

## **Chapter 17 Road Development Plan**

### **17.1 Road Network Plan**

Based on the evaluation and prioritization of the maximum network projects, the following road projects were selected for completion during the master plan period. These projects are added to the base network to constitute the master plan network.

- Arterial road projects proposed by IMM, including the tunnel roads for the builtup area
- A new transversal expressway proposed by KGM
- Widening of certain sections of the existing expressways
- New roads in the new urban subcenters in the western region such as Silivri and Tuzla
- New roads in the new residential zones about to be developed in Kucukcekmece and Buyukcekmece

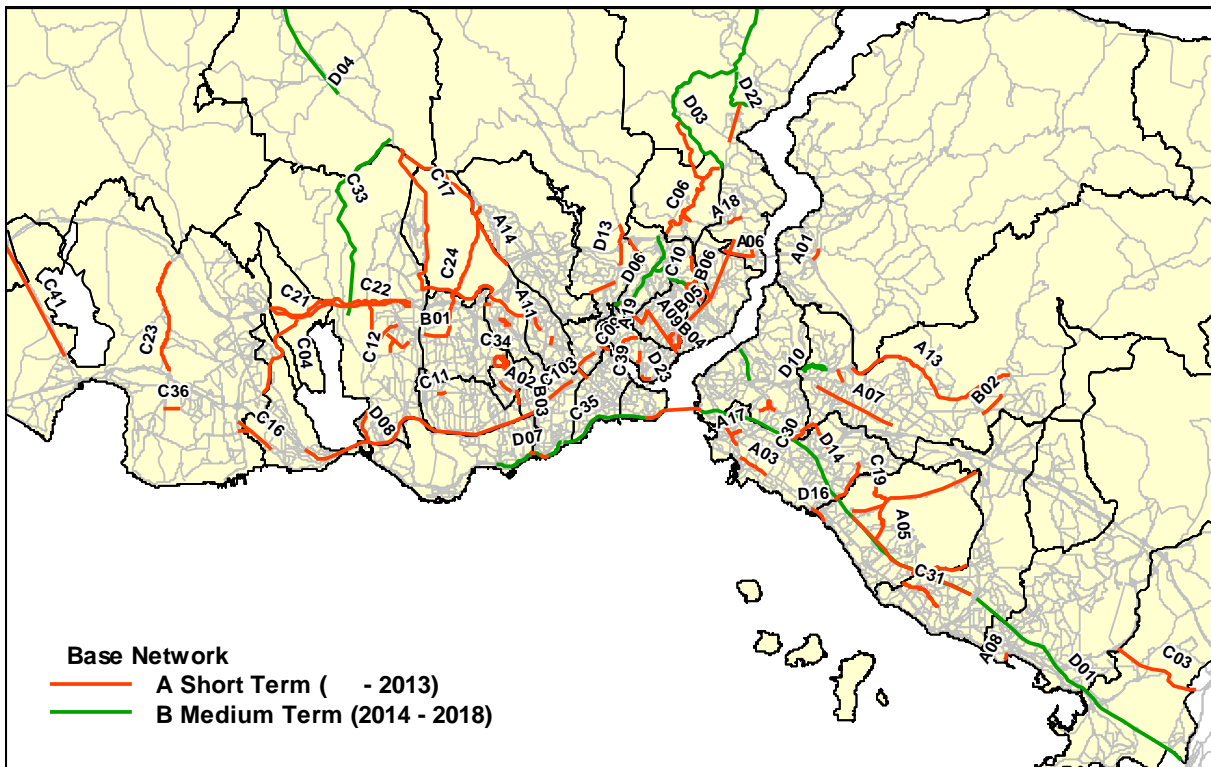
#### **17.1.1 Arterial Road Projects in the Builtup Areas**

Figure 17.1.1 shows the committed road projects included in the base network. All of them are located in the builtup areas of metropolitan Istanbul, none in the suburbs. Major projects that call for sizable investment are as follows.

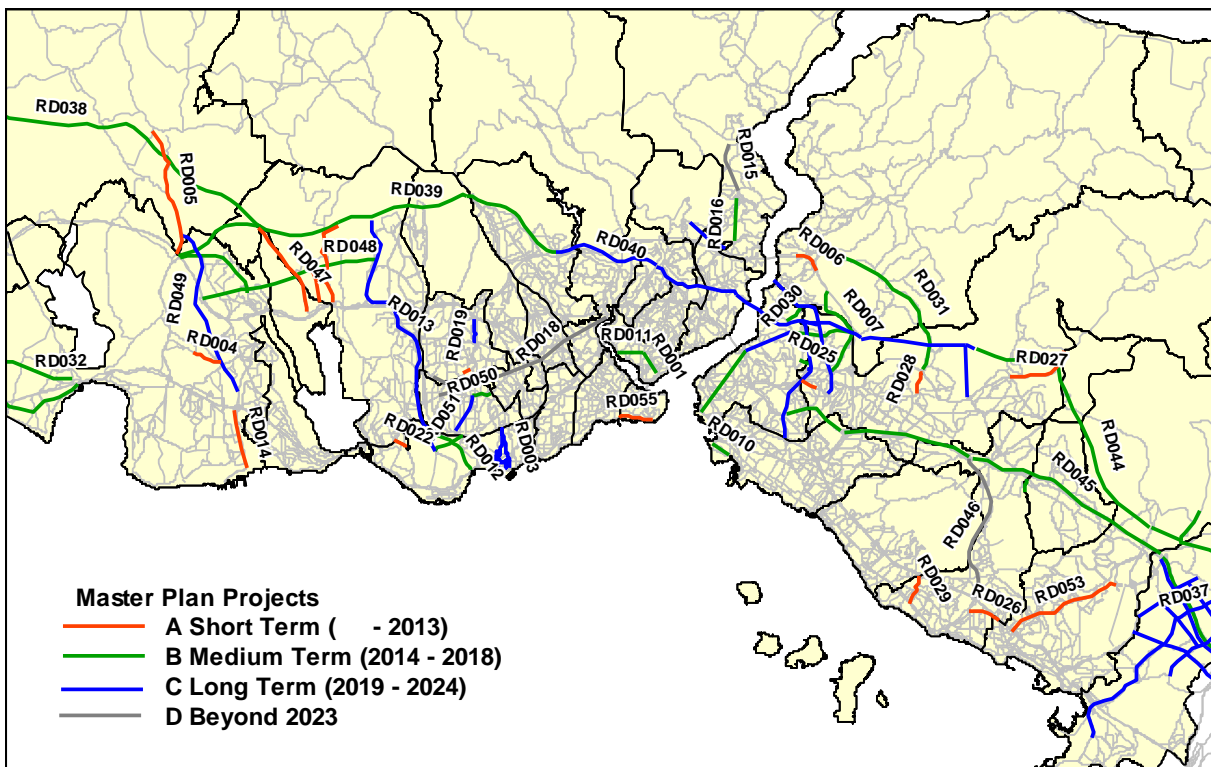
- Tunnel projects in and around the CBD
- The north – south arterial road between Istasyon Street and Kayabasi in Kucukcekmece (C33)
- The Bosphorus road tunnel to connect Kennedy Street in Eminonu and D-100 in Uskudar on the Asian side of Istanbul(B09)
- Rehabilitation of the approach roads to the Umraniye Junction of the Sile Highway(A13)
- Rehabilitation of the Zeytenbumu – Bakirkoy – Kennedy Street road (D07)
- Improvement of the Harem – Kartal section of D-100(D14)
- Widening of Cendere – Ayazaga – Buyukdere Street(C06)

Figure 17.1.2 shows the master plan projects that are located in the builtup areas. Major projects are as follows. (Refer to Figure 12.2.2 in Chapter 12 and Figure 15.3.2 in Chapter 15 in detail)

- A new transversal expressway (see section 17.1.2)
- Umraniye tunnel road (see section 17.1.3)
- Road network development for the urban subcenter in Kucukcekmece (RD047)(see section 17.1.4)
- The north – south arterial road for heavy duty vehicles in Buyukcekmece (RD049) that connects Ambarli Port and the logistic center nearby
- Widening of the Asian-side section of TEM Highway from current 6-lane road to 10-lane width.(RD045)



