



**ARCHITECTURE PATTERNS OF WATER IN SAFAVI PALACES (SAMPLE  
STUDY ON CHEHELSOTOUN AND HASHTBEHESHT PALACES)**

**HOUTAN IRAVANI<sup>1</sup>, NASIM NASERI ESFAHANI<sup>2</sup>, SABA HAJIVAND<sup>2</sup>, MARJAN  
ESFANDIARI<sup>2</sup>, AZADEHHASAN AJILI<sup>2</sup>, ABDOLREZA KHOSROWPOUR<sup>2</sup>**

<sup>1</sup>Phd, Department of Architecture, Ardestan branch, Islamic Azad University, Ardestan, Iran

<sup>2</sup>Department of Architecture, Ardestan branch, Islamic Azad University, Ardestan, Iran

**ABSTRACT**

Safavi architecture is the reflex of social, economic, political conditions in the current era that considers the whole dimensions of life such as religion, power, and culture the same in validity. In this subject, the Safavi palaces (the symbol of the authority of government) are the buildings which are mixed with the nature and human-spiritual body. Water as the holy element has an effective role in better space for the palaces. So those who accomplish this research try to detect the effect of water on the pattern of the Safavi palaces. So by studying the literature and analyzing the samples of the Safavi palaces (Alighapou, Chehelsotoun, and HahtBehesht), it is found that the system of the Safavi palaces is based on the main axis of water flow that forms the other elements of palace.

**Keywords:**Safavi palace, architecture pattern, water

**INTRODUCTION**

Safavi era is one of the important eras in history of urban Development in Iran. Creating the central and authoritative government depends on the stable government, inventories, and technology development in buildings, urban development by developing the economy, having interest on the art and training the artists of Safavi kings, especially Shah Abbas I, are the effective factors for

developing in architecture and urbanization in that era. Because of the dimensions deserved to more researches, auspicious happen that they would never repeat in Shah Esmaeil I established this dynasty in 907 AH (1502 AD). In the first years of establishing this dynasty, Tabriz was the capital.

In the late 10 AH, the capital changed from Qazvin to Esphahan at the time of Shah

Abbas kingdom. By selecting the new capital, this city developed as the best and brightest city in Middle East. Regarding to the security of Iran in this era, buildings were made like Alighapou, Chehelsotoun, HashtBehesht the gate of Alighapou, and Ashraf palace in Isphahan, ShahzadehHossein in Qazvin. Magnificence in architecture and design of palaces increase the past experiences. Regarding to the importance of the subject, the architecture patterns of water in these palaces are analyzed. This research is done by the descriptive-analytic method. The method for gathering the data is based on library and observations.

## **2- Literature**

### **1-2- Pattern Water Supply in Gardens**

The most important issue for relieving the gardens is water supply that it is done by far distance. Well is one of the old methods for accessing the groundwater. Apart from the issue of access to water from distant places, supplying water is the other important subject that it is solved by the builders of gardens. The subterranean water in the culverts flows and passes in the main culvert and as the main source flows to the subsidiary culverts (pirnia, 2004, P. 429).

This method of supplying water was effective in designing gardens.

On the other word, design of garden is based on the garden segmenting, and the

main and subsidiary culverts (that resource, P. 430).

In designing the Islamic-Iranian gardens that the water should be cleaner than usual, as the unicellular and multicellular plants and animals grows faster in summer, for preventing to be contaminated, water should flow continuously, because cleanness and brightness cause to coolness and happiness. The gardens are made on the inclined ground; finally by making the steps on the way of waters, the water flow gets faster with noise (Naeima, 2006, P 43). The architecture played with water strangely. First, water came out from a main source and flowed in two sides, reached to the culverts that had many fountain and after flowing came out from the garden (that resource, P 45). The fountains and pools in the old gardens in Iran are the most essential factors in creating the gardens and the deep pools which had some fountains (that resource, P 46). For creating the calm and cool environment, there is no way, but to make the culverts in gardens that reach to the pools. These culverts often start to flow and reach to the pools in the regular intervals by using the natural slope. The fountain often is made in front of the main building of the garden. The fountain is the culverts that it is used for and decorating the water and compensating the drought.

The depth of these culverts is about 30 cm and its width is 80 cm, these waterfronts had the fountains that flew the water to the destination. This part was stone (that resource, P. 46). Next, the fountain dispread the water to outside and it

cool the weather .For creatingthe fountains that the treasure was on the high place in order to prevent the pressure of the height (image No. 1 and 2), (Naeima, 1385, P. 44).

