



HOUSING PRICE INDEX

MARCH 2021

ISSUE 25

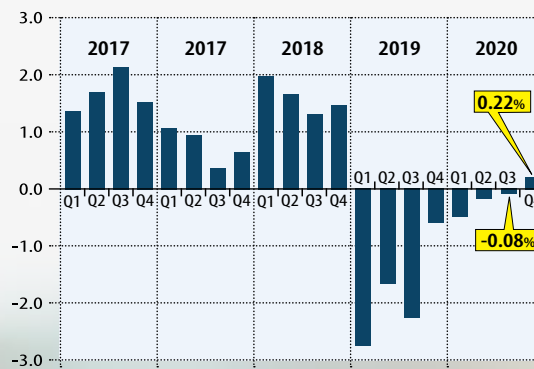
Background

Initiated in 2015, the KBA-HPI is a quarterly publication by the Kenya Bankers Association Centre for Research on Financial Market and Policy®. Given the interdependence between the housing market and other segments of the economy, the index serves two critical roles. First, it is a useful risk management tool for the financial industry players and, more importantly, banks who finance the home developments and use the property as collateral. Second, it is a vital instrument to the non-financial sector that seek to invest in the housing market.

The index's computation captures quarterly data covering mortgage financed transactions of all residential units by financial institutions and the National Housing Corporation. The data collected relates to the transaction prices and house specific attributes such as location, age, house type, floor area, number of bedrooms, bathrooms, and floors, among other attributes such as the presence of an elevator, jacuzzi, DSQ, borehole, gated community, and separate dining room etc. which also affect house prices. This report summarises data for 314 mortgage transactions in three regions on 4 types of houses, surveyed in the fourth quarter of 2020.

House Prices Signal Some Recovery after Seven Quarters of Depressed Growth

Figure 1: Overall Q-o-Q Price Change (%)



The housing market prices since 2019 remained depressed, but signs of recovery are emerging. House prices rose by 0.22 percent during the fourth quarter of 2020 compared to a 0.08 percent contraction in the previous quarter (Figure 1). The fourth quarter's positive growth, the first after seven quarters, reflects some recovery in housing prices.

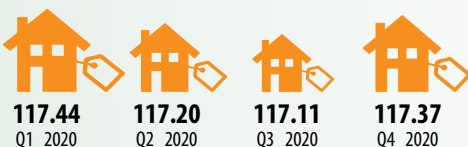
The price adjustments reflect the demand and supply dynamics in the housing market. On the supply side, housing is largely fixed, with adjustment to meet demand being typically gradual rather than instantaneous. As evidenced by the dwindling number of new buildings being approved, the under-supply of new units has triggered price rises with the sales being on the already completed units from the previous periods.

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The Numbers at a Glance

1 House prices depicted recovery in Quarter 4 2020.



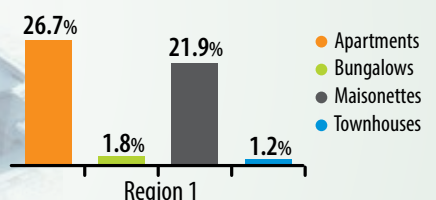
* Based on Base period Q1_2013

2 The main prices drivers were sensitive to:

- Plinth area (size)
- No. of Bedrooms
- No. of Floors
- Age



3 Market activity was dominant in region 1



Technical Note

The index follows a Laspeyres index method. In this method, the index is computed by getting the ratio of the estimated current quarter price from the hedonic method (multiplied by the weights of the preceding quarter) to the price of the preceding quarter (multiplied by the respective weights of that quarter).

The weights of the quantitative variables are obtained by getting their respective mean values. For the dummy variables however, their weights are computed as the proportions of the number of houses possessing a certain attribute to the total number of houses. Thus the index is computed by the formula:

$$Index = \sum_{i=1}^n w_i \frac{\hat{P}_1}{\hat{P}_0} = \frac{\sum_{i=1}^n w_0 \hat{P}_1}{\sum_{i=1}^n w_0 \hat{P}_0}$$

Where; \hat{P}_1 is the shadow price from the estimated hedonic function for the current quarter;

\hat{P}_0 is the shadow prices from the estimated hedonic function for the preceding quarter;

And w_0 are the weights of the respective variables for the preceding quarter.