Source: Elaborated by Study Team based on Information of Transportation Planning Dept., IMM  
**Figure 17.1.1 Base Network Road Projects**



Source: *ibid.*

**Figure 17.1.2 Master Plan Road Projects**

### 17.1.2 Transversal Expressways

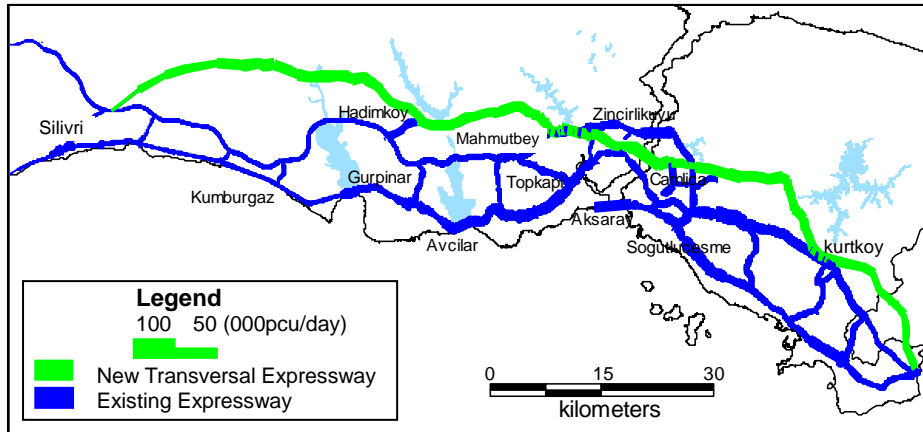
Metropolitan Istanbul extends lineally eastward and westward. The transversal movement dominates the traffic flows in the city and is destined to do so in the future. The two existing east – west expressways, TEM and D-100, will not be able to service the growing traffic before long. The need of the third transversal thoroughfare has been variously argued with proposals and counterproposals. Figure 17.1.3 shows seven alternative routes proposed by KGM for the third expressway. According to the JBIC-commissioned study on the 3rd Bosphorus Bridge in 2005 (JBIC, The Study for Construction of New Bosphorus Crossing, May 2005), the Routes 2 and 5 were judged more promising than the other alternatives. After the detailed analysis of the two, the said study found that the Route 2, though superior in its estimated demand and financial and economic internal rates of return, would involve the heavy cost of land acquisition for the right of way. The study concluded thus that the Route 5 would be more feasible. One of the justifications offered was that the said route would contribute to the northern regional development.

The Route 5 has no possibility, however, now that the IMM land use plan bans any further development in the northern region (except some part of the Black Sea coast) for environmental conservation. Even if the route should ever be selected, it runs too north to service the daily metropolitan transversal traffic. Moreover, the present master plan proposes the 3rd Bosphorus crossing bridge as both railway and road links, which precludes the possibility of having the new expressway further north from the 2nd Bosphorus Bridge. Accordingly, the present study made the transport demand forecast on the Route 2 and evaluated the new expressway.



Source: Transportation Planning Dept., KGM

**Figure 17.1.3 Alternative Routes for a New Transversal Expressway**



Source: Study Team

**Figure 17.1.4 Demand Forecast for the New and Existing Transversal Expressways (in 2023)**

Figure 17.1.4 shows the traffic forecast on three east - west expressways in 2023. The estimated daily transversal traffic assigned to the new expressway is in the range of 80,000 – 100,000pcu, very close to the capacity of a 6-lane expressway. The two existing expressways would suffer severe congestion unless the new thoroughfare should be provided.

The economic evaluation suggested high economic returns: namely, the IRR of 45% for the European side of the new expressway, 19% for the bridge crossing, 39% for the Asian side, and 38% for the entire distance from Silivri through Gebze. This evaluation assumed that the construction of the bridge would be equally allocated to the road and the railway link. If the entire cost of the bridge be part of the road construction, the IRR would be down to 15%, less feasible yet feasible enough.

The financial evaluation of the 3rd Bridge as a road link showed the IRR of 5% at the toll rate of US\$2.00/passenger car one way, and 12% at US\$4.00. This suggests that the bridge project can be implemented by the PPP scheme of financing. The actual toll rate across the bridge will have to be decided as part of the proposed TDM measure on the highway toll system.

The master plan assumes that the bridge section be completed during the period of 2019 – 2023 after the road and railway sections on the European and the Asian sides are both completed. The Bosphorus Strait is one of the prides of Turkey for its world renowned scenic beauty. Any hint of a new Bosphorus crossing raises hues and cries, about problems of land acquisition, adverse impacts on environment and scenery, policy implications for transport development and demand management and so forth. It is evidently necessary to undertake thorough studies over such issues and reflect the findings in the project formulation and design. Above all, the relevant information need be offered to any interested party for further discussion and review, in due time to foster a general consensus over the issue of the new Bosphorus crossing.

### 17.1.3 Tunnel Roads in Builtup Areas

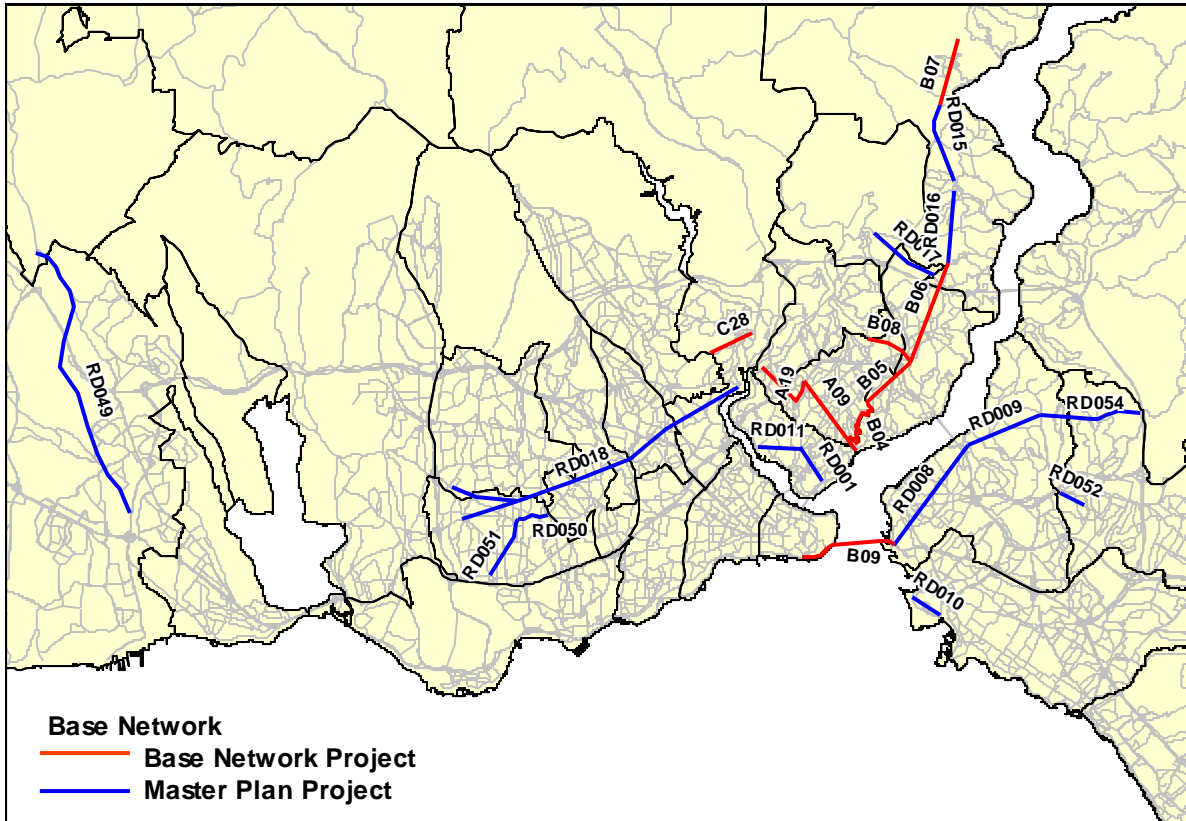
The construction of underground roads is one of the few alternatives available for the densely packed urban areas. The extreme difficulty of land acquisition in the builtup areas precludes any new road extension on the land. The construction of elevated roads is also becoming increasingly difficult to find enough space. Going underground is practically the only possibility left.

