In [1]:

```
#transformation
```

In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [3]:

```
df=pd.read_csv('.\\dataset\\train.csv')
```

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30471 entries, 0 to 30470
Columns: 292 entries, id to price_doc
dtypes: float64(119), int64(157), object(16)
memory usage: 67.9+ MB
```

In [5]:

```
df_numeric = df.select_dtypes(include=[np.number])
df_non_numeric = df.select_dtypes(exclude=[np.number])
```

In [7]:

```
#missing values
df.isnull().sum()
```

Out[7]:

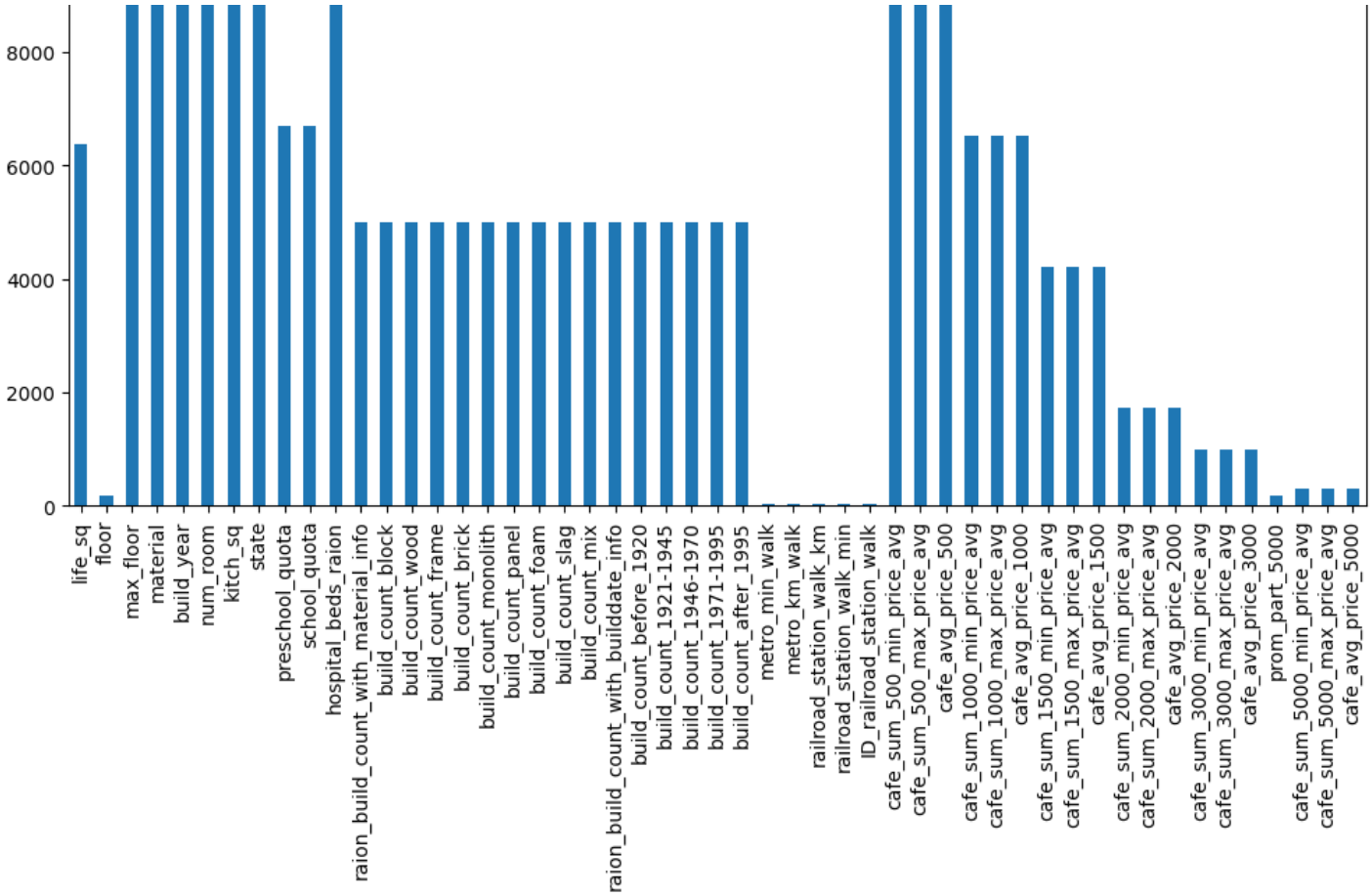
```
id                       0
timestamp                0
full_sq                  0
life_sq               6383
floor                  167
                      ...
mosque_count_5000        0
leisure_count_5000       0
sport_count_5000         0
market_count_5000        0
price_doc                0
Length: 292, dtype: int64
```

In [12]:

