



October 23, 2010

Project: 379-101

Mr. Hashem Ghadaki  
Life Construction Inc.  
330 Hwy #7 East, PH5  
Richmond Hill, Ontario  
L4B 3P8

Re: **EDEN PARK 2**

Dear Hashem;

Further to our telephone conversation this letter will summarize our findings on an Aquifer Thermal Energy Storage (ATES) system at Eden Park 2. We will document our findings in more detail in a report on the drilling of test wells at Eden Park 2.

We understand that the Times Group propose to heat and cool Eden Park 2 with a pilot ATES system. As the first step in the specific development process, we drilled 3 wells into the aerially extensive aquifer known as the Thorncliffe Formation. These wells were drilled to a depth of about 60 m (200 ft) at approximately the Southwest, North Central and Southeast extremities of the site, see **Figure 1**. Each of the boreholes was equipped with a 50 mm (2 inch) diameter PVC casing and screen and was sand packed with #00 silica sand. The next stage was to install a 150 mm (6 inch) diameter well which was to be pumped to determine the aquifer characteristics and measure the sustained groundwater temperature.

The drilling of the 3 monitoring wells clearly identified the thickness and permeable nature of the aquifer. We are confident without conducting the pumping tests that adequate aquifer exists to heat and cool the condominium building.

It was also apparent to us that the footprint of the Eden Park 2 parking garage occupies the entire site. Also the building is oriented in an east-west direction and we know that groundwater flow is north to south.

The permeability of the aquifer will allow us to pump warm water from the Westerly portion of the site, recover energy then discharge the cool water into wells on the easterly portion of the site. The problem that occurs at this site is that the cooler water that is discharged will have flowed beyond the reach of the cool water pumping wells 6 months later (in the summer). Similarly cool water pumped in the summer, into which energy from the building is transferred, will be discharged into the "warm water recharge wells". This water will flow naturally beyond the reach of warm water pumping wells before the next winter. Therefore the balancing of the recharge and discharge to enhance energy capture and recovery was not going to work because of the natural flow of the groundwater.

A second problem relates to the location of the wells. Eden Park 2 has a 3 level underground parking garage, which extends to the property limits in all directions. That means that all wells would be located in pits in the basement (P3). This means there would be little available depth below P3 to the static level in a recharge well [the well would be about 9 m (30 ft) lower than the ground surface].

With all of these factors being taken into account the following are our general conclusions and recommendations.

### **Conclusions**

Based on the drilling and testing completed to date at Eden Park 2 we conclude that:

1. The highly permeable Thorncliffe Formation aquifer exists at the site,
2. The apparent permeability and aquifer thickness will support a groundwater source pumping and recharge system,

3. Groundwater flow is to the South,
4. The Eden Park 2 site is oriented East to West,
5. Cool water recharged in the winter will have flowed beyond the reach of the recovery wells before the next summer (and vice versa),
6. The Parking Garage footprint at Eden Park 2 occupies the entire site,
7. Operation of recharge wells within the parking garage will require many more recharge wells,
8. Operation of a successful Pilot Project at this site will be compromised by the horizontal and vertical constraints at this site.

### **Recommendations**

Based on the above comments and conclusions it is recommended that:

1. Installation and operation of a pilot geothermal energy system at this site is not advisable due to the above stated constraints,
2. Installation and operation of a pilot ATES system is feasible at other larger sites in the Markham area where the aquifer exists and where larger property is available so recharge facilities can take advantage of the deeper static levels (from ground surface). An ATES system could also be used at a site, for instance, where warm water and cool water flush mounted recharge wells were located in say an up-gradient adjacent park.