House Prices Rise, as Buyers Prefer Newer Units Amidst Contained Supply

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A number of factors have compounded the rise. First, homeowners' preferences for newer buildings over older ones. Second, muted credit supply to the private sector and especially for construction activities has significantly restricted supply of new units consequently contributing to the rise in house prices.

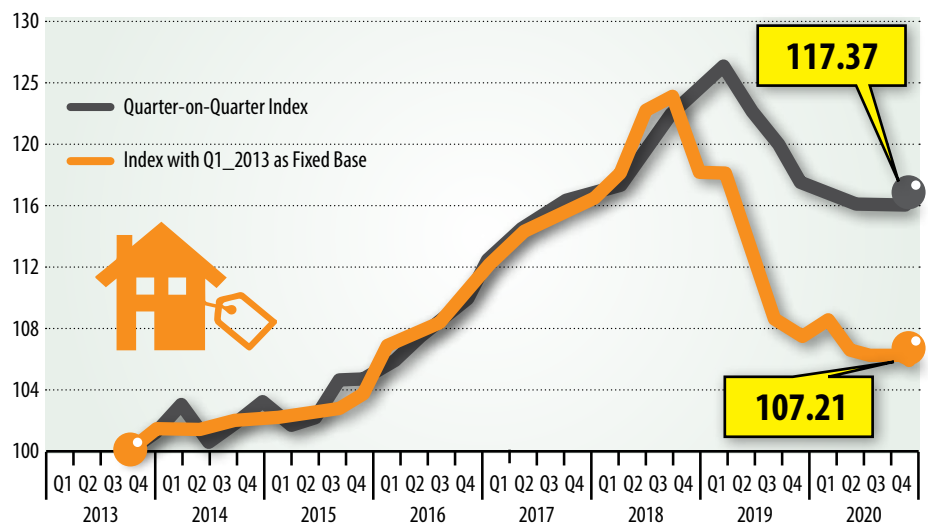
Although house prices have been on the rise, it has been gradual. Based on the Laspeyres Index methodology (See **Technical Note**), the evolution of the KBA Housing Price Index (KBA-HPI) indicates that since 2013, house prices rose by 17.37 percent in the fourth quarter of 2020 on the moving-base basis and 7.21 percent on the fixed-base basis as in **Table 1** and **Figure 2**. The moving base index's sustained upward trajectory, which stood at 117.37 per cent, represented a 0.23 percent rise between the third and fourth quarter of 2020.

Table 1: Price Movement Series

Period	Index with a fixed base	Index with a moving base
Q4_2016	114.91	115.10
Q1_2017	115.92	116.37
Q2_2017	116.67	117.52
Q3_2017	117.59	118.01
Q4_2017	119.19	118.81
Q1_2018	123.83	121.29
Q2_2018	124.78	123.42
Q3_2018	119.38	125.10
Q4_2018	119.48	127.00
Q1_2019	114.30	123.56
Q2_2019	109.17	121.47
Q3_2019	108.02	118.76
Q4_2019	107.86	118.04
Q1_2020	106.87	117.44
Q2_2020	106.66	117.20
Q3_2020	106.63	117.11
Q4_2020	107.21	117.37

* Base Period Q1_2013

Figure 2: KBA – House Price Index Evolution



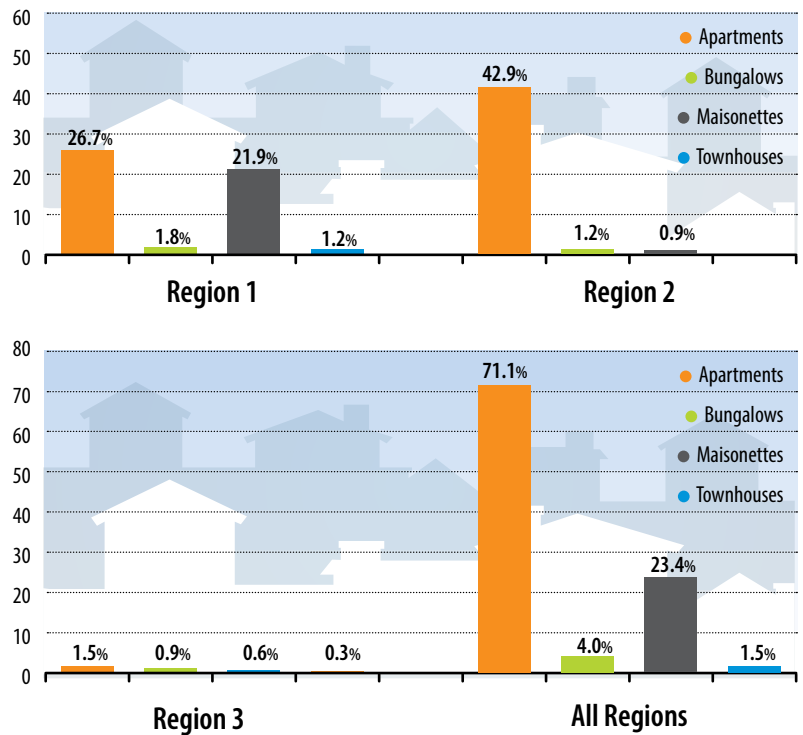
Demand for Apartments Dominates, and Activity Concentrated in the Low Market Segment (Region 1)

