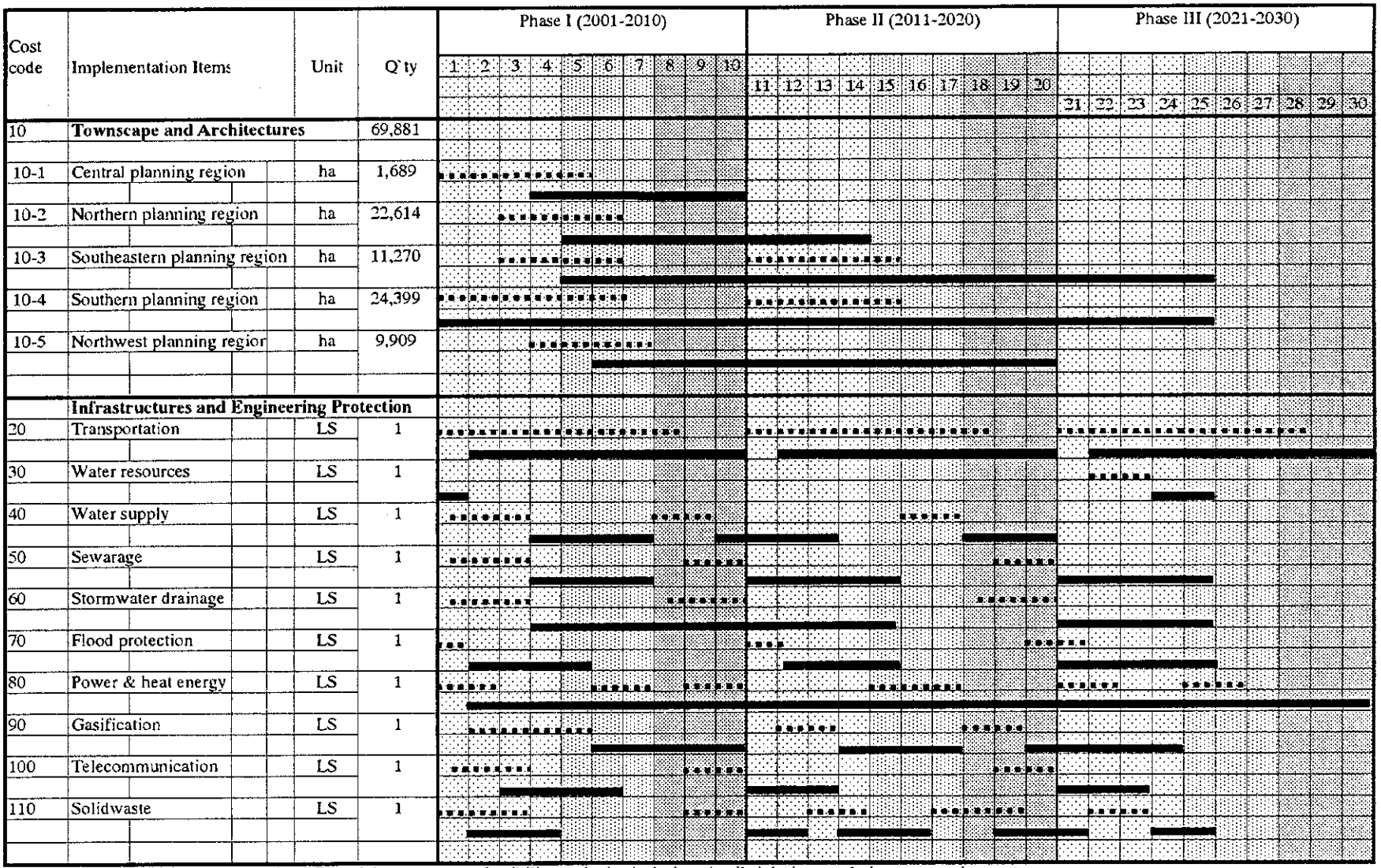
SCALE 1:60,000

0 1km 2km 5km

FIGURE 5.2.1

Figure 7.3.1 Overall Implementation Schedule for the Development, Phase I, II, and III

Cost code	Implementation Items	Unit	Q'ty
10	**Townscape and Architectures**		69,881
10-1	Central planning region	ha	1,689
10-2	Northern planning region	ha	22,614
10-3	Southeastern planning region	ha	11,270
10-4	Southern planning region	ha	24,399
10-5	Northwest planning region	ha	9,909
	Infrastructures and Engineering Protection		
20	Transportation	LS	1
30	Water resources	LS	1
40	Water supply	LS	1
50	Sewarage	LS	1
60	Stormwater drainage	LS	1
70	Flood protection	LS	1
80	Power & heat energy	LS	1
90	Gasification	LS	1
100	Telecommunication	LS	1
110	Solidwaste	LS	1



lead time (financial arrangement, feasibility study, basic design, detailed design, tendering, contracting etc.)