**Summary**

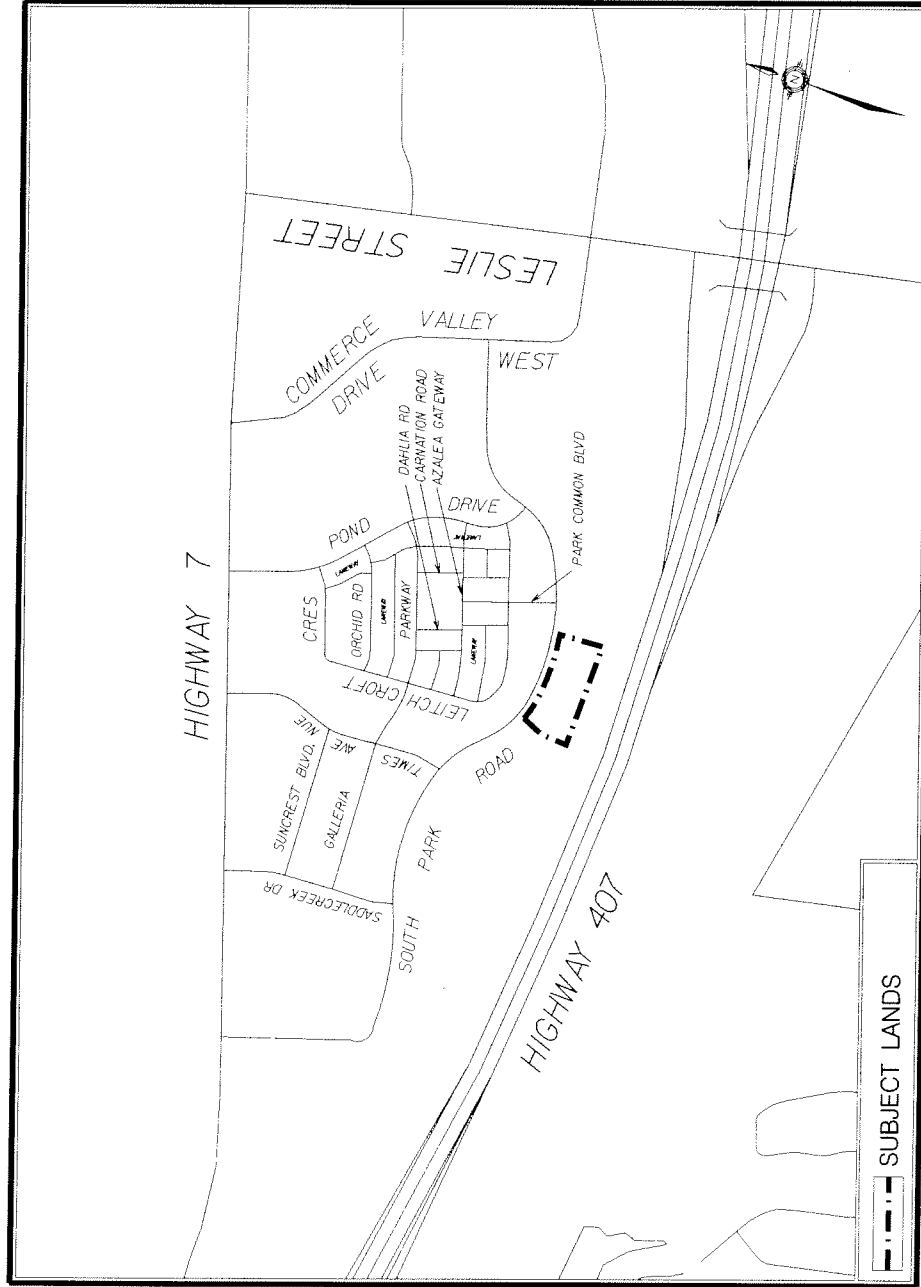
In summary the concept of heating and cooling condominiums using an enhanced groundwater sourced energy (ATES System) is sound and viable in the Markham area, however, the geometry at Eden Park 2 does not permit the construction of an efficient Pilot Project. A more comprehensive report is being prepared.