The KBA-HPI index trend outlined above mirrors trends in the number of transactions, rising pre-2016, and slumping thereafter (See **Figure A1**, in appendix). The number of transactions in quarter four of 2020 increased five-fold from 57 in quarter three to 314 units and two-fold compared to a similar period in 2019. However, these aggregate trends mask the extent of dynamism of house type and regional differences in transactions concluded.

Apartments continued to dominate, accounting for 71 percent of the total number of units traded, while maisonettes and bungalows accounted for 23 percent and 4 percent, respectively (**Figure 3**). Further, house type distribution across the regions was heterogeneous. For instance, apartments accounted for 42.9 percent in Region 2, 26.7 percent in region 1 and 1.9 percent in Region 3.

Across the regions, housing transactions were predominant in Regions 1 (accounting for 52.0 percent) and 2 (45.0 percent) compared to Region 3 (3.0 percent), indicating buyers preferences and affordability characteristics.

Figure 3: The housing composition is dominated by activity in Region 1 and 2, and apartments by house type



Characterisation of Prices and Attributes by House Type and Regional Distribution

The computation of the KBA-HPI, is underpinned by estimating the weights and the shadow prices. The weighting scheme applied to the shadow prices varies quarterly and relates to units transacted during the quarter (see **Technical Note** for details). The weights applied in the case of quantitative attributes are respective averages and proportions in qualitative attributes.

Out of the units transacted during the period, the average floor area was

100.63 square metres, with an average price per square metre at Kshs. 85,963. Prices per square metre however varied across regions and house types. The price per square metre was the highest in Region 3 and the least in Region 1.

The average floor area in Region 3 stood at 247.82 square metres, with a price per square metre estimated at Kshs. 105,916. The average floor area in Region 2 was 67.27 square metres associated with a

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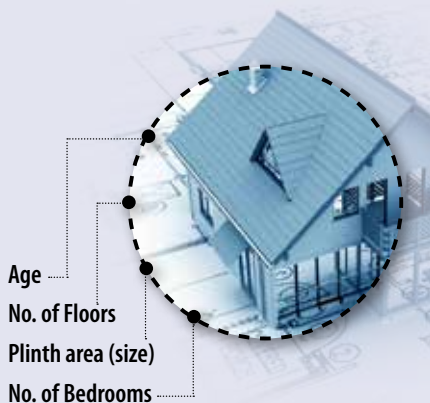
Characterisation Of Prices and Attributes

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per square metre price of Kshs. 100,062.6. In Region 1, the floor space area averaged 120.14 square metres but its price was the lowest at Kshs. 71,542.8 per square metre.

In terms of house type, apartments had the least average floor area at 77 square metres and their prices per-square metre stood at Kshs. 90,499.33. Townhouses had the largest floor area at 299.8 square metres and a per-square metre price of Kshs. 124,784. Bungalows and Maisonettes had a floor area of 141.54 and 164.13 square metres, with the price per square metre at Kshs. 75,099.93 and Kshs. 69,604.49, respectively.

Other specific attributes relating to the transactions during the quarter show that the most common transactions were for two-bedroom houses and units in 4-storey buildings, that are predominantly two-years old.



Hedonic Regression Estimation of House Price Drivers

The qualitative and quantitative parameters that drive the house price changes and feeds into the construction of the KBA-HPI are based on an estimation of a hedonic regression. The regression generates the shadow prices or marginal contributions, taking cognisance of the heterogeneous nature of housing goods best characterised by their attributes¹. Results for the hedonic regression are presented in **Table 2**².