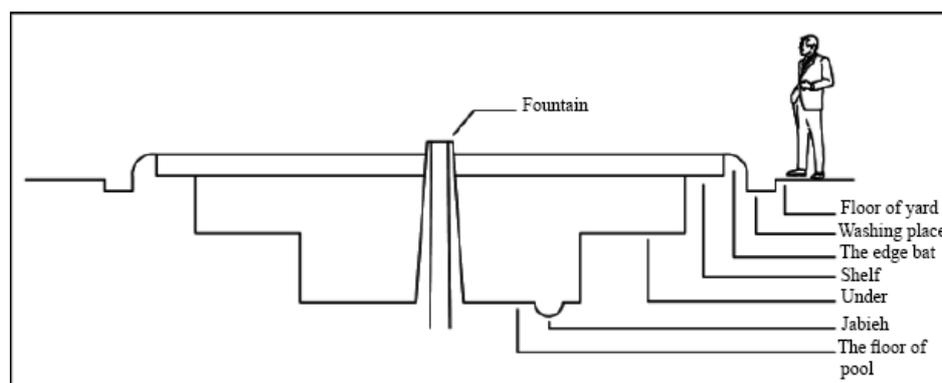


Image 1: A section of a length of the pool; (Resource : Pirnia, 2004, P 29)

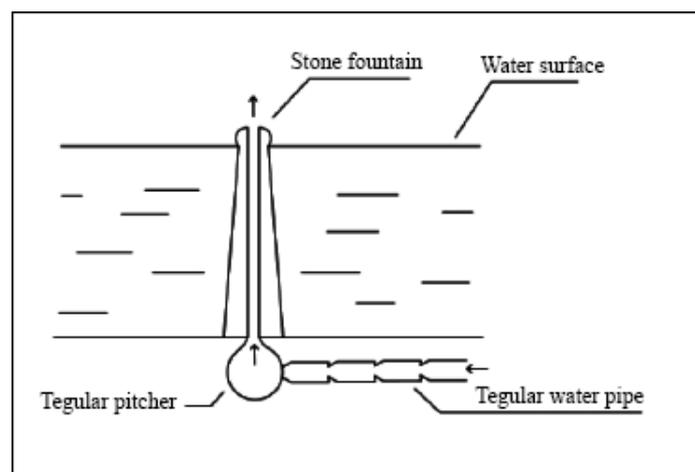


Image 2: The parts of building, transferring the water to the fountains (Resource: Pirnia, 2004, P 290)

The fountains are designed like the symbols that are the part of water supplying system (that resource, P 44). The big fountains are called Sherniashelen. The other made things for decorating the water is waterfall, for example, water pours on the piles of the grand floor from the upper floor of the building in HashtBehesht in Isfahan (Pirnia, 1383, P. 438). A pool is made near the building that it is smaller than

theheadmostpool. Totally, the pools in Iran were made in rectangle shape with 8 sides. The big pools had 12 sides, but none of them was circle or oval because they believe that water spoils in these pools (that resource, P. 435).

## 2-2The Effect of Water on thefiveSenses

Totally, water affects on the senses that it is analyzed in below chart (chart No. 1).

Chart 1: Reconfiguration on concentrating in the Iranian garden (resource: Shahcheraghi, 2005)

Perception of the senses	
System of water	Body systems
<ul style="list-style-type: none"> <li>- Finding and hiding water</li> <li>Linearlywater View / - Surface / volume / waterfall / river / drainage / Abgardan / pond / fountain / Search</li> <li>- The effect of some factors such as building the floor with stone for increasing the water, visually.</li> <li>- Light reflection and lightening.</li> <li>- Reflection of the picture of garden and creating the virtual extent, visually.</li> </ul>	Sight
<ul style="list-style-type: none"> <li>-Creating different phones and water sounds</li> <li>- Audile reflection</li> <li>- Surrounding for concentrating on audition</li> </ul>	Hearing
<ul style="list-style-type: none"> <li>-Creating humidity and dispersion of soil smell</li> </ul>	Taste and smell senses
<ul style="list-style-type: none"> <li>- Coolness (airflow with compound of wind, water, and shadow)</li> <li>- Making ready the path of waterflow</li> </ul>	touch
System of water	The main directing system
<ul style="list-style-type: none"> <li>- Mixing water system with flowing path</li> <li>-Flowing water in flowing path</li> </ul>	Direct path

### Comparing the Similarities and the Strength of the Palace in Different Eras in the History of Iran

One of the important features in Iranian architecture before modern era is its strength and harmony. There is no wonder if we know that from the late of Sasaki to the Islamic era, the effective principles governed on the most of the palaces. These palaces were the compounded and three-part that contain of three parallel axes that build the cruciform plan. You can see this system in the Sasaki and Sarvestani palaces. You can see the pattern of the Achaemenid palace with 4 porches and 4 rooms on their corners in most of the Safavi

palaces, such as HashtBehesht palace (Ziba artistic journal, 1386).