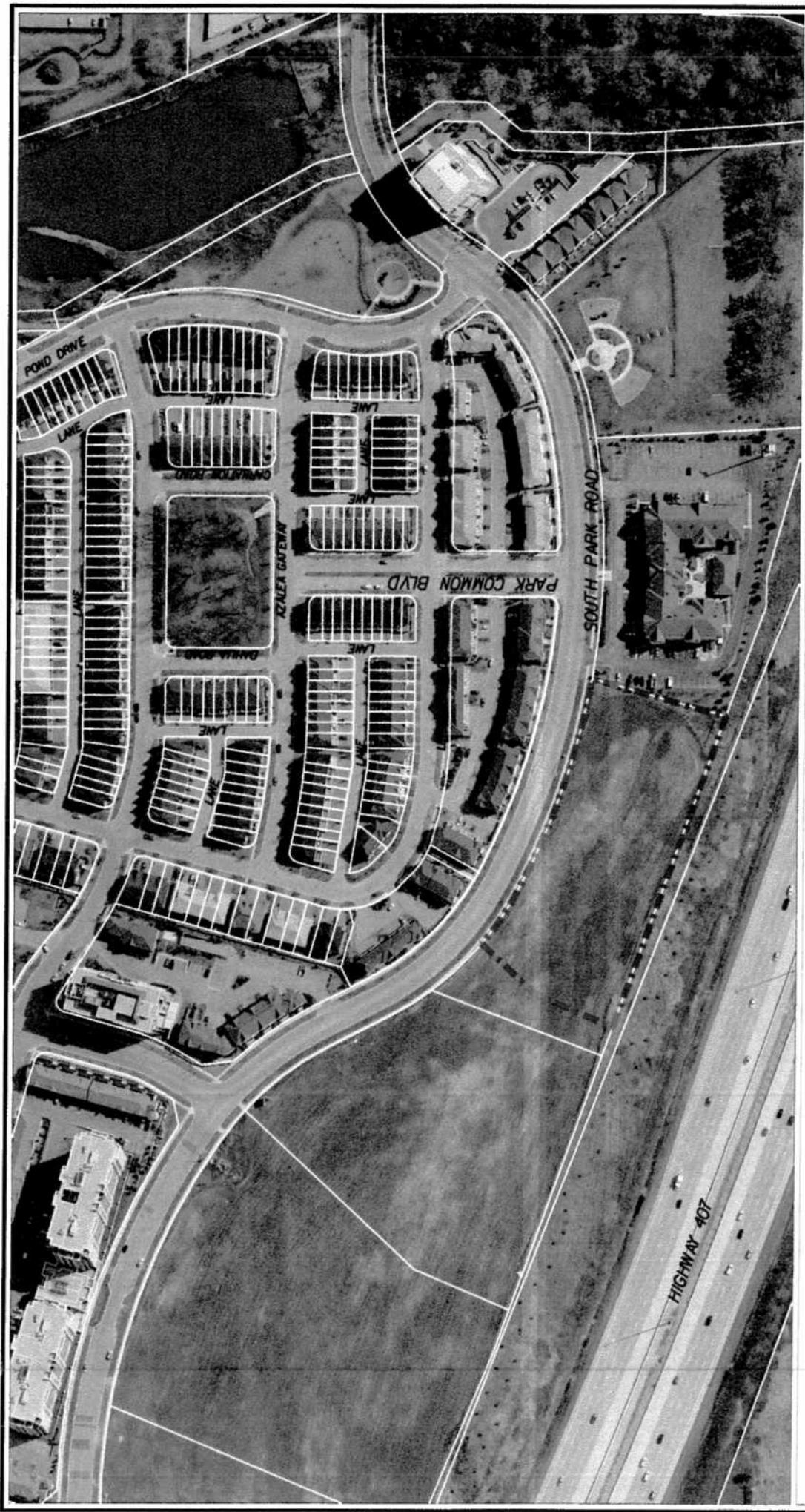
Yours very truly,

**MORRISON ENVIRONMENTAL LIMITED**

A handwritten signature in black ink, appearing to read 'W. D. Morrison', is written over the company name.