A significant portion of house prices variations are explained by the hedonic regression model estimated, suggesting house prices to a great extent are supported by fundamentals with a small portion not being accounted for by factors in the model. For instance, in the fourth quarter, our model explains 83.0 percent of house prices variability, compared to 88.7 percent in a similar period in 2019 and better than 56.0 percent in quarter three of 2020 (See **Figure A2**, in appendix)³.

The hedonic regression estimates reveal 2 main patterns about the attributes of shadow prices, consistent with those from previous periods. First, the structural attributes of the units are key in explaining price movements. In particular, prices increase with the floor (plinth) area, with an additional 10 percent increase in the plinth area increasing prices by 2.8 percent. Similarly, a unit's number of bedrooms and floors are also important, with an additional bedroom and floor

(for the same region and house type) increasing the house prices by 10.0 percent and 19.0 percent, respectively. Moreover, the age (measured in years) of a house is also a significant determinant of its price, with results indicating that newer houses fetch a 6.0 percent markup on prices over the older ones.

Second, non-structural attributes are also significant drivers of house prices by type and across regions. For instance, in terms of regions, average prices were the lowest in Region 1 followed by Region 2 and then Region 3. This mirrored observations over a similar period in 2019 and Quarter 3 of 2020. It was also noted that apartments' prices were significantly higher than prices of bungalows and townhouses but lower than the prices of maisonettes.

The rise in the price of apartments compared to bungalows and maisonettes alludes to an element of affordability to potential home buyers, given the lower cost of construction per unit.

More market activity appears to be skewed on the lower end of the market than the middle and upper market segments. This points out two possible reasons: First, the affordability aspect and secondly more supply of units in the lower segment given land availability compared to the upper market segment.

1. Hedonic regressions recognise that a dwelling is composed of a bundle of characteristics. There is no market for characteristics, since they cannot be sold separately, so the prices of the characteristics are not independently observed. The demand and supply for the properties implicitly determine the characteristics' marginal contributions to the prices of the properties.
2. For comparison purposes, those for the third, second and first quarter of 2020 are given in Tables 3, 4 and 5, respectively
3. In terms of the model's goodness of fit, the F-statistic reveals that the model is a good fit. However, it is not possible to explain all of the variation in prices that is observed, and the explanatory power should be seen as very satisfactory

Table 2: Housing Price Index Drivers for Quarter 4 of 2020

Source	SS	df	MS
Model	37.02	10.00	3.70
Residual	7.18	303.00	0.02
Total	44.21	313.00	0.14

No. of Obs. = 314
 F(8, 48) = 156.14
 Prob > F = 0.00
 R-squared = 0.84
 Adj R-squared = 0.83
 Root MSE = 0.15

Natural logarithm of Property Value	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Plinth area	0.28	0.04	6.80	0.00	0.20	0.36
No. of Bedrooms	0.10	0.04	2.79	0.01	0.03	0.17
Number of floors	0.19	0.04	4.92	0.00	0.12	0.27
No. of Bathrooms	-0.01	0.02	-0.39	0.70	-0.04	0.03
Age	-0.06	0.01	-4.39	0.00	-0.08	-0.03
Regional Dummy						
Region 2	0.38	0.03	13.11	0.00	0.32	0.44
Region 3	0.82	0.07	11.31	0.00	0.68	0.97
House Type Dummy						
Bungalow	-0.15	0.09	-1.73	0.09	-0.32	0.02
Maisonette	0.01	0.05	0.03	0.97	-0.10	0.11
Townhouses	-0.24	0.09	-2.61	0.01	-0.42	-0.06
Constant	13.77	0.17	81.85	0.00	13.44	14.10



Housing Price Index
 Quarter 4, 2020  **117.37**

Table 2: Housing Price Index Drivers for Quarter 3 of 2020

Source	SS	df	MS
Model	6.25	8	0.78
Residual	3.78	48	0.08
Total	10.04	56	0.18

No. of Obs. = 57
 F(8, 48) = 9.92
 Prob > F = 0.00
 R-squared = 0.62
 Adj R-squared = 0.56
 Root MSE = 0.28