The cases of building underground or tunneled roads have been increasing in such large cities as Paris, Tokyo and Cairo. The idea of tunnel roads is a logical answer to metropolitan Istanbul that grew on the hilly terrains, where the valleys can be connected by passing tunnels through ridges and hills. There are 7 committed projects. The tunnel road of 1.4km extending from Piyalepasa to Dolmabahce (A09) is now under construction and four others (B04-B08) are in the process of bidding. Other two are under detailed designing (C26,C28). Tunnel roads will become more common before long in Istanbul. In addition, the BOT scheme is about to start the construction of the undersea tunnel across the Bosphorus Strait connecting Kennedy Street on the European side and Harem on the Asian side (B09).

**Table 17.1.1 Tunnel Road Projects**

	Code	Name
Base Network	A09	Kagithane - Piyalepasa - Dolmabahce (Inonu Stadium) Tunnel
	B04	Dolmabahce - Fulya Tunnel
	B05	Fulya - Levazim Sitesi Tunnel
	B06	Levazim Sitesi - Akatlar Tunnel
	B07	Sanyer Merkez -Cayirbasi Tunnel
	B08	Zinciridere - Levazim Tunnel
	B09	Bosporus Road Tunnel Crossing
	C26	Kagithane - Piyalepasa Tunnel Project
	C28	Eyup(Silahtaraga) - GOP cd. Tunnel,
Master Plan	RD001	Tophane - Iplikci Tunnel
	RD008	Beylerbeyi - Harem Tunnel
	RD009	Beylerbeyi - Hekimbasi Tunnel
	RD010	Kadikoy - Moda Tunnel
	RD011	Tophane - Haskoy Tunnel
	RD015	Derbent Haciosman Tunnel Project
	RD016	Armutlualti - Poligon Mah. Tunnel Project
	RD017	Armutlualti - Ayazaga Tunnel Project
	RD018	Kuyumcu Kent - Otogar - Eyup Tunnel Project
	RD049	New Truck Route for Ambarli Port - Logistic Center
	RD050	E-W Missing Linkage in Gungoren (tunnel)
	RD051	N-S Missing Link in Bahcelievler (tunnel)
	RD052	Connection Tunnel between Bosna Bulvari and Hatboyu St (tunnel)
RD054	Connection Road between New Motorway and Uskudar Tunnel (50% tunnel)	

Source: Transportation Planning Dept., IMM



Source: *ibid.*

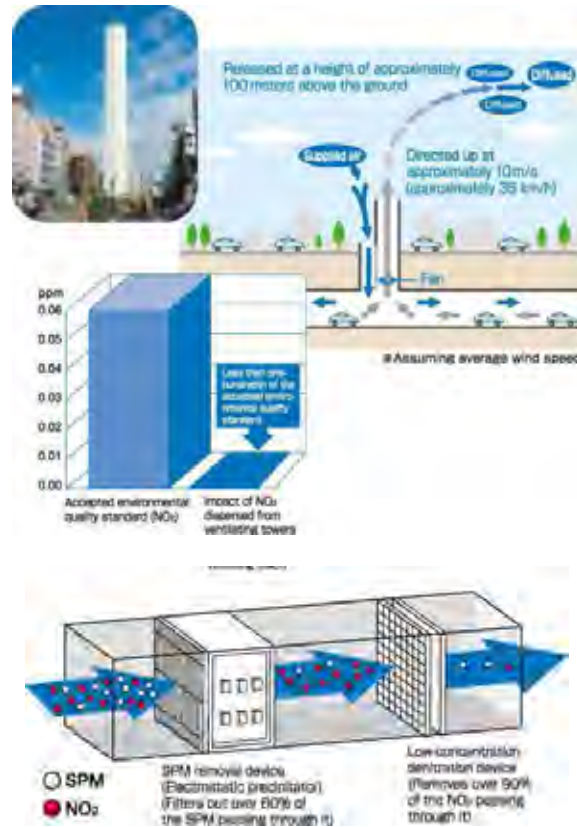
**Figure 17.1.5 Distribution of Tunnel Road Projects**

The master plan proposes 13 tunnel roads to be completed by 2023. The longest tunnel road proposed for the distance of Kuyumcu Kent – Otogar – Eyup (RD018) is estimated to cost as much as US\$330 million and thus scheduled to be completed after 2023. Long distance tunnel roads in the urbanized areas require especially careful safety and security measures. Ventilators and shelter caves must be provided for emergencies like traffic accidents and fires inside, while the tunnel structures must be sufficiently earthquake resistant. It will take some time to acquire necessary technical expertise in designing, constructing and operating long-distance tunnels. It is also important to educate car drivers about the traffic rules in the tunnels and how to behave in cases of emergency. Accordingly, it is more appropriate to postpone the tunnel road projects of long distance until ordinary drivers get well acquainted with short tunnels and learn how to behave inside the tunnels.

### Yamanote Tunnel in Tokyo

The western part of the metropolitan expressway ring was in the densely builtup area of Tokyo. The tunnel road of 30m underground was proposed because of the prohibitive cost of land acquisition. Of the total length of 11km, 7km is now in operation.

Ventilation towers as high as 45m above the ground level are provided at every 2km of the tunnel. The towers are equipped with air filters and powerful fans blow up the filtered air to the height of 100m above the ground. Reportedly, CO<sub>2</sub> of 60,000 tons, NO<sub>x</sub> of 700,000 tons and SMP of 40,000 tons are eliminated per annum by the ventilation filters.



Source: Tokyo Metropolitan Expressway Co.,Ltd

#### 17.1.4 Road Network Development in Newly Urbanizing Areas

The density of arterial roads appropriate for builtup areas varies by the geographical configuration of urban space and the traffic volume. Generally speaking, the arterial roads are provided at intervals of 1.0km to 2.0km. Therefore, the density per square kilometer ranges from 1km to 3km. The density of arterial and general roads altogether would be from 10km to 20km per km<sup>2</sup>.

The Marmara coastal area from Buyukcekmece to further west is at present sparsely populated with density ranging from 1 to 30 persons per km<sup>2</sup>, and serviced by a paltry extension of arterial roads. This western area is expected to absorb a large population increase of 2.5 million by 2023. The density will then increase to 60 persons per km<sup>2</sup> on the average, and reach 100 to 120 persons per km<sup>2</sup> in its urban subcenters. The area's

requirement of arterial roads, at the density of 1.0km to 2km per km<sup>2</sup>, would be simply enormous.

Figure 17.1.2 illustrates possible networks of arterial roads in a number of urban subcenters that are likely to develop in the said western area. The network grids are drawn mainly by following the contours of the terrains. It would be better to carry out the actual network development in the manner tried for the special development zones in Istanbul by inviting proposals from the public.

For the purpose of project evaluation and scheduling, arterial roads are bundled into project packages for six subcenters. The aggregated length of these roads is 350km, with the estimated total cost of US\$3.6 billion.

**Table 17.1.2 Arterial Road Packages in Newly Urbanizing Areas**

No.	Urbanizing Area	Length (km)	Cost (US\$ million)
RD032	Buyukcekmece	40.46	495.6
RD033	East Silivri	66.30	842.0
RD034	Silivri center	74.57	827.2
RD035	West Silivri	91.85	844.6
RD037	Tuzla	58.51	477.7
RD047	Kucukcekmece	17.50	135.8
Total		349.19	3,622.9

Source: Study Team

The arterial roads in six urban subcenters need be constructed at the earliest possible opportunity. When the urbanization picks up its pace, it will become increasingly difficult to acquire land for these roads. It is essential to draw up a city plan for each subcenter as early as possible and thereby earmark the land for roads, railways, parks and other public facilities. The recent method of constructing new roads in the old built-up areas is to pass the legislation authorizing the construction of new roads over the designated land as earmarked in the official urban development plan, and then let the existing buildings fall to ground by not allowing any new building or improvement on the land. The method is obviously not meant for the subcenters in question, but has an important implication nonetheless. It would be necessary to take precautionary steps by enacting ordinances authorizing city plans and prevent the land earmarked for economic and social infrastructure from being occupied piecemeal by incoming settlers. The investment in transport infrastructure at least must take place as early as possible to attract and absorb the population increase in metropolitan Istanbul. If the western subcenters should fail to attract and absorb because of the delayed and inadequate infrastructure investment, the old builtup areas of Istanbul would suffer the excessive pressure of population growth and sprawl outward in concentric waves to the immediately outlying periphery. Under such circumstances, the reshaping of metropolitan Istanbul into a multipolar structure, as clearly envisioned in the land use plan, will never materialize.