construction

: 1st priority group : 2 nd priority group : 3rd priority group

Figure 7.4.1 **Implementation Schedule for New City Center at District 13 and 14 in Townscape and Architectures, Phase I, II, and III**

No.	Name or User of Building	Type	No.of story	Unit	Q`ty (floor area)	Phase I (2001-2010) 1 2 3 4 5 6 7 8 9 ##	Phase II (2011-2020) ## ## ## ## ## ## ## ## ## ##	Phase III (2021-2030) ## ## ## ## ## ## ## ## ## ##
I	**Government Area**							
1	Residence for President	RC	4	m2	20,000		1st priority group	
2	President`s Administration	RC	17	m2	40,500			
3	Perliament	RC	17	m2	63,500		2nd priority group	
4	National Security Committee	RC	7	m2	30,000			
5	Supreme Court	RC	7	m2	40,000		3rd priority group	
6	Cabinet of Ministers	RC	7	m2	30,000			
7	Ministry of Interior Affairs	RC	7	m2	30,000			
8	Ministry of State Revenue	RC	7	m2	20,000			
9	Ministry of External Affairs	RC	12	m2	12,000			
10	Ministry of Culture, Information an	RC	7	m2	20,000			
	Public Accord							
11	Ministry of Science and High Educa	RC	7	m2	30,000			
12	Ministry of Health Care, Education	RC	7	m2	30,000			
	and Sports							
13	Ministry of Energy and Mineral Res	RC	7	m2	38,000			
	and Environmental Protection, R.K			m2				
14	Ministry of Labor and Social Securi	RC	7	m2	40,000			
	Ministry of Agriculture, Agency of R.K							
15	Ministry of Defense	RC	7	m2	20,000			
16	Ministry of Justice	RC	7	m2	20,000			
17	General Prosecutor Office	RC	7	m2	15,000			
18	SME (Small & Medium Entreprene	RC	14	m2	130,000			
19	Ministry of Transport and Commun	S	40	m2	40,000			
20	Universal Hall	RC	4	m2	66,000			
21	National Library	RC	6	m2	400,000			
22	Service Facility (Commercial Build	RC	3	m2	56,525	(1)	(2)	
	and Apartment)			m2				
	Total			m2	1,191,525			
II	**Business Area including Commercial**							
	Area							
1	Business District 13			m2	901,475	(1)	(2)	
2	Business District 14			m2	1,088,000	(1)	(2)	(3)
3	World Trade Center			m2	150,000			
4	Commercial District 13			m2	145,747	(1)	(2)	(3)
	Total			m2	2,285,222			

Legends;

Structure type of building:

S : Steel structure type

RC : Reinforced Concrete structure type

SRC : Steel Reinforced Concrete type

Implementation:

■ ■ ■ lead time (financial arrangement, feasibility study, basic design, detailed design, tendering, contracting etc.)

▬ construction

ANNEX

ANNEX

Main Technical and Economic Indicators of the Master Plan of the City of Astana (1/2)