Natural logarithm of Property Value	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Constant	15.32	0.64	23.8	0.00	14.03	16.61
Plinth area (LN)	-0.04	0.09	-0.44	0.66	-0.22	0.14
No of bedrooms	0.05	0.08	0.72	0.48	-0.10	0.21
No of bathrooms	0.27	0.08	3.3	0.00	0.11	0.43
No of floors	0.02	0.13	0.19	0.85	-0.24	0.29
Regional Dummy						
Region1	-0.19	0.09	-1.98	0.05	-0.37	0.00
Region3	0.35	0.14	2.42	0.02	0.06	0.64
House Type Dummy						
Apartment	0.09	0.53	0.17	0.86	-0.98	1.16
Maisonette	0.28	0.15	1.88	0.07	-0.02	0.57



Housing Price Index
 Quarter 3, 2020  **117.11**

Table 3: Housing Price Index Drivers for Quarter 2 of 2020

Source	SS	df	MS
Model	8.35	8.00	1.04
Residual	6.02	81.00	0.06
Total	14.37	89.00	0.07

No. of Obs. = 90
 F(8, 81) = 14.060
 Prob > F = 0.000
 R-squared = 0.581
 Adj R-squared = 0.540
 Root MSE = 0.273

Natural logarithm of Property Value	Coef	Std. Err.	t - stats	P> t	[95% Conf. Interval]	
Constant	14.323	0.581	22.400	0.000	11.866	14.180
Plinth area (LN)	0.358	0.084	4.270	0.000	0.191	0.525
No. of bedrooms	0.294	0.063	4.690	0.000	0.169	0.418
No. of bathrooms	-0.180	0.084	-2.150	0.035	-0.348	-0.013
No. of floors	0.003	0.058	0.060	0.955	-0.112	0.118
House Type Dummy						
housetype 1	-0.180	0.310	-0.580	0.564	-0.797	0.438
housetype 2	-0.168	0.146	-1.150	0.252	-0.458	0.122
Regional Dummy						
Region 1	0.003	0.119	0.020	0.982	-0.233	0.239
Region 3	0.454	0.151	3.000	0.004	0.153	0.754



Housing Price Index
 Quarter 2, 2020  **117.20**

Table 5: Inter quarter Sub-Regional Indices (Moving Base): Q2-2013 – Q4-2020

	Region 1			Region 2			Region 3		
	Apart-ments	Bunga-lows	Maison-ettes	Apart-ments	Bunga-lows	Maison-ettes	Apart-ments	Bunga-lows	Maison-ettes
Q3-2013	99.67	100.40	99.40	102.44	100.99	100.49	98.56	105.20	102.09
Q4-2013	100.74	102.82	99.38	101.80	100.82	98.81	103.75	103.95	100.32
Q1-2014	100.45	99.38	99.67	101.63	100.91	100.91	97.70	102.58	102.58
Q2-2014	100.50	99.67	99.54	100.75	101.75	101.27	96.70	102.74	103.32
Q3-2014	99.41	100.31	100.33	100.63	101.27	99.91	98.90	102.98	100.56
Q4-2014	97.48	99.29	105.21	97.82	101.98	99.61	104.54	104.36	100.62
Q1-2015	95.20	101.54	100.95	98.67	102.01	100.25	104.67	104.92	100.71
Q2-2015	102.92	102.78	100.53	101.11	102.05	100.77	105.23	104.91	102.51
Q3-2015	103.54	103.04	101.02	104.81	102.99	101.51	105.54	105.43	104.08
Q4-2015	105.23	104.57	104.66	104.84	103.47	102.43	106.25	105.37	105.26
Q1-2016	105.56	106.49	104.87	104.22	103.30	102.58	107.05	105.96	105.37
Q2-2016	103.48	104.08	102.96	100.19	100.30	100.93	101.23	100.96	100.27
Q3-2016	104.81	104.92	104.02	103.62	101.51	102.62	103.07	102.59	104.29
Q4_2016	106.82	105.05	104.83	105.04	102.61	103.60	105.72	102.94	105.94
Q1_2017	108.63	105.81	104.96	106.75	102.81	104.27	107.49	103.27	106.24
Q2_2017	109.73	105.97	105.22	107.86	102.96	104.27	108.65	103.83	106.70
Q3_2017	110.04	106.08	105.63	107.93	103.17	105.08	109.38	103.94	107.08
Q4_2017	111.53	106.86	106.04	108.61	103.51	105.84	110.63	104.04	107.75
Q1_2018	112.39	107.16	108.82	110.07	105.58	108.03	111.41	107.04	110.08
Q2_2018	113.30	107.92	109.49	110.96	106.33	108.70	112.31	107.80	110.76
Q2_2019	103.58	100.58	104.35	102.83	107.41
Q3_2019	100.97	114.91	98.75	95.66	99.22	99.84	99.36	.	102.67
Q4_2019	102.6	87.15	101.27	.	.	101.16	99.04	.	.
Q1_2020	103.07	101.38	103.91	102.03	100.14	102.35	99.96	104.29	103.92
Q2_2020	103.04	101.22	104.85	102.10	100.57	102.14	99.91	.	103.86
Q3_2020	102.57	101.11	104.45	101.80	100.53	101.66	101.02	104.21	103.84
Q4_2020	105.26	108.06	104.47	103.89	105.13	107.00	.	108.96	110.97