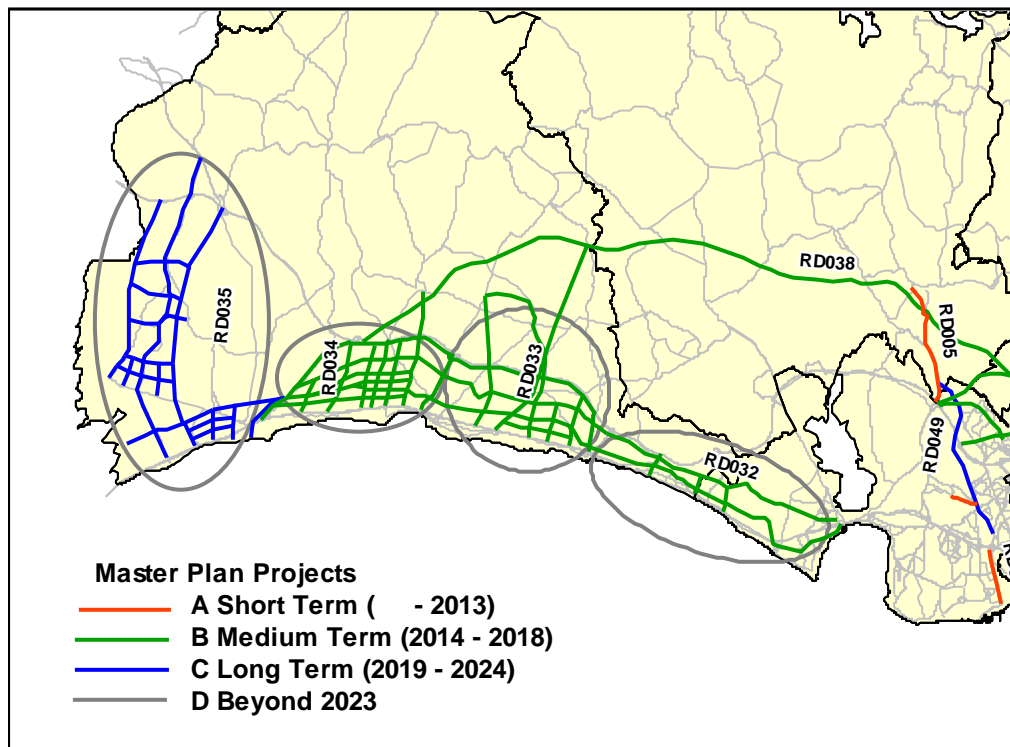
The arterial road network is urgently needed in the subcenter of Bahcesehir, where the multi-story housing development has been going on in earnest. The inflow of population will sharply increase when the on-going construction of the metro railway line of Bagcilar – Ikitelli – Olimpiyat Koyu is completed. As the residential population of this area is expected to increase to some 800,000, it is judged necessary to complete the new transversal expressway of the European side during the medium term period (2014 – 2018).



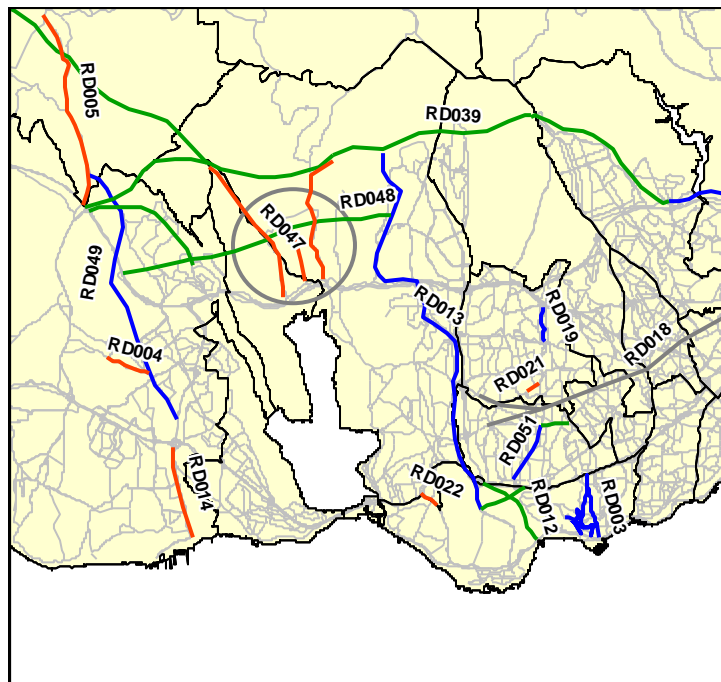
Although the arterial roads are urgently needed in all the newly urbanizing areas, it will be impossible to complete the entire 350km during the short term period. Allowing a few years for drawing up city plans with appropriate institutional development, the implementation must begin during 2009 – 2013 in the other subcenters, targeting the completion sometime during the medium term period.

Aspace with urbanization in the western Marmara coastal area, the land price will jump up to more than 25 times the present level. While the government revenue from taxes on fixed assets will increase as a result, the public expenditure on social welfare, education and health care also increase at the same time. There appears to be no reason to refuse out of hand the possibility of raising fund for infrastructural development from the expected land price boom.

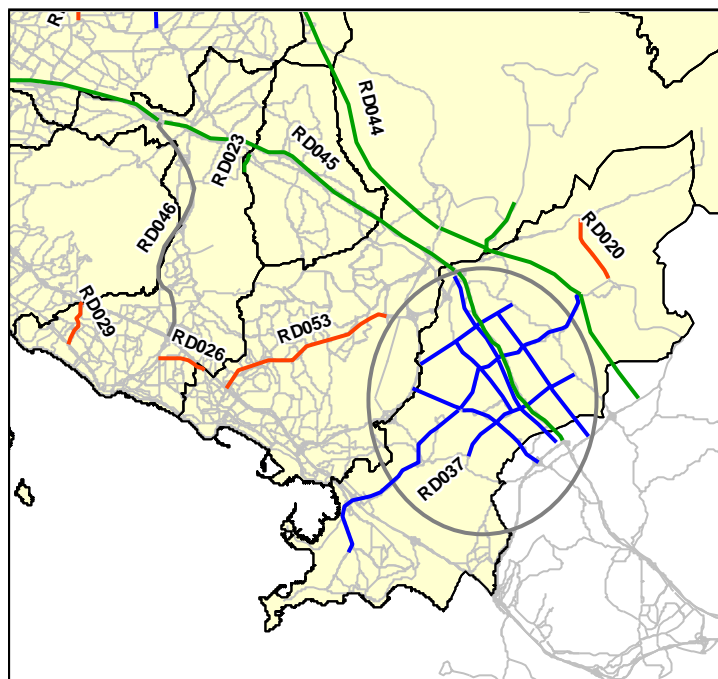
IMM itself does not have the mandate to take direct advantage of the situation. Instead, the present study proposes the establishment of a non-profit third sector body that will undertake the land development and the construction of multi-story residential and office buildings to sell at market price. The proposed body, tentatively called “West Istanbul Urban Development Corporation (WIDEC)”, will internalize the profits from real estate dealings to invest in local economic and social infrastructure. The proposed institutional development will partly solve the financial constraint on the master plan implementation. If the proposed organization needs the business acumen for real estate development and marketing, it is as well to head hunt appropriate persons from the private sector or to invite the participation of private capital. The said organization will probably require some legislation of limited duration, say about 20 years.



a) Buyukcekmece – Silivri – Gumusyaka



**b) Kucukcekmece Area**



**c) Tuzla Area**

Source: Elaborated by Study Team based on IMM/KGM Information.