**W. D. Morrison, P.Eng.  
President**





# AIR PHOTO 2009

APPLICANT: TIMES GROUP CORP.  
PART 2 65R-31766 AND  
PART OF BLOCK 50 PLAN 65M-3226  
FILE No: OP10120306;ZA10120307(RB)

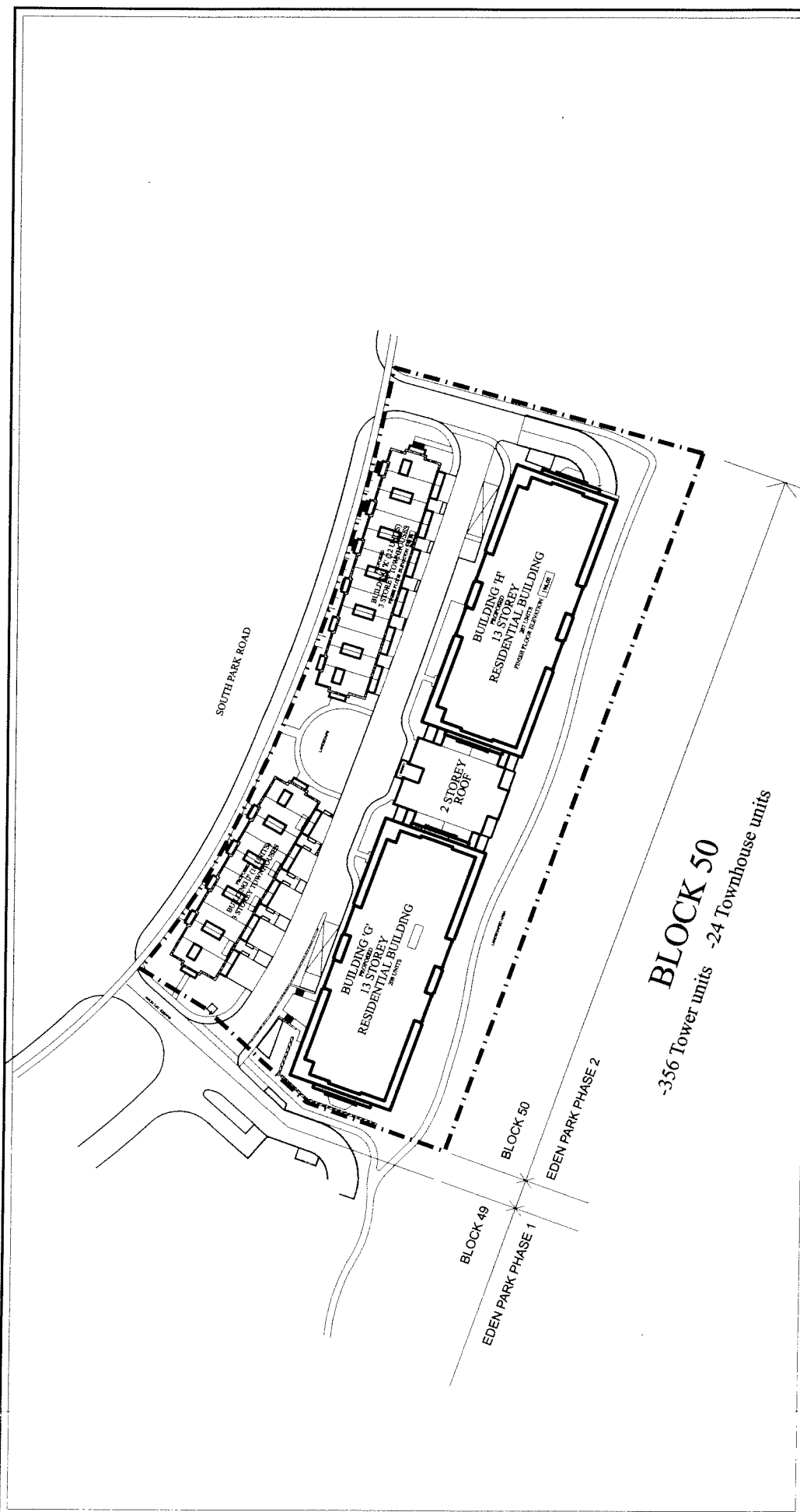


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FIGURE No.2

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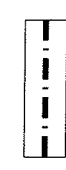
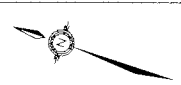
**BLOCK 50**  
 -356 Tower units -24 Townhouse units