Note: The dot (.) as usually denotes insufficient observations to run the regression analysis. This is even the case where Apartments were not common in Region 3.
 * Definition of the Sub-regions listed overleaf ** Base period: Q1_2013

APPENDIX

Figure A1: Number of Transactions

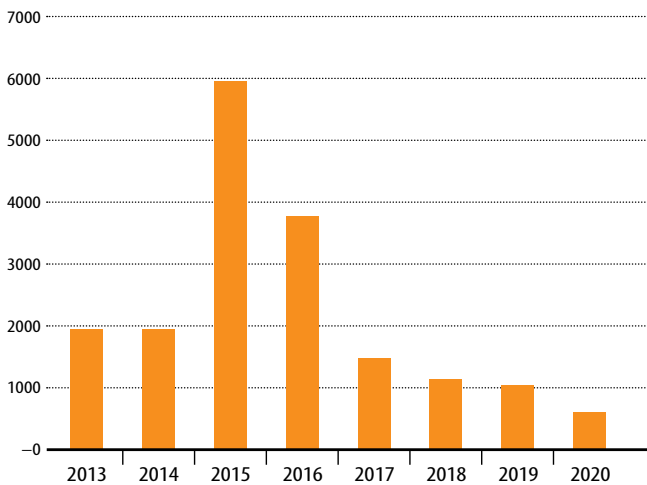
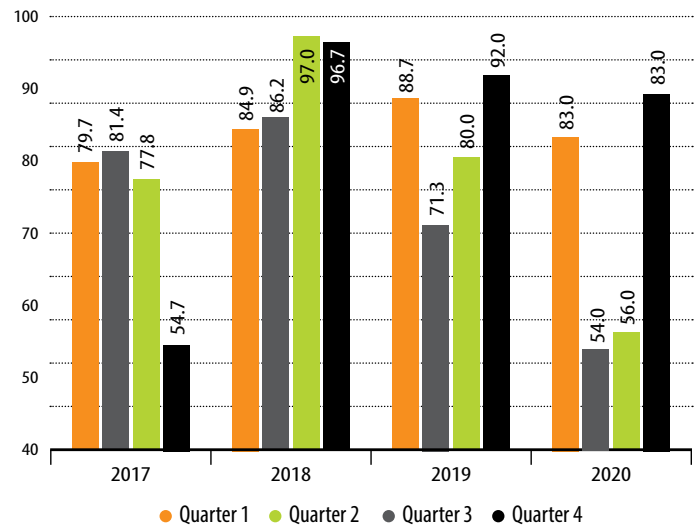


Figure A2: Hedonic Regressions Model's Explanatory Power



THE DEFINITION OF THE SUB-REGIONS

REGION 1

Athi River, Mlolongo, Mavoko, Nakuru, Ngong, Ruaka, Syokimau, Embakasi, Kahawa Wendani, Thika, Mtwapa, Utange, Kitengela, Kiembeni, Nyeri, Likoni, Eldoret, Ruiru, Kilifi, Thika road (Kasarani, Roysambu, Ruaraka), Meru, Bungoma.

REGION 2

Thindigua (Kiambu Road), Kiambu, South B, South C, Kabete, Komarock, Imara Daima, Membery, Buruburu, Rongai, Waiyaki Way (Uthiru, Regen, Kinoo, Kikuyu), Mbagathi road, Ngong Road, Langata.

REGION 3

Kileleshwa, Kilimani, Lavington, Westlands, Spring Valley, Riverside, Milimani (Kisumu), Milimani (Nakuru), Runda, Karen, Garden Estate, Parklands, Ridgeways, Muthaiga, Loresho, Kitisuru, Adams Arcade, Nyali, Mountain View, Nyari.

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