Aqueduct of Padre Tembleque (Mexico)
No 1463

Official name as proposed by the State Party
Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America

Location
Districts of Tepeapulco, Zempoala and Otumba
State of Hidalgo, State of Mexico
Mexico

Brief description
The aqueduct of Padre Tembleque, named after the friar Francisco de Tembleque, was constructed between 1554 and 1571 and constitutes an hydraulic system located between the states of Mexico and Hidalgo in the Mexican Central Plateau. The heritage canal system encompasses a water catchment area, springs, main and secondary canals, distribution tanks, arcaded aqueduct bridges, reservoirs and other auxiliary elements, which extend over a maximum distance of 48.22 kilometres. The aqueduct structures were built with supporting structures of earthen adobes in the Mesoamerican construction tradition, and reference European models of water conduction developed during the Roman period.

Category of property
In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this property was initially submitted as a serial nomination of 3 *sites*. At the recommendation of ICOMOS the State Party withdrew the nomination of 2 serial components by letter of 16 February 2015. The property accordingly remains a nomination of 1 *site*.

In terms of the *Operational Guidelines for the Implementation of the World Heritage Convention* (July 2013), Annex 3, the property is also nominated as a *heritage canal.*

1 Basic data

Included in the Tentative List
20 November 2001

International Assistance from the World Heritage Fund for preparing the Nomination
None

Date received by the World Heritage Centre
2 October 2013

Background
This is a new nomination.

Consultations
ICOMOS has consulted its International Scientific Committee on Earthen Architectural Heritage, TICCIH and several independent experts.

Technical Evaluation Mission
An ICOMOS technical evaluation mission visited the property from 9 to 12 September 2014.

Additional information received by ICOMOS
ICOMOS sent a letter to the State Party on 22 August 2014 requesting additional information with regard to the exact location of features described in the nomination dossier, the description of all features proposed for nomination, the justification for the serial contribution as well as the history and development of components 02 and 03, the justification of criterion (v), future conservation plans and operation of the aqueduct, ownership details as well as the protective designation of the property. The State Party provided additional information in response to the questions raised as well as further aspects on 24 October 2014

Following its World Heritage Panel, ICOMOS sent a second letter on 22 December 2014 recommending a reduction in number of the serial properties and requesting additional information with regard to management and monitoring. ICOMOS and the State Party further arranged an online conference call to have some dialogue with the technical experts concerned on 13 January 2015 and a meeting on 22 January 2015. The second additional information letter sent by the State Party on 16 February 2015 responded to some of the aspects discussed during this online meeting.

The additional information has been included under the relevant sections below.

Date of ICOMOS approval of this report
12 March 2015

2 The property

Description
Nominated as a heritage canal, the property presents the key components of an hydraulic system of water aqueducts located in the Mexican Central Plateau. The property was initially composed of three site components comprising an overall property area of 6,560.3 ha. These have been reduced by the withdrawal of site components 02 and 03, which are described below, which reduces the size of the property to 6,540 ha.

The first component, indicated as 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites, covers these 6,540 ha and includes the key elements of the hydraulic system along a distance of 48.22 km. It is surrounded by a buffer zone of 34,820 ha. Component 02,

Town, Convent, Aqueduct and Water Tank of Tepeapulco, initially designated the second site component, was 17.7 ha in size. It shared a mutual buffer zone of 555 ha with the third site component entitled 03 Archaeological Site of Xihuingo, which covered an area of 2.6 hectares. The currently proposed and the two withdrawn components remain described separately below:

01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites

The key elements of the hydraulic system are located in this largest site component, which includes to the north the water source of the system in the form of the volcanic mountain El Tecajete, which acts as a water catchment area. In its vicinity are a series of springs, so-called *ojos de agua*, which are diverted into a main water canal. This main water canal covers the first 3.37km of the system up to the diverter or slit tank of El Tecajete, which divides the canal into two main branches, the branch to Zempoala of 5.98km length, and the branch towards Otumba which extends furthest south for 38.87km.

One of the key architectural features on the initially shared main canal is the aqueduct of the Hacienda el Tacajete, an arcaded structure carrying the water across 55 round arcades over a distance of several hundred meters. The branch towards Zempoala is frequently an underground canal cut to a depth of 1.2 meters into the hilly landscape. In Zempoala this branch splits again into two terminal 16th century square cisterns, which provided water to the key complexes in Zempoala, such as the Main House or the Todos los Santos Convent.

The branch towards Otumba heads largely south-west, passing by a number of haciendas, which are provided with water through smaller diverter tanks along the course. To reach the Hacienda of Guadalupe de Arcos an aqueduct of 14 round arches carries the water across the lake at Guadalupe de Arcos. Between the southern borders of the municipality of Zempoala and the northern borders of the municipality of Nopaltepec, one finds the key structures which facilitate the functioning of the southern hydraulic system, the monumental arcade which bridges the Tepeyahualco Ravine and the Papalote River. The aqueduct bridge is constructed of 68 round arches of stone masonry with lime-sand mortar, the tallest of which reaches to a height of 38 metres.

In the central section of this branch a number of haciendas are connected to the water canal before the hydraulic system enters the municipality of Otumba, such as the Hacienda of Santa Inés and the Haciendas of San Miguel Ometusco and Zoapayuca in the municipality of Axapusco. The town of Otumba marks the southern end of the hydraulic system, once more integrating several diverter tanks and water storage tanks. Their provision can still be understood in some architectural structures, such as the House of Culture, the House of Viceroys or the Convent of La Purísima Concepción.

02 Town, Convent, Aqueduct and Water Tank of Tepeapulco (withdrawn by letter of 16 February 2015)

The second site component is entirely located in the Town of Tepeapulco, about 12 kilometres east of the first site component. It contributes fragments of an antecedent to the aqueduct of Padre Tembleque, the aqueduct of Tepeapulco completed in 1545. In contrast to the first site component, this structure is limited to its urban and somewhat fragmented features and includes a small arcade, a water tank, a reception pond and communal laundries as well as an atrium and the terminal cistern. Of the previous 27km extension of the aqueduct of Tepeapulco, only around 600 meters of water canal and structures are included in this site component.

03 Archaeological Site of Xihuingo (withdrawn by letter of 16 February 2015)

This third site component, Xihuingo Archaeological Site, is located 5 kilometres north of the second and likewise circa 12 kilometres east of the first site component. The archaeological site comprises a walled settlement built for astronomical and calendar observation