# SITE PLAN

APPLICANT: TIMES GROUP CORP.  
 PART 2 65R-31766 AND  
 PART OF BLOCK 50 PLAN 65M-3226  
 FILE No: OP10120306;ZA10120307(RB)



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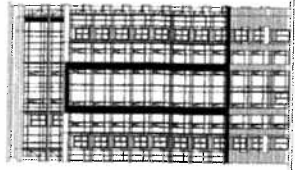


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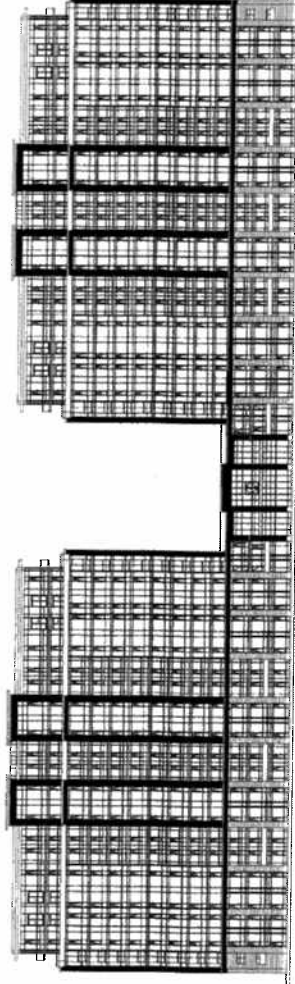
FIGURE No.4

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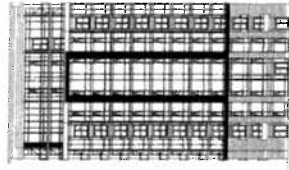




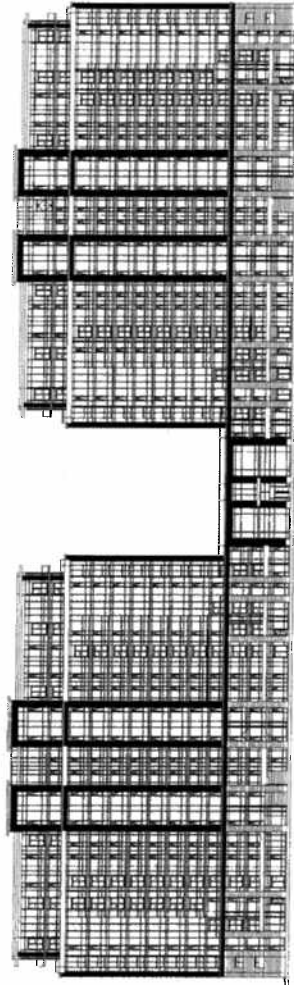
BUILDING G&H EAST ELEVATION



BUILDING G&H SOUTH ELEVATION



BUILDING G&H WEST ELEVATION



BUILDING G&H NORTH ELEVATION

# ELEVATION

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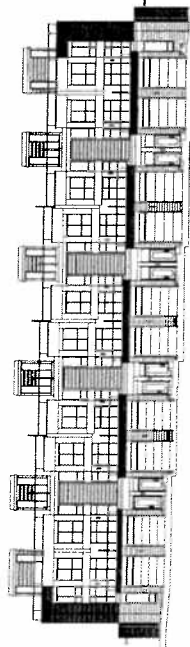


DEVELOPMENT SERVICES COMMISSION

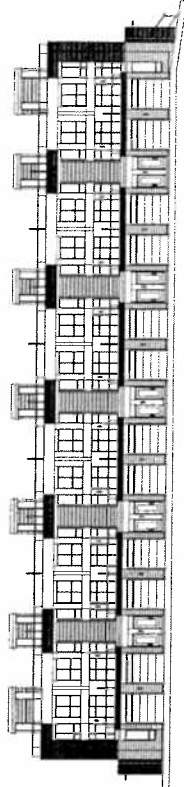
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FIGURE No.5



BUILDING J&K SOUTH ELEVATION

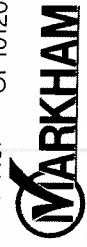


BUILDING J&K NORTH ELEVATION



# ELEVATION

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FILE No: OP10120306;ZA10120307(RB)