Indicator	Unit	2000	2010	2020	2030
1. Territory					
1.1 Settlement area within the city boundaries	ha	71,000	71,000	71,000	71,000
1.1.1 Residential area		4,052	5,726	7,840	9,075
1.1.2 Government,Dipromat and New Business City		-	750	850	950
1.1.3 Expansion area of New business		-	-	-	300
1.1.4 Industrial area		7,000	7,000	7,000	7,000
1.1.5 River zone,waterbodies and Other open areas		N.A.	6,405	4,191	2,556
1.1.6 Green buffers(316m2/p to 250m2/p)		10,180	13,543	16,726	20,000
1.1.7 Buffer zones and open land (non urban areas)		N.A.	37,576	34,393	31,119
2. Population					
2.1 Population taking into account the dependent settlements	th. people	331	490	690	800
2.2 Density of population					
within the residential area	person/ha	99	109	114	118
within the city development area		82	86	88	88
2.3 Number of employed people, total	th. people	147	254	374	436
3. Residential construction					
3.1 Housing stock	th. m^2 of the total area	5,016	7,968	12,429	15,197
3.2 Maintained housing resources	th. m^2 of the total area	5,016	4,628	7,690	12,299
3.3 Demolition for redevelopment		0	388	278	130
3.4 Floor area per person	m^2/person	15	16	18	19
3.5 New residential development, total	th. m^2 of the total area	-	3,340	4,740	2,898
4. Social facilities					
4.1 Kindergartens, total/1000 people	places	8300/25	14700/30	27600/40	40000/50
4.2 Secondary schools, total/1000 people	places	52700/160	83306//170	116863/170	135324/170
4.3 Colleges, total/1000 people		7628/23	10915/33	22685/33	26269/33
4.4 Higher education, total/1000 people		33611/100	39203/80	54995/80	61522/80
4.5 Polyclinics, total/1000 people	visits per shift	4772/14,4	7350/15,0	11730/17,0	16000/20,0
4.6 Hospitals, total/1000 people	bed	2911/8.8	4312/8.8	6049/8.8	7005/8.8
4.7 Police stations(catchment area of 1PS=17500p)	No.	19	28	39	44
4.8 Fire stations	Fire-station/No. of fire engines	6/24	11/61	17/69	21/80
5. Transport					
5.1 Length of the main streets and roads, total (to be constructed after 2000)	km				
5.2.1 Special Road			3.76	3.76	3.76
5.2.2 Arterial Road			105.18	177.84	231.58
5.2.3 Primary Road			26.77	62.96	62.96
5.2.4 Secondary Road			41.29	115.86	137.96
5.2.5 Thertiary Road			19.75	67.75	79.60
5.2 Number of vechicle					
Vechicle ownership	(ver./1000 person)	92	(178)	(264)	350
Number of vechicle	ver.	29,000	(112667)	(196333)	280,000
6. Engineering equipment					
6.1 Water Supply					
6.1.1 Total water consumption (including leakage and water loss)		160,320	175,100	243,700	295,300
Drinking water	m^3/day	138,100	151,700	217,100	264,600
Technical water	m^3/day	17,800	23,400	26,600	30,700
6.1.2 Capacity of water treatment plants	m^3/day	165,000	200,000	270,000	320,000
6.1.3 Water supply sources	MCM/year	89.2	152.2	152.2	215.2
Ishim River		89.2	89.2	89.2	89.2
Iritish Karaganda Canal		-	63.0	63.0	126.0
6.1.4 Groundwater reserves confirmed by the relevant State Commission (potential)		4.4 - 6.2	4.4 - 6.2	4.4 - 6.2	4.4 - 6.2
6.1.5 Average daily consumption per capita	l/day	322	235	239	251
6.2 Sewerage					
6.2.1 Total volume of effluent	m^3/day	104,133	112,224	171,273	216,842
6.2.2 Capacity of the wastewater treatment facilties	m^3/day	136,000	136,000	176,000	218,000
6.2.3 Sewerage Service Population	person	220,100	421,400	641,700	760,000

ANNEX

Main Technical and Economic Indicators of the Master Plan of the City of Astana (2/2)

Indicator	Unit	2000	2010	2020	2030
6.3 Power supply					
6.3.1 Electoric Power Demand Forecast	GkWh/year	1.480	2.374	3.189	3.749
6.3.2 Annual average power consumption per head, including domestic	kWh	4,598	4,845	4,621	4,687
6.4 Heat supply					
6.4.1 Capacity of centralized sources	MW	1,272	1,596	1,841	2,140
6.4.2 Maximum heat energy demand forecast	Geal/hour	764	1,306	1,619	1,974
6.5 Gas Supply					
6.5.1 Natural gas consumption, total	mln.m^3/year	0.0	176.9	317.6	466.7
7. Engineering preparation of the territory					
7.1 Network length					
7.1.1 Water Supply Pipe, Dia: 150 - 1,200 mm (accumulated length to be constructed after 2000)	km		72.7	134.7	167.6
7.1.2 Pump stations of water supply (to be constructed after 2000)	unit		1	2	3
7.1.3 Sewer Pipe, Dia: 350 - 1,500 mm (accumulated length to be constructed after 2000)	km		36.1	86.6	101.6
7.1.4 Pump stations of sewerage (to be constructed after 2000)	unit		3	4	4
7.1.5 Stormwater Drainage Pipe, Dia: 500 - 1,800 mm (accumulated length to be constructed after 2000)	km		204.0	262.0	277.0
7.1.6 Pump stations of stormwater drainage (to be constructed after 2000)	unit		19	24	26
7.2 River Improvement					
Widening river cross and dike construction	km		7	21	30