### 3- Sample studies of Safavi Palaces

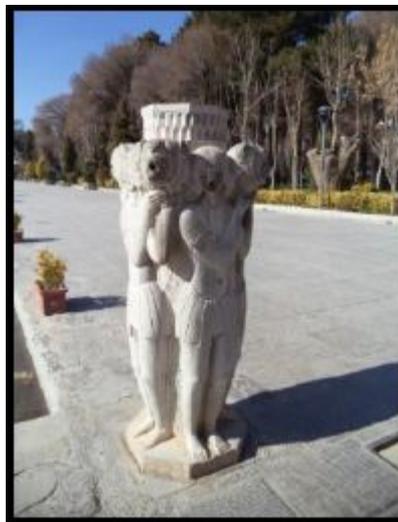
In this part, we are going to analyze the Alighapu palaces. Chehelsotoun, and HahtBehesht palaces.

**1\_3- ChehelSotoun Palace:** Another palace of Safavi palace in Isfahan is ChehelSotoun. This palace consists of the main palace which is decorated and painted, and a ceiling palace in front of the big pool. The ceiling of this palace is fixed on twenty staples that you can see the reflex of these staples on the water, so it is the set of 40 staples, and it is called ChehelSotoun (image No. 3). (Ziba artistic journal, 2004).



**Image 3: ChehelSotoun palace; (resource: Internet).** This palace that consists of 40 staples and garden, and ChehelSotoun palace is located on the middle; The area is 2120 m, the place of building is upper than the ground for 1 m, and a big pool was made in the middle that is as a lake. The length of pool which is in front of the building is 110 m, and its width is 16 m that it makes the palace more beautiful. The water flow is from the middle of palace from 4 taps that

are in the corners of the pool. The stone fountains that are in all parts of the small culverts, makes that more beautiful. There are four stone lions in four corners of the pool which is in front of the building like the stone lions around the pool in the middle of the 18 staples porch. There is a column of fountains in the middle of this pool (image No. 4 and 5). In the Campfer's view, this pool was like the last piece that completes the magnificent image of ChehelSotoun. Half of this pool is located next to the building and the other is behind that, and today we can see that it goes on to the end of the garden. The water of this pool multiplies the staples. (Honarfar, 1971, P. 560) (MokhtariEsfahani and Esmaeili, 2006, P. 163-164).



**Image 4: The stone lions around  
The large pool  
(resource: author)**

ChehelSotoun consists of a big porch that its length is 38 m, width 17 m, height 14 m; and it's made to the east, 18 staples are buttonwood and pinyin and the shapes are



**Image 5: The stone lions around  
Marble pool  
(resource: author)**

multilateral, 16 sides and 8 round sides. Four staples in the middle are located on four stone lions. These lions incised in away that two lions have a head; water

comes out from the mouth of the headmost lion and it flows to the marble pool which is in the middle, and the source of that

water is from the black culvert (Image No. 6 and 7). (RafieiMehrabadi, 1973).(Godar, 1989, P. 347).

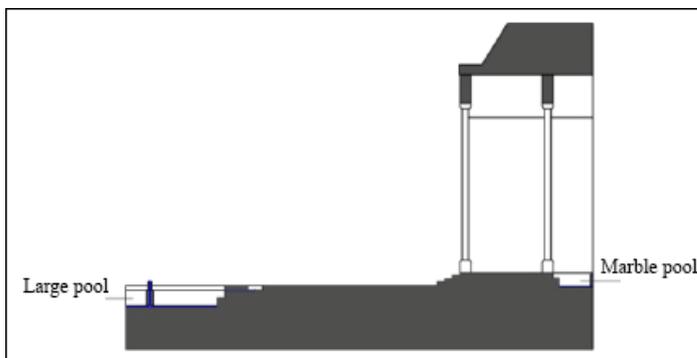


Image 6: The section of Marble pool  
( Resource : author )

Image 7: Marble pool  
( Resource : author )

The marble pool has four sides, and there is a beautiful culvert with many fountains.(image No. 8 and 9).

