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26 March 2018

Chief Engineer: Water Services Planning
City of Ekurhuleni
P O Box 215
BOKSBURG
1460

Attention: Mr. Mthokozisi Mlotshwa

Dear Sir,

PROPOSED RESIDENTIAL DEVELOPMENT OF LEACHVILLE X2- BRAKPAN: ASSESSMENT OF IMPACT ON WATER SUPPLY SYSTEM AND REQUIRED WORKS

As requested by JT Evolve on behalf of their client, Metroprojects Developments (Pty) Ltd, we have investigated the capacity of the water supply system to supply the proposed development and comment as follows:

1. EXTENT OF DEVELOPMENT

As indicated in the information provided to us, the proposed development will comprise of the following land use distribution:

LAND USE	NUMBER OF STANDS/UNITS	TOTAL SITE AREA (ha)	DENSITY (Units/ha)
RESIDENTIAL 3	810	47.281 (90%)	40
STREETS	-	5.253 (10%)	-
TOTAL	**810**	**52.534**	**40**

GLS Consulting (Pty) Ltd
Tel +27 21 880 0388 **| email:** info@gls.co.za
PO Box 814, Stellenbosch, 7599, South Africa
13 Electron Street, Techno Park, Stellenbosch
www.eoh.co.za | www.gls.co.za
Reg no: 2007/003039/07

This study was based on a minimum required residual pressure of 24 m from the municipal system. Please note that, should any part of the proposed development ultimately have more than two storeys, private boosting to the higher storeys might be required if excess pressure is not available from the municipal system.

The location and layout of existing water supply services in the vicinity of the site are indicated on Figure A included herewith. The future water distribution zones of the area under discussion are indicated on Figure B. We confirm that the site is located within the urban development boundary, as defined in the 2010/2011 Metropolitan Spatial Development Framework (MSDF).

We furthermore confirm that provision was not made for the proposed development in the Brakpan water master plan. Therefore, the master plan will be updated accordingly.

2. WATER SYSTEM

2.1 Water demand:

The total water demand for the proposed development is estimated as follows:

LAND USE	UNIT	QTY	UNIT DEMAND (kl/day)	TOTAL (kl/day)
RESIDENTIAL 3	No.	810	0.68	550.8
SUB-TOTAL				**550.8 kl/d**
PLUS UAW (15% OF TOTAL AADD)				**97.2 kl/d**
TOTAL AVERAGE DEMAND (AADD)				**648.0 kl/d**
PEAK DEMAND (excl. fire flow)				**30.0 l/s**
FIRE FLOW PER HYDRANT (x1) - (Low risk)				**15.0 l/s**

2.2 Existing Water Services, Proposed Connection Point and Proposed Upgrading

Water distribution zone (See Figure B)

The proposed development site falls within the existing RW2572 Direct water distribution zone. The RW2572 direct zone is currently being supplied directly from the Rand Water system via the L6 pipeline from meter number RW2572 at the corner of Buchu- and Rangeview Road in Leachville.

According to the master plan the site is to be incorporated into the future Leachville booster pump station distribution zone. Since the RW2572 Direct water distribution zone cannot supply the development site with sufficient pressure, the proposed Leachville booster pump station will have to be implemented for the interim scenario. The development will therefore be supplied from the Leachville booster water distribution zone for the interim and ultimate scenario. The isolation and implementation of the Leachville booster pump station zone is a critical requirement for the proposed development to proceed.

Reservoir Capacities

No existing reservoirs are required or affected by the additional demand from the proposed development.

Water tower capacities

No existing or future planned water towers will be affected by the proposed development.

Pump Station Capacities

New proposed Leachville booster pump station:

In order for the proposed development to proceed the new proposed Leachville pump station must be implemented as per the master plan (master plan item number MP - LPS1.2a, a portion of master plan project BRAK-RET-600). The requirements of the Leachville pump station is a pump flow rate of 390 ℓ/s at a pumping head of 22m.

The proposed location of the pump station is on the existing 300Ø bulk main feeding northwards in Rangeview Road directly downstream of Rand Water meter number RW2572. Before the pump station can be implemented, however, the booster zone must be isolated by implementing master plan item MP - LPS1.3. This entails the construction of a new closed valve on the existing 160Ø pipe at the corner of Buchu and Bessieheide Street as indicated on Figure A.

Please note that construction of the Leachville pump station is already an existing priority and the requirement to construct the pump station was not caused by the incorporation of the additional demand from the proposed development.

Bulk pipe capacities

Existing affected bulk pipes:

With the incorporation of the additional demand from the proposed development none of the existing affected bulk pipes will experience an increase in flow velocity to above the maximum allowable flow velocity of 2.0 m/s as per the Ekurhuleni Metropolitan Municipality's modelling guidelines. Therefore we can confirm that all affected bulk pipes have sufficient spare capacity available to accommodate the additional demand.

Future planned bulk pipes:

No future planned bulk pipes are affected by or required for the development to proceed.

With the incorporation of the additional demand from the proposed development none of the future affected bulk pipes will experience an increase in flow velocity to above the maximum allowable flow velocity of 2.0 m/s as per the Ekurhuleni Metropolitan Municipality's modelling guidelines.

Connection to the existing system, residual network pressures and required works

The proposed connection points to the existing network are at points A, B, C, D, E and F, as indicated on Figure A.

With the above connections in place, the inclusion of the additional demand from the proposed development will not result in any of the affected main feeder pipes or network pipes experiencing an increase in flow velocity beyond the maximum flow velocity of 2.0 m/s nor will it result in other more critical sections of the water supply network experiencing decreases in residual pressures below the minimum of 24 m head.

SCENARIO	PRESSURE (m) Excl Leachville pump	PRESSURE (m) Incl Leachville pump	CRITERIA
Peak flow	5	40	24 m minimum
Fire flow	0*	26	8 m minimum
Static	39	46.7	90 m maximum

Note: The required peak and fire flow cannot be supplied without the incorporation of the proposed Leachville booster pump station. The implementation of the proposed Leachville booster pump station is therefore critical for the development to proceed.*

3. DEVELOPER CONTRIBUTIONS TO CONSTRUCTION / UPGRADING OF INFRASTRUCTURE

GLS hereby confirms that any contributions of the developer to the required construction of infrastructure and/or the upgrading of the existing infrastructure, whether it be in the form of a cash contribution, or in the form of constructing sections of new infrastructure, is a matter to be discussed and agreed upon between the developer and the City of Ekurhuleni (CoE).

4. SUMMARY RECOMMENDATIONS

In summary we comment as follows:

- The proposed development falls within the RW2572 Direct water distribution zone
- The development will however be supplied from the Leachville booster water distribution zone for the interim and ultimate scenario due to insufficient pressures in the RW2572 Direct water distribution zone
- The isolation and implementation of the Leachville booster pump station zone is a critical requirement for the proposed development to proceed.
- No upgrading to any reservoirs, water towers or pump stations are required
- No existing or future planned bulk pipes are affected by or required for the development to proceed
- The proposed connection points to the existing network are at points A, B,C, D, E and F, as indicated on Figure A.

We trust you will find the above sufficient in terms of your request. Should you have any further queries, please do not hesitate to contact us. The contact person regarding the above is Dian Pretorius.

Yours sincerely,
GLS CONSULTING

Per: JL (LOUIS) STRIJDOM