```
df.isnull().sum()[df.isnull().sum()>0].plot(kind='bar', figsize=(12,8))
```

Out[12]:

```
<Axes: >
```



In [22]:

```
#handel missing values
#1. drop

missing_values = df.isnull().sum()
s = list(missing_values[(missing_values > 0) & (missing_values < 0.5 * len(df) / 100)].i
ndex)
print(s)
no_na_df=df.dropna(subset=s)
no_na_df.info()
```

```
['metro_min_walk', 'metro_km_walk', 'railroad_station_walk_km', 'railroad_station_walk_mi
n', 'ID_railroad_station_walk']
<class 'pandas.core.frame.DataFrame'>
Index: 30446 entries, 0 to 30470
Columns: 292 entries, id to price_doc
dtypes: float64(119), int64(157), object(16)
memory usage: 68.1+ MB
```

In [27]:

```
#2. drop col

s = list(missing_values[missing_values > 40 * len(df) / 100].index)

col_dropped_df=no_na_df.drop(columns=s)
print(len(col_dropped_df.columns))
```

```
286
```

In [28]:

```
#3. default values

df_numeric = col_dropped_df.select_dtypes(include=[np.number])
numeric_cols = df_numeric.columns.values
for col in numeric_cols:
    missing = df[col].isnull()
    num_missing = np.sum(missing)
    if num_missing > 0:
```

```
        med = col_dropped_df[col].median() #impute with the median
        col_dropped_df[col] = col_dropped_df[col].fillna(med)
```

In [29]:

```
df_non_numeric = col_dropped_df.select_dtypes(exclude=[np.number])
numeric_cols = df_non_numeric.columns.values
for col in numeric_cols:
    missing = df[col].isnull()
    num_missing = np.sum(missing)
    if num_missing > 0:
        med = col_dropped_df[col].mode() #impute with the mode
        col_dropped_df[col] = col_dropped_df[col].fillna(med)
```

In [31]:

```
col_dropped_df.isnull().sum().sum()
```

Out[31]:

```
0
```

In [41]:

```
#outliers
print(col_dropped_df.columns)