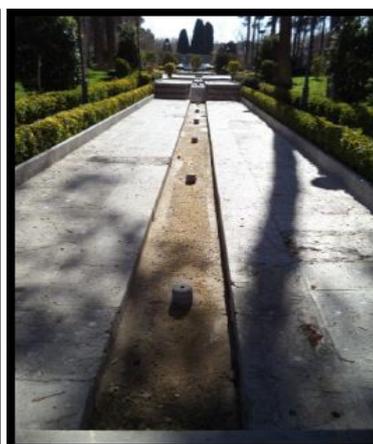


Image 8: The culvert with many  
(resource: author)

Image 9: The culvert with many  
(resource: author)

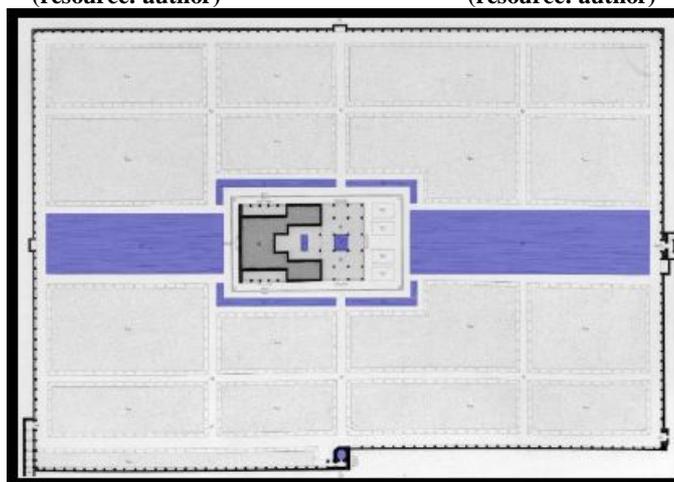


Image 10: The architecture pattern of water in ChehelSotoun gardens (resource: Pirnia, 2006)



Image 11: The section of architecture pattern of water in ChehelSotoun gardens (resource: author)

**2-3 HashtBehesht Palace:** Another palace of Safavi in Isfahan is HashtBehesht that it refers to the late Safavi, and the feature is using water in building of that (image No. 12). (Ghayoumi, 1999).



Image 12: HashtBehesht palace in Isfahan (resource: Ziba artistic journal, 2007)

This palace has the beautiful middle space, the pool in down, light in up, and the decorated ceiling. There are four porches around the pool in the corners. (Ziba artistic journal, 2007). This three floors palace is like a cave, as water flows from every side. Water flows in a thin path to the all floors; if someone stands on every part of this palace, he could imagine that water has surrounded him. Water is transferred by a machine and the pipe (image No. 13 and 14). (Mokhtari and Esmaili, 2006, P. 171).

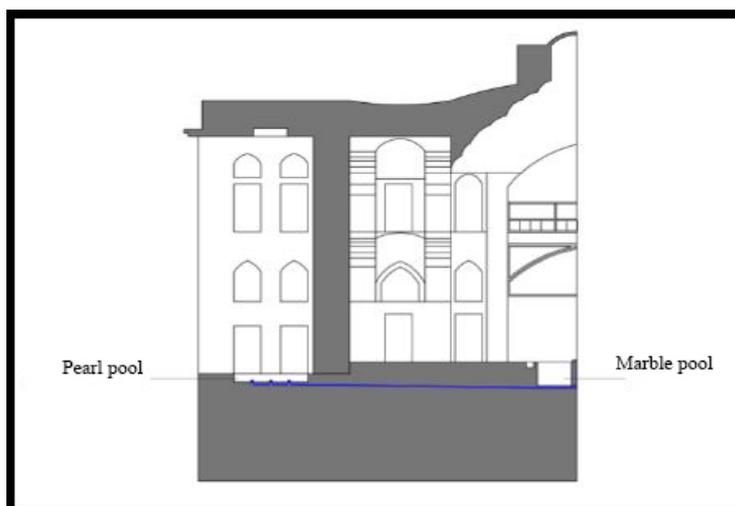


Image 13 : The section of marble pool ( resource : Author )

Four opened porches are designed to the garden in four sides around the palace, the north porch that is expanded three other porches and the space is about 100 m<sup>2</sup> with