**Figure 17.1.6 Arterial Road Networks for New Urban Subcenters**

## 17.2 Intersections and Junction Plan

IMM is implementing many intersection improvement projects covering almost all the urban area of Istanbul. The total number is 122 projects at various stages from under study to under construction.

Some of them are involving construction of underpass or viaduct in order to improve the traffic flow at the corresponding intersection, some are expanding the intersection area to make additional lanes or construction of additional ramps to the junction.

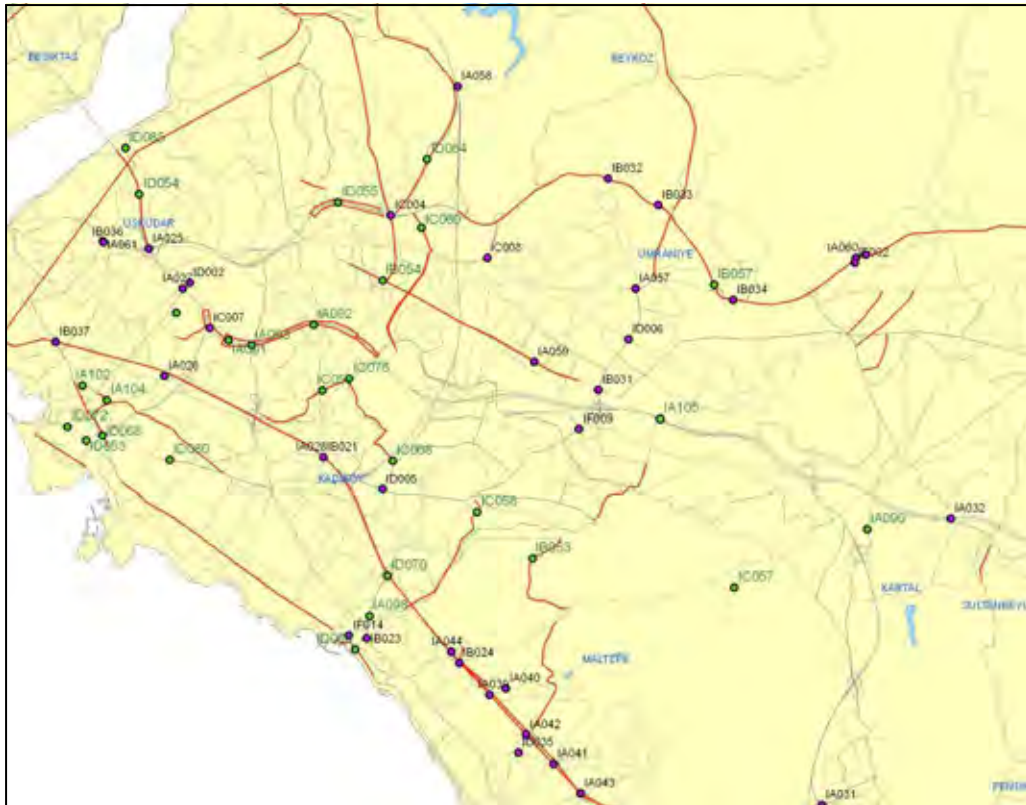
Among the 122 projects, 73 have been approved already by the city council though some of them are still at the design stage.

The location maps of the intersection projects are shown in Fig17-2-1 and Fig17-2-2.



Source: *ibid.*

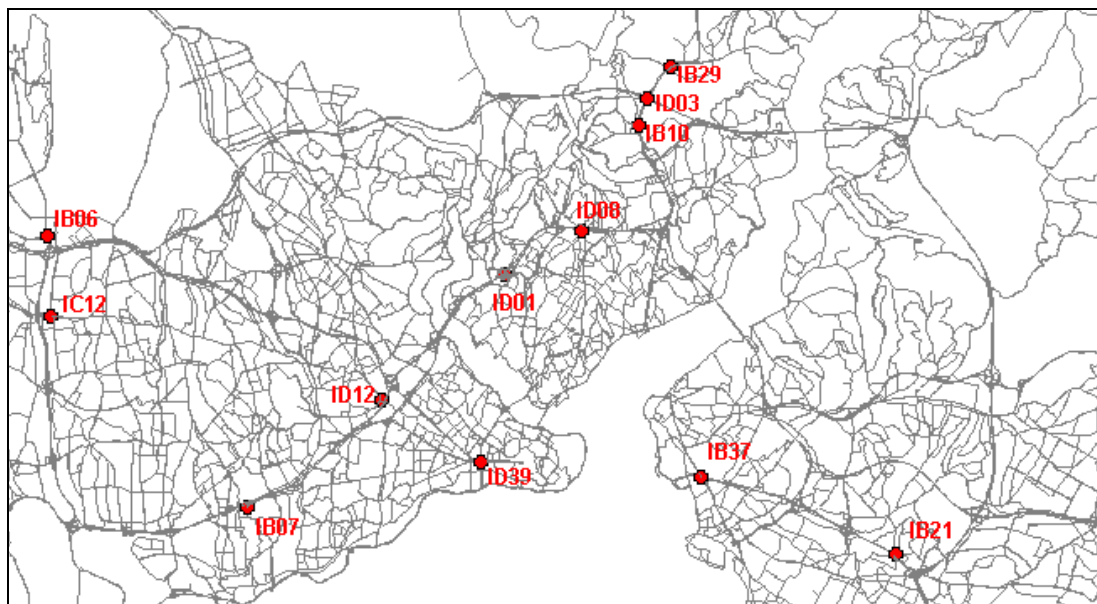
**Figure 17.2.1** Intersection Improvement Projects in European Side



Source: *ibid.*

**Figure 17.2.2 Intersection Improvement Projects in Asian Side**

Above intersection projects include the following 12 intersection projects, which are either planned or implemented to cope with the congestion problems which have been identified as the most serious locations in the city as explained in Chapter 23. Most of them are either located in the CBD area or located at the entrance points/ road sections connected to Motorways. (refer to Figure 17.2.3)



Source: *ibid.*

**Figure 17.2.3 Intersection Projects at Congested Point/Road Section**

**Table 17.2.1 Contents of the Intersection Projects Corresponding to Fig**

Project No.	Intersection Project	Status	Contents
1	IB6 Mahmutbey Ataturk st. Junction organization underpass 2. branch construction	U.Constr.	Grade separation of level crossing and construction of additional connection ramps to Istoc Cevre Yolu
2	IB7 Bahcelievler Yayla junction and Unverdi junction construction	U.Constr.	Construction of viaduct crossing over D100
3	IB10 4.Levent Industry junction and branch roads construction	U.Constr.	Minor improvement of service roads and connection overpass between service roads at both sides
4	IB21 Kadikoy Yenisahra underpass linkage roads and common infrastructure construction	U.Constr.	Construction of underpass of D100 at the side of Workshop of Kadikoy-Kartal rail
5	IB29 Ayazaga junction road and average infrastructure construction	U.Constr.	Construction of interchange to connect Ayazaga Cendere road with Buyukdere St.
6	IB37 Uskudar county in front of hospitals E5 bridge junction and linkage roads construction	U.Constr.	Construction of additional clover leaf ramp of interchange D100/Dr.Eyup Aksoy Rd
7	IC12 Ikitelli Bridge (underpass) project	D/D Cimplt.	Construction of Connection ramps of interchange at Media Corridor ad Halkali Road and Tosocagi Rd
8	ID1 Kagithane, Okmeydanı Junction and surrounding road junction project	Under D/D	Construction of additional ramps of interchange at D100 / Halic Sahil Rd
9	ID3 Kagithane, War Academy Junction and Surrounding Road Junction Project	Under D/D	Construction of additional ramps of interchange at TEM / Buyukdere Rd
10	ID8 Sisli, Darulaceze st.- Abidei Hurriyet st. intersection road junction project	Under D/D	Grade separation of level crossing intersection near D100 in Sisli
11	ID12 Zeytinburnu, Topkapı Maltepe road- Topkapı street intersection, road junction project	Under D/D	Grade separation of level crossing intersection near D100 in Zeytinburnu
12	ID39 Aksaray square and Surrounding Road Junction Project	Under D/D	Improvement of alignment of Vatan Road and circulation system around Aksaray square

Source: Transportation Planning Dept., IMM

These projects are mainly intending to alleviate the traffic congestion at the intersections near the entrance of Motorways or important intersections in CBD by changing from level crossing to grade separated type or providing additional ramps at the junction.