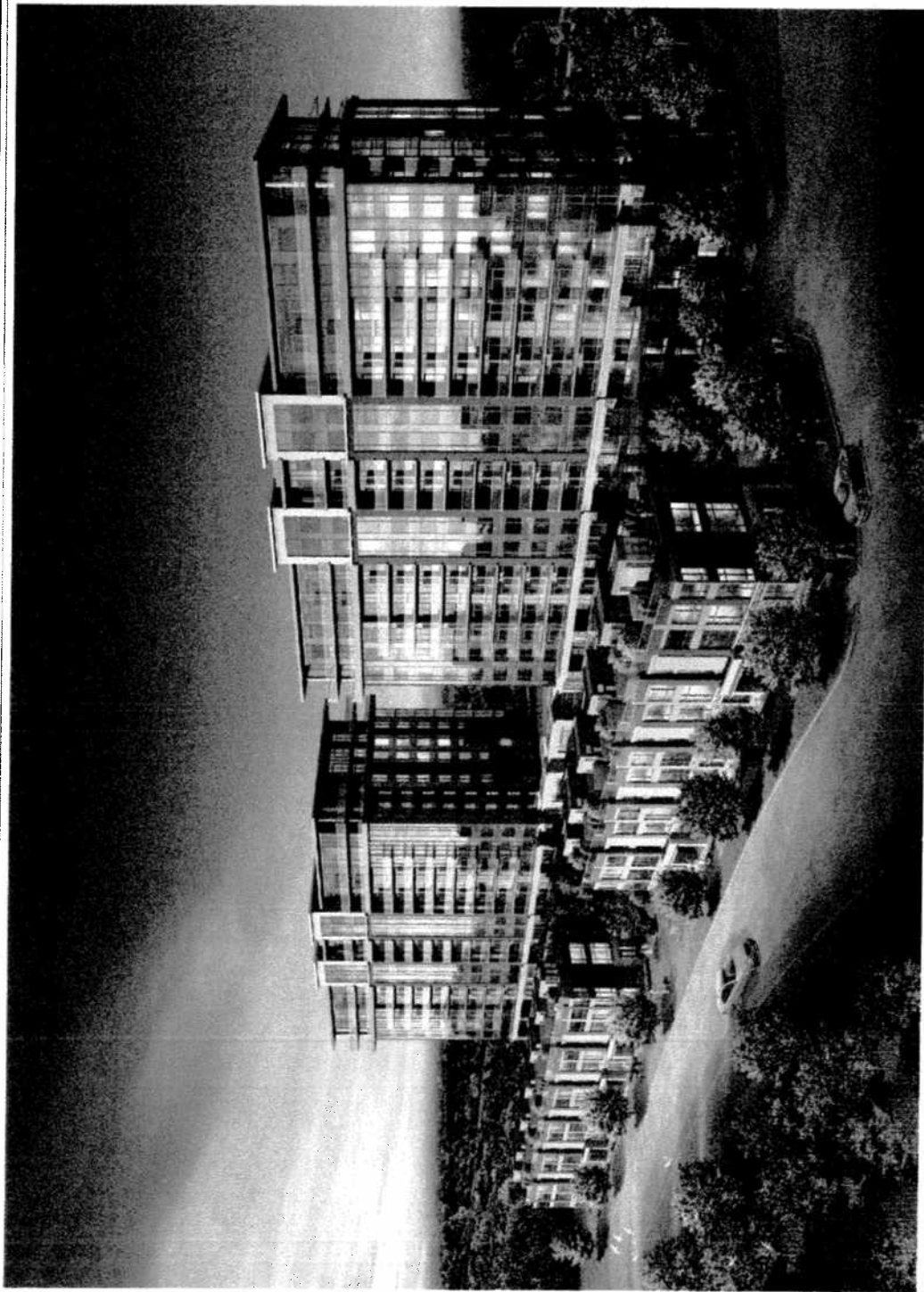


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FIGURE No. 6



## PERSPECTIVE VIEW

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FIGURE No. 7