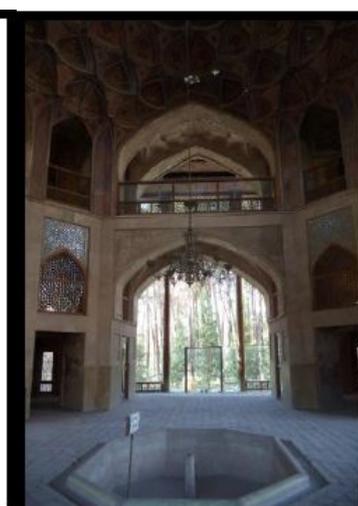


Image 14 : Spring house ( resource : Author )

a marble pool which is not deep and it is called ChehelMorvarid. The floor of this building is equipped with a hydraulic system, water flows in the fountains of the

four pools, especially in the mentioned pool of this palace .(Shayesteh and Ghasemi, 2004). There is a beautiful marble pool in the middle of the north porch. This pool is called pearl (morvarid), as it is incised in a

way that when water comes out from the holes, it is like a pearl. Jaberi has known this pool as one of the marble pool which is remained from safavi dynasty (image No. 15 and 16). (Ghayoumi, 1999).



Image 15: Pearl pool



Image 16: The fountains of the pearl (resource: Author) pool. (resource: Author)

This palace has the hydraulic system which is under the pressure of the pipe like a fountain and it is equipped with the system like a waterfall in the south side of the porch like channel; and water flows from the upper floor, it pours to the small pool in this porch; it acts like an air conditioner with an euphonic sound (Shayesteh and Ghasemi, 2004). In the south porch, water pours to the wall of porch from the pool which is located on the upper room; it

moves on the marbles with the salient edges and it flows to the tile pool in the middle the internal porch, as if the water of the other pools is supplied from here. This pool is a water pipe that the water flows to the pool which is in the middle of the palace. Water may be transferred from the well which is located on the side rooms or the opened space on the south porch, and it is supplied by pressure (image No. 17 and 18). (Ghayoumi, 1999).



Image 17: The pool of the south porch (resource: Author)

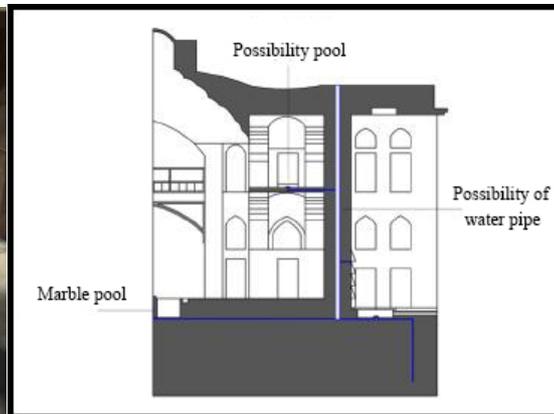


Image 18: The section of pool south porch. (resource: Author)

Each of the small rooms has the decorative shape, some of them have the special pool; the water of these fountains is supplied by a

lead pipe which is applied on the wall (image No. 19). (Vilber, 2006).



**Image 19: The rooms of the building (resource: Author)**

There were some pools around the garden in a specified space. These pools are made of the big sculptor stones and they are joined by the special material. There were the stone culverts (RafieiMehrabadi, 1973). The east and west culverts flow the water which is from Chahar- bagh garden to the pool that you can see the ducks on that. A small culvert is around the building, and there is also a big waterfront in front of the eastern and western porches with girth of 8\*50 (Ghayoumi, 1999). The building is located on the platform; a culvert passes in the middle around this platform that every porch would be like a pool. These pools

can be like an inductor between the inside and the beautiful view of outside and its big waterfronts. According to the gained map, the east and west pools are made around the building up to the edge, so they join this small place to the big place. The pools flow to the porch, and they are like the mirrors for increase the beauty of this building (that resource). Two big culverts have surrounded the garden; one is in front of the palace and flows to two big lakes, there are the stone culvert and waterfronts around the building that water is always flowing (Image No. 20 and 21). (RafieiMehrabadi, 1973).



Image 20 : waterfronts  
(resource: Author)

The big pool is the answer to the Muqarnas arc. According to the Cast images and his explanations and others, this pool has a fountain with a long spurt that it causes to water flow in a beautiful shape under the Muqarnas arc, and the sound of water could be heard. (Ghayoumi, 1999).