col_dropped_df.life_sq.describe()
```

```
Index(['id', 'timestamp', 'full_sq', 'life_sq', 'floor', 'max_floor',
       'material', 'num_room', 'kitch_sq', 'product_type',
       ...
       'cafe_count_5000_price_2500', 'cafe_count_5000_price_4000',
       'cafe_count_5000_price_high', 'big_church_count_5000',
       'church_count_5000', 'mosque_count_5000', 'leisure_count_5000',
       'sport_count_5000', 'market_count_5000', 'price_doc'],
      dtype='object', length=286)
```

Out[41]:

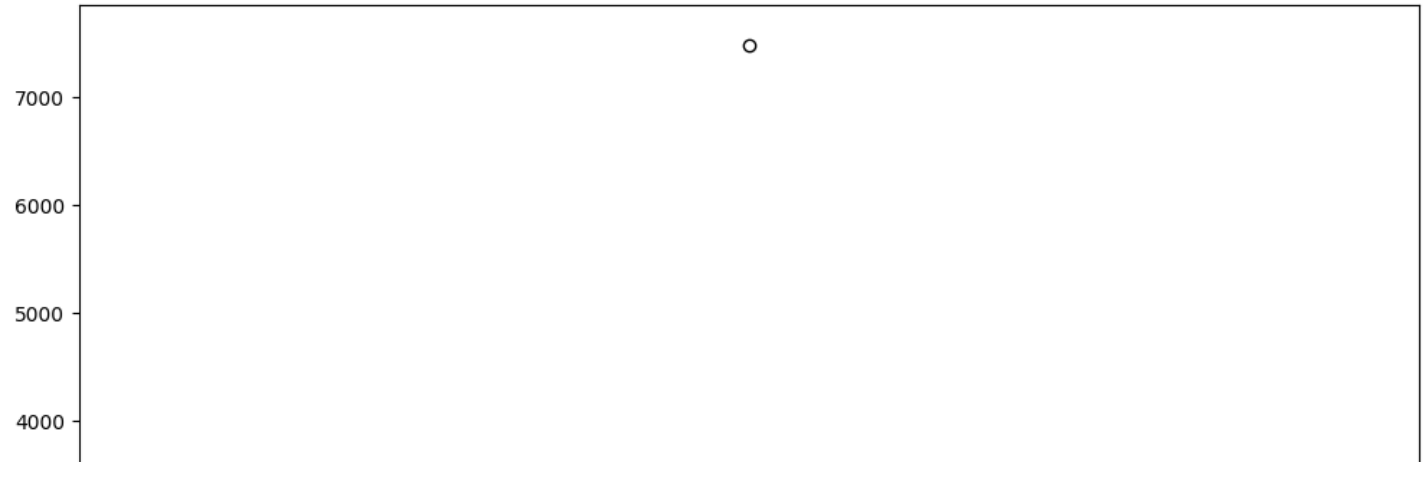
```
count    30446.000000
mean        33.482658
std         46.538609
min          0.000000
25%         22.000000
50%         30.000000
75%         38.000000
max       7478.000000
Name: life_sq, dtype: float64
```

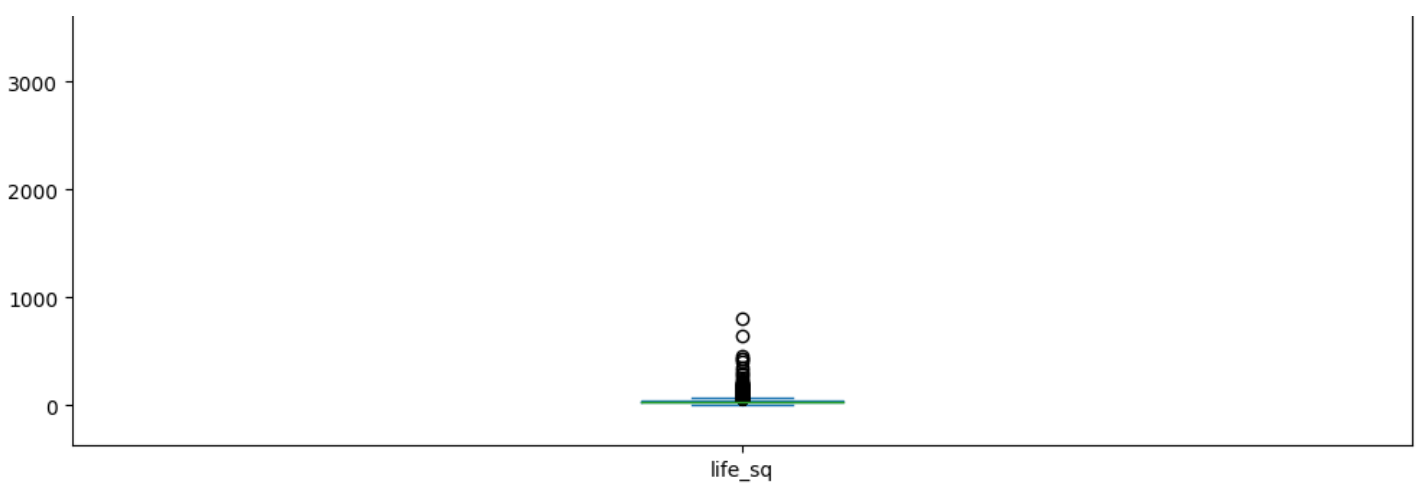
In [44]:

```
col_dropped_df.life_sq.plot(kind='box', figsize=(12, 8))
```

Out[44]:

```
<Axes: >
```





In [43]:

```
col_dropped_df = col_dropped_df.loc[df.life_sq < 7478]
```

In [33]:

```
#dupes

col_dropped_df.drop_duplicates(inplace=True)
col_dropped_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 30446 entries, 0 to 30470
Columns: 286 entries, id to price_doc
dtypes: float64(113), int64(157), object(16)
memory usage: 66.7+ MB
```

In [34]:

```
#fix data types

col_dropped_df['timestamp'] = pd.to_datetime(col_dropped_df.timestamp, format='%Y-%m-%d'
)
```