Figure 7) geo-location map of the accidents in the sewage network in a period of 5 years in Isfahan in 2019

Table 2) the weights (%) calculated for each of the factors using the AHP method in Isfahan in 2019

	Effective causes for the accidents	AHP weight
1	Inappropriate beds	18.2
2	Age older than 30 years	16.2
3	Destruction	5.74
4	Human factors	5.70
5	Inappropriate tube diameter	5.40
6	Lack of rinsing	5.05
7	Inappropriate design	5.28
8	Inappropriate pool diameter	5.05
9	The age between 20 to 30 years	5
10	Putting staff in the manhole	4.96
11	Soil quality	4.91
12	The age between 10 to 20 years	4.90
13	Un-flattered lids	4
14	Poor pipes	3.90
15	Acidity changes in the sewage	3
16	Age between zero to ten years	2.46

Table 3) the main causes of the accidents in different parts of Isfahan in 2019

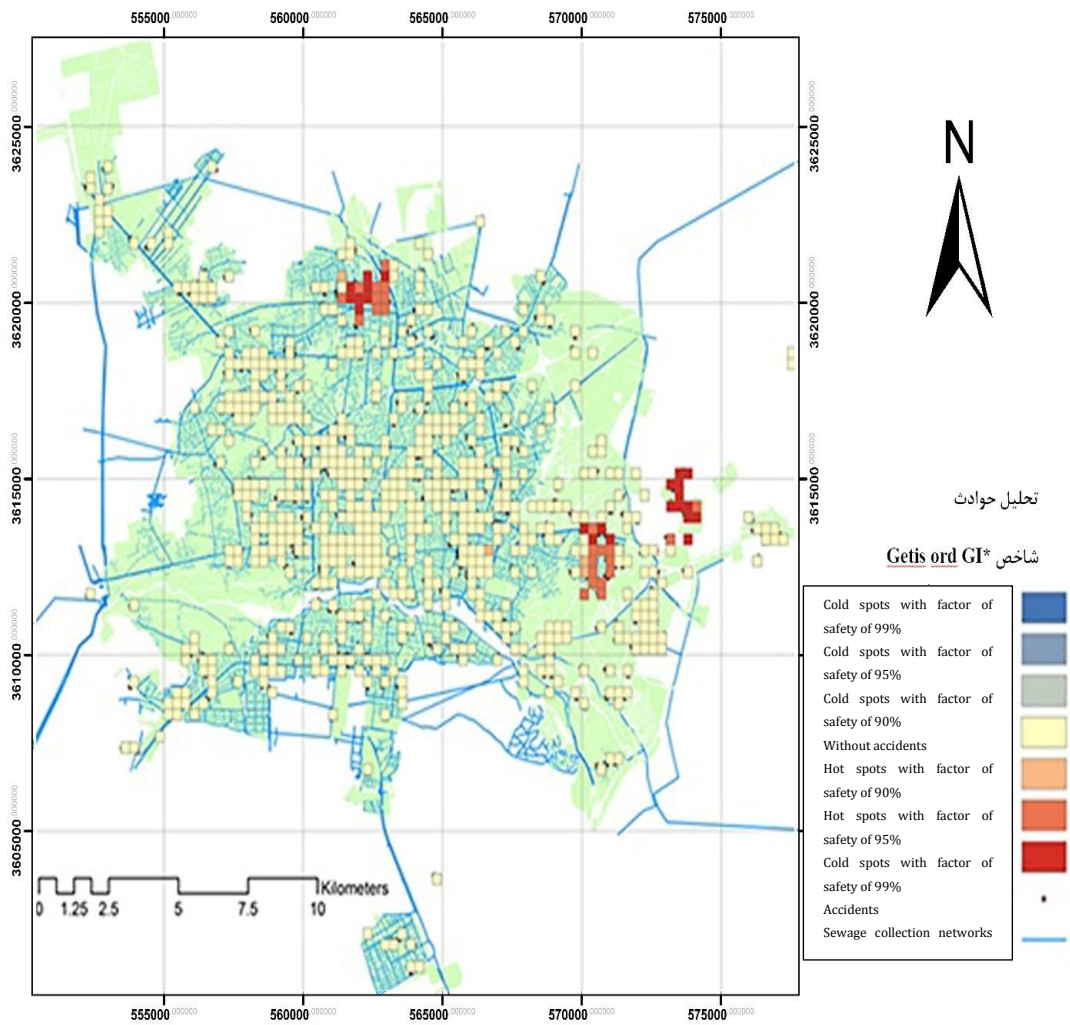| The accidents' cause	Geographical location
The age of the network, soil salts, deep pipes	Central part
Un-flattered wells lids	Northern part
The age of the network, low pipes' diameter	Western part
Soil salts, low pipes' diameter	Eastern part

Figure 8) accidents hot spots map in the sewage network according to the results of Getid ord Gi in Isfahan in 2019

Table 4) the results of the statistical tests to find the relationship between the pipes' diameter and the accidents in Isfahan in 2019

Test	Factors	Correlation parameters	Diameter	Accident
Kendall	Diameter	Correlation coefficient	1	-0.905
		Significance level		0.004
		Number	7	7
Kendall	Accident	Correlation coefficient	-0.905	1
		Significance level	0.004	
		Number	7	7

Table 5) the results of the statistical test to find the relationship between the pipes' age and the accidents in Isfahan in 2019

Test	Factor	Correlation parameters	Diameter	Accident
Kendall	Pipes' age	Correlation coefficient	1	0.8
		Significance level		0.05
		Number	5	5
	Number of accidents	Correlation coefficient	0.8	1
		Significance level	0.05	
		Number	5	5
Spearman	Pipes' age	Correlation coefficient	1	0.9
		Significance level		0.37
		Number	5	5
	Number of accidents	Correlation coefficient	0.9	1
		Significance level	0.037	
		Number	5	5