Image 21 : waterfronts  
(resource: Author)

Something which is hided beyond these glaring beauties is wonderful skill in water engineering that it is manifested from the early years ago in Allhaverdi Khan bridge, Khajou bridge, lake garden. (image No. 22 and 23 ). (that resource).

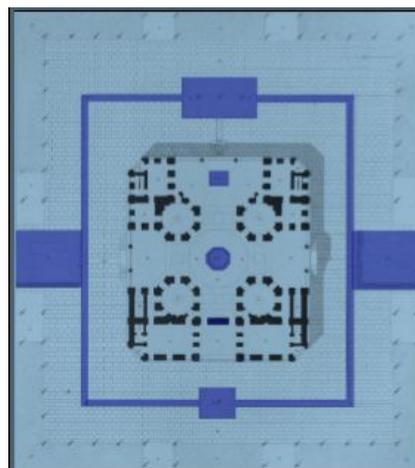


Image 22: The architecture pattern of water in HashtBehesht  
(Resource: Pirnia, 2004)

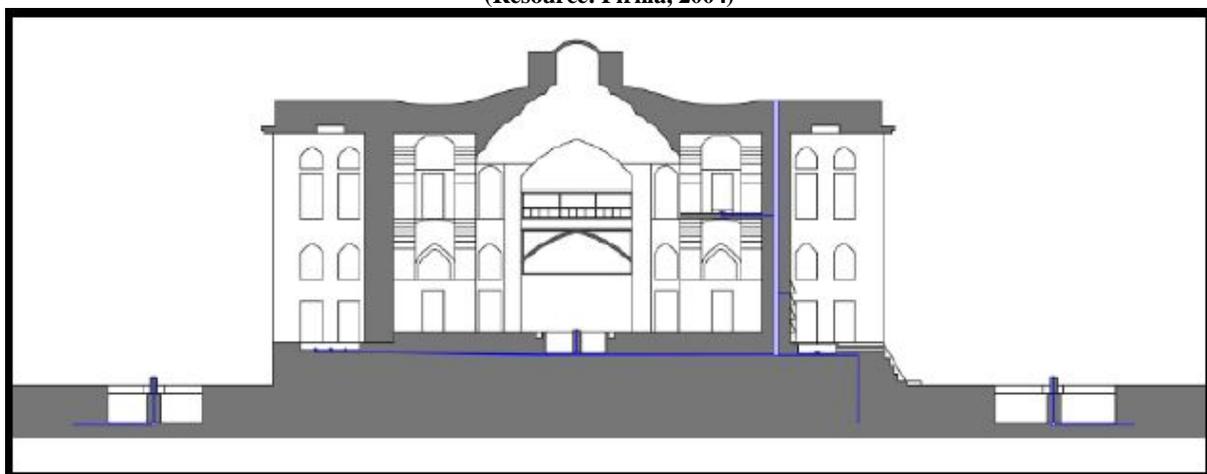


Image 23: The section of the architecture pattern of water in HashtBehesht(resource: Author)

## CONCLUSION

Iranian palace in Safavi era is mixed with water, a vital element, as if it is the inseparable part of that. The studies in this research indicate that palace building in Safavi era is designed with the geometric pattern which has four gardens, and the water is supplied by people of Mad. Water flows to garden, it comes out more than its consumption, and it is used for the other cases. The water is gathered in a big pool and it flows to the ditches. The water flows to the small pool by the culverts around the garden parallel to the natural slope and it emerges from the garden. Also, in palaces in the gardens, water flows to the palaces like a waterfall. Totally, water is undeniable element in designing the Safavi palaces, as it is the big rectangle pool is located in front of the building.( image No. 24 ).

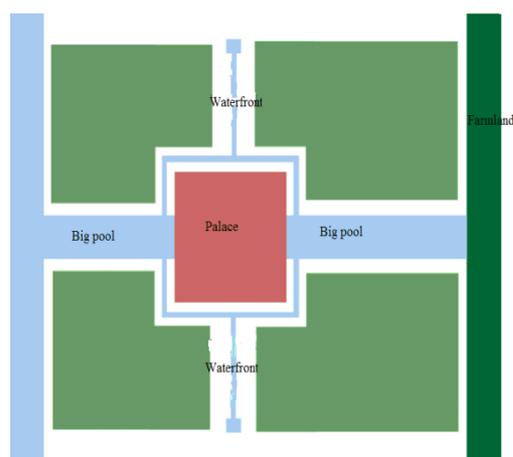


Image 24: The common pattern in the water architecture in safavipalaces (resource: Author)

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