In addition to the above projects, JICA study team proposes the improvement of the following intersections.

- Taksim Square
- Mecidiyekoy

1) Taksim Square

(1) Present Condition

Taksim Square is located at the center of new CBD area, therefore many bus routes are either originated from or dropping in this point. Tarlabasi St./Cumhuriyet St./Buyukdere St., is the most important street passing through the new CBD area linking Taksim with Sisli District and D100 Motorway at North and the old CBD at south. In addition, it is also crowded with lots of pedestrians including transfer passengers between buses and metro.



Source: Study Team

**Figure 17.2.4 Location Map of Taksim Square**

IMM has announced the plan to change the Square into a pedestrian zone and integrate the square with Gezi Park by closing the short pass, Tak Zafer St. connecting Tarlabasi St. and Mete Cad for the sake of pedestrian's safety and conveniences. It is also including the traffic circulation plan using Tarlabasi St./Cumhuriyet St., Asker Okagi St. and Mete St. which are surrounding the Square and Gezi Park.

Once the plan is implemented, pedestrians will be able to walk from Istiklal St. to Gezi Park without meeting any vehicle traffic.

## (2) Improvement Plan

Based on this concept, the study team proposes the following improvement plan.

Firstly an underground bus terminal will be built under the Gezi Park in order to accommodate all the buses using the existing bus terminal in the Taksim square.

The bus terminal is proposed to be developed just above the metro station, which is located sufficiently deep under the ground level. Then it will enable the transfer between metro and buses much easier and safer. The entrance to the bus terminal will be built at both side of the terminal; one will be at Cumhuriyet St. the other will be at Mete St. The exit from the bus terminal will be created at a little north of the entrance point on the Cumhuriyet St. Since the ground level of Gezi Park is topographically higher than the Taksim Square, the underpass will not be so deep under the ground.

Secondly, a one-way underpass for vehicles will be built from Mete St. to Tarlabasi St. for enabling the direct access between the two circulation roads as well as the U-turn from Tarlabasi St, which is currently possible by using the short pass in the Taksim Square.

The entrance of the underpass will be same as the buses for the bus terminal. The exit point of the underpass will be developed at a little south of bus terminal entrance on the Cumhuriyet St. At the exit point, a traffic signal should be installed to allow the left-turn traffic from the underpass.

This underpass is proposed as a one-way, because the Mete St. as well as the connecting road Sira Sevilir St. is too narrow.

Thirdly pedestrian crossings will be installed across the Tarlabasi St./Cumhuriyet St. and Mete St. They will be either zebra crossings and signal control or pedestrian underpasses.



Source: *ibid.*

**Figure 17.2.5 Proposed Improvement Plan of Taksim Square**

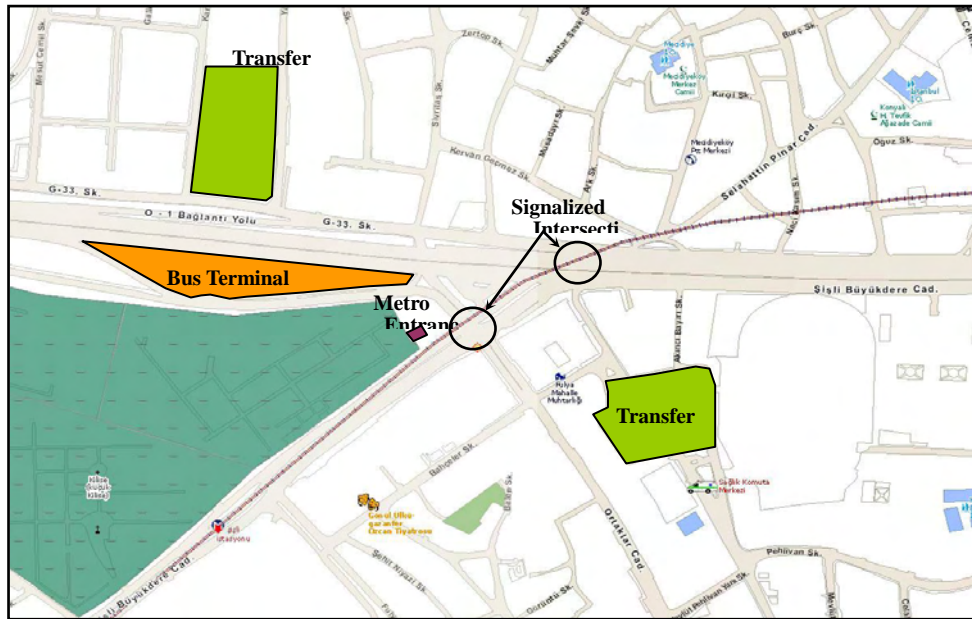
2) Mecidiyekoy

(1) Present Condition

Mediciyekoy is located at the crossing point between the Buyukdere St. and D100 Motorway in the new CBD area. Mediciyekoy intersection is one of the bottleneck points caused by the large traffic demand on Buyukdere St., and those merging from and entering into D100 motorway and lots of transfer passengers between buses and metro.

In addition, this point is composed of two neighboring traffic signal intersections, Butyukdere St./Abide Hurriyet Mecidiekoy road and Buyukdere St./G-33.Sk therefore, in most cases the traffic along the Buyukdere St. has to make a stop two times at the signals.

The entrance/exit of metro in Mediciyekoy is currently located at the corner of the former intersection. There are bus stops at the opposite corners of the metro entrance/exit in addition to the bus terminal along the Abide Hurriyet Mecidiekoy road. There are many transfer passengers among buses and metro, who have to cross the congested streets.



Source: *ibid.*

**Figure 17.2.6 Location Map of Mecidiyekoy**

IMM has two transfer centers development plan: one is located at the north side of D100, which is under construction already. The other one is located at the existing bus terminal next to the Stadium. The former one will accommodate the buses operated along the side road of D100 and some of buses using the bus terminal along the Abide Hürriyet Mecidiyekoy road.

In addition, a new metro line is planned to be developed: According to the plan, the metro line Kabatasi – Besikitas - Sisli – Givimkent – Bağcılar will be constructed a little south of the intersection Büyükdere St./Abide Hürriyet Mecidiyekoy road. Accordingly the new metro entrance/exit will be built along Büyükdere St. and the adjacent point of the planned transfer center near the Stadium.

## (2) Improvement Plan

The main objectives of the improvement at Mecidiyekoy are as follows:

- To mitigate the traffic congestion and create a smoother traffic flow at the intersection
- To develop a safe and convenient pedestrian network particularly for the transfer passengers

The main flow at Mecidiyekoy is the traffic from Taksim to Bosphorus Bridge for Asian side or to Beikitas via Sisli along the Büyükdere St. and vice versa.

Therefore it is proposed to construct an underpass for the vehicle traffic along the Büyükdere St. in order to cross the two neighboring intersections without stop. By doing so, longer green time of the traffic signals can be allocated for the turning traffic at the intersections.

The entrance/exit of the underpass will be built at about 150 m south of the intersection between Büyükdere St. and Abide Hürriyet Mecidiyekoy road at one side, and at about 150m



east of the intersection of Buyukdere St./G-33.Sk at the other side. At the latter side, the entrance of the underpass will be developed by using the left lane of the four lanes toward Mecidiekoy, while the exit will be built by using the right lanes out of the three lanes under the D100 viaduct toward the Bosphorus Bridge for the convenience of the diverging traffic to the side road of D100.

The number of lanes for the underpass will be two lanes for the northward/eastward and one lane for the other direction, taking into account of the current road conditions.

For meeting the second objective, pedestrian network will be developed among metro stations, transfer center and bus stops. For this purpose, a pedestrian underpass will be constructed between the transfer centers at G-33.Sk.and the bus terminal at Abide Hurriyet Mecidiekoy road. The pedestrian underpass will be constructed from the bus terminal to the Mecidiekoy Square, where the entrance/exit of existing metro line is installed at the corner of the intersection Bukdere St. - Abide Hurriyet Mecidiekoy road.

The Mecidiekoy Square will be an open cut space exclusively for the pedestrians and will be accessible also from the ground level by using stairs or escalators.

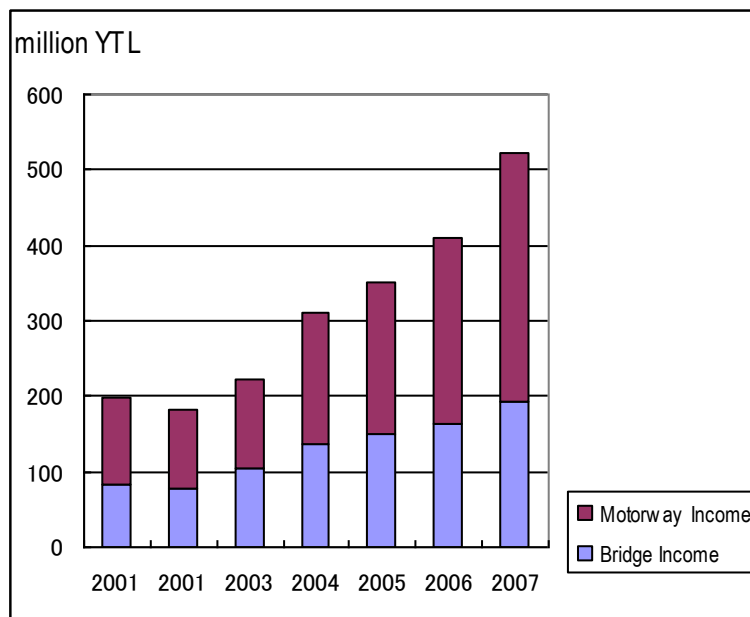
The pedestrian underpass will be further extended from Mecidiekoy Square to the bus stops or transit center located at the opposite side of Buyukdere St.

### 17.3 Operation and Maintenance

#### 17.3.1 Motorway and Bridges over the Bosphorus

The TEM highway and two bridges over the Bosphorus have been operated and maintained by the KGM under the Ministry of Transport as stated earlier.

The net income from the toll on the motorway and two bridges has steadily increased as shown in Fig17.3.1.



Source: KGM

**Figure 17.3.1 Annual Toll Income**

All the income after deducting the operation cost once goes to Ministry of Treasury and allocated again as a budget for the highway development or maintenance.

The operating right of these assets, however is presently under the privatization process by Privatization Administration, the executive government body for privatization. The operating rights will include the operation of two bridges over the Bosphorus and the motorway nearly 2000 km in total length and some ancillary facilities. A draft of legislation calling for private bids on the operation right is awaiting parliamentary approval. These assets will be operated by the successful bidder for 25 years under the supervision of KGM. The collected toll income will be transferred to the Ministry of Treasury after deducting the expense of Privatization Administration. Many global companies are interested in the privatization project.

The maintenance of the assets is usually included in the contract in order to give the incentive to the successful bidder in other countries. But it is still uncertain depending on the proposal from the bidders which may include various factors such as toll rate, bidder's share, minimum guarantee etc. Therefore the maintenance will be done either by the successful bidder based on the contract under the supervision of the KGM or the KGM itself as before.

The new motorway and the Third Bosphorus Bridge proposed in the Master plan are also likely to be privatized. It is still unknown whether the operation of the new motorway and the new bridge is entrusted to the same company as the successful bidder of the existing assets.

### **17.3.2 Road Tunnel crossing the Bosphorus**

The road tunnel crossing the Bosphorus is still at the tendering stage at present. The total tunnel length will be 5.4 km including the section of 3.3km under the water. It is to be implemented as a BOT project.

The operation and maintenance will be probably done by the successful bidder in accordance with the contract with the Central Government.

It will be used only for light vehicles such as passenger car, van, minibus etc. The toll rate will be reportedly 4 YTL for one way at maximum, which is double of the current rate for the Bosphorus Bridge if charged in both ways.

It is anticipated that the successful bidder will be not same as the company in charge of Bosphorus Bridge, the road tunnel may have a competitive relationship with the Bridge, which may affect the future toll rate increase.

### **17.3.3 Other Roads**

The arterial and semi-arterial roads will increase as long as 484km by realizing the master plan network.

Since the total length of the existing arterial roads is 4100km, the incremental length will be approximately 12% of the existing length. The maintenance work of all the municipality roads have been done under the responsibility of Department of Transport, IMM. For the new roads as well, the same section will be in charge for the maintenance. For the purpose of the road maintenance, about 400 million YTL has been spent per year, therefore it is expected to increase to about 450 million YTL per year.

## 17.4 Pedestrian Friendly Environment

### 17.4.1 Background

The Kadikoy area, located on the Asian side of Istanbul, functions as one of the important transportation nodes in the metropolitan area. It provides two terminals for intra-city bus service, two terminals for mini bus, two dolmus terminals and a few ferry terminals. The traffic volume through this area is one of the largest among the transport nodes in Istanbul, reaching several thousand persons during rush hours. Pedestrians are forced to weave perilously through automobile traffic to access one of the available bus services.

There are many other transport nodes for bus, tram and metro-bus services where pedestrian safety and convenience are largely neglected as in Kadikoy. Tram stations built in the median are difficult to access, and many bus stops as well as tram stations force users to ignore the red light and jaywalk at their own risk. Pedestrian safety and convenience at transport nodes are essential to increase the users of public transport services. It is one of the urgent issues for the city administration to cope with in the short to the medium term.

Based on this understanding, the present study undertook a social experiment in the Kadikoy area with the aim of improving the pedestrian environment.



Source: Study Team

**Figure 17.4.1 Dangerous Pedestrian Crossing**

### 17.4.2 Problems at Kadikoy Terminal Area

#### 1) Car Parking

There are numerous double parked vehicles at the road side; taxis, private cars and minibuses. Some vehicles are parking on the pedestrian crossing hindering crossing pedestrians. These illegally parked vehicles cause traffic congestion endangering pedestrians.



Source: *ibid.*

**Figure 17.4.2 Illegally Parked Vehicles**

## 2) Non-Pedestrian-Friendly Traffic Signals

There are three big pedestrian crossings in Kadikoy area. The green time of the traffic signals is not enough for pedestrians to cross the road, and the signal pattern is not convenient for pedestrians, because these are set up on vehicle-priorities.



Source: *ibid.*

**Figure 17.4.3 Three Intersections at Kadikoy Terminal**

The width of the pedestrian crossing is not enough as composed to the number of pedestrians. So many pedestrians need to cross the road outside the designated crossing points.



Source: *ibid.*

**Figure 17.4.4 Crossing Pedestrians Outside the Designated Crossing Point**

## 3) Pedestrian Path Inconvenient for Pedestrian

There are some construction areas at present in Kadikoy. The construction walls installed there limit the walking space endangering the pedestrians.



Source: *ibid.*

**Figure 17.4.5 Inconvenient Pedestrian Path**

4) Barriers for Handicapped People

There are various barriers for the handicapped at some pedestrian crossings.



Source: *ibid.*

**Figure 17.4.6 Barriers for Handicapped People**

5) Countermeasures

As noted above, there are many problems that need to be improved for convenient and safe pedestrian environment in Kadikoy. And the following countermeasures will be needed to improve for the pedestrian friendly environment.

**Table 17.4.1 Countermeasures**

Problems	Countermeasures
a. Illegal Car Parking	a-1. Enforcement on illegal road side parking a-2. Control of road side parking
b. Unfriendly Traffic Signals for Pedestrians	b-1. Widening of pedestrian crossing b-2. Change of signal patterns toward pedestrian-priority
c. Inconvenient Pedestrian Path for Pedestrians	c-1. Provision of slope for the handicapped c-2. Widening of pedestrians path
d. Barriers for the Handicapped	d-1. Making guideline for handicaps d-2. Making usefulness facilities

Source: *ibid.*

**17.4.3 Outline of Pre-study: Pedestrian Friendly Metropolitan Municipality at Kadikoy.**

1) Purpose

The purpose of the experiment was to suggest a guideline for the pedestrian environment easily and safely accessible by users of public transport services. The findings at Kadikoy were expected to offer useful pointers for other major transport nodes in the metropolitan area.

2) Period of Experiment

The experiment was conducted on weekdays (Monday through Friday) over one week in

late July 2008 for six hours every day, namely, three morning peak hours from 6 to 9 o'clock and three evening peak hours from 18 to 21 o'clock.

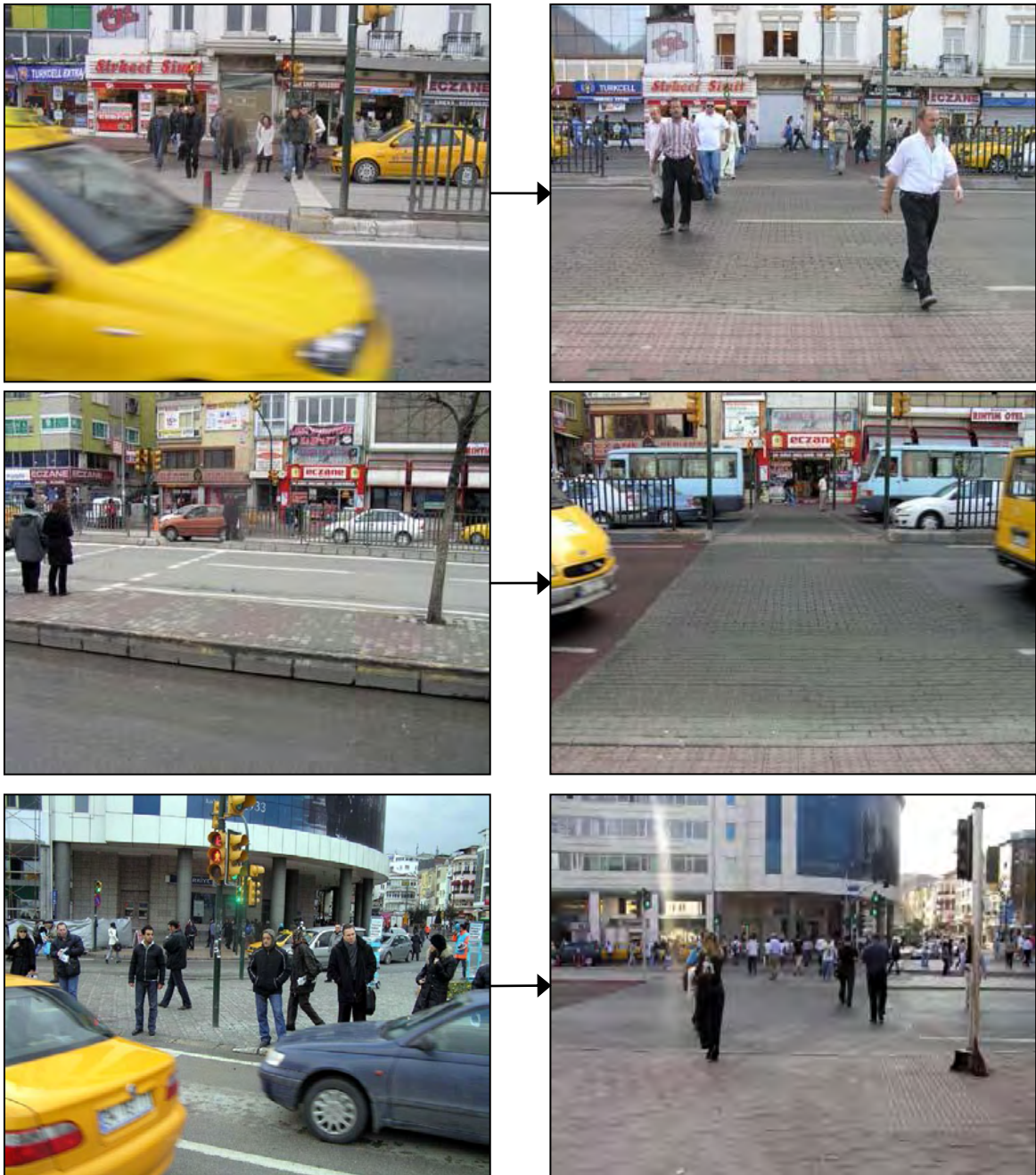
### 3) Outline of Experiment

Three major intersections with traffic signals were selected in the Kadikoy area as shown below and the following three steps were taken at each intersection.

To change the green phase of the traffic signal to let pedestrians take more time for crossing

To widen the crosswalks and improve the pavement thereof

To provide barrier-free pedestrian crossing



Source: *ibid.*

**Figure 17.4.7 Experimental Changes at Three Selected Intersections**

#### 17.4.4 Outcome of the Experiment and Major Findings

Opinion surveys of this pre-study have been implemented for pedestrians and neighborhood during implementation. The aims of these opinion surveys are to evaluate before implementation and after implementation. Three hundred (300) pedestrians and one hundred twenty (120) neighbors and were randomly interviewed before and after the implementation.

**Table 17.4.2 Opinion Survey Results**

		Before		After	
		Yes	No	Yes	No
Is it easy to walk on the street?	Pedestrian	54 (52.9)	48 (47.1)	61 (62.1)	42 (37.9)
	Neighborhood	276 (66.2)	141 (33.8)	314 (43.7)	404 (56.3)
Is it easy to cross street at signalized crossing?	Pedestrian	46 (44.7)	57 (55.3)	92 (89.3)	11 (10.7)
	Neighborhood	252 (37.7)	416 (62.3)	358 (85.6)	60 (24.4)
Is there enough area to walk?	Pedestrian	75 (72.8)	28 (27.2)	83 (80.6)	20 (29.4)
	Neighborhood	293 (69.9)	126 (30.1)	321 (76.6)	98 (23.4)
Scoring (from 1 to 10)	Pedestrian	5.12		8.00	
	Neighborhood	4.77		7.64	

Note: ( ) %, Neighborhood means residents or workers in the area adjustment to the project  
 Source: Opinion Survey conducted by Study Team.

The experiment was able to substantiate the favorable outcome of three changes made at the selected intersections. However, it must be noted that the positive outcome of the changes were observed only during the week for the experiment when the police effectively controlled the automobile traffic at the intersections. After the study was over, taxis quickly reverted to the roadside parking to wait for fares and other motorized vehicles began illegal parking and stopping along the approaches to each intersection. Consequently, the safety and convenience of pedestrian crossing were lost in no time. It is obvious that the three measures taken at the intersections are not sufficient by themselves to ensure the safety and convenience for pedestrians. The continued police surveillance over automobile drivers is indispensable to sustain their favorable impact.

The interviews with local residents and crossing pedestrians found that more than 80% of them thought the crossing much easier than before. Their approvals stressed that the three changes are important to improve the ease and safety of transfer from one bus service to another. They expressed their opinions that the pedestrian-friendly crosswalks must be provided at other intersections in Istanbul.

The traffic survey conducted in the area around the three intersections found that no obvious traffic congestion resulted from the experiment. No complaint was heard from the bus and mini-bus drivers and the Dolmus operators.

Some interviewees voiced that the pedestrian crossing was as difficult as before in the vicinity of bus, mini-bus and Dolmus terminals despite the improvement made at three intersections.

#### 17.4.5 Conclusion and Recommendation

The decrease of motorized traffic and the increase of more livable urban space are achievable in the metropolitan area by implementing pedestrian-friendly improvements

with sufficient provision of space for pedestrian movement. The introduction of such relatively small measures in the wider metropolitan area will ensure in the end the much less obstructed and more comfortable pedestrian mobility in the built-up areas and foster the willingness among people to use public transport services instead of private automobiles.

It is often argued in Istanbul that exclusive pedestrian streets, widened crosswalks and other pedestrian-friendly measures will end up slowing down the average speed of driving and worsening the already bad traffic congestion. That is why it has been difficult so far to adopt such measures. However, it will become increasingly crucial in the future to provide environmentally less harmful and more varied public transport services that promise easy access and flexible choices of mobility for the metropolitan population and thereby to reshape the metropolitan space away from the excessive dependence on automobiles.

And the following transport measures that have not been improved in this pre-study will be needed to implement in the future.

- To prevent or discourage illegal parking of all modes along the streets
- To designate loading and unloading areas for taxis and private cars
- To train and empower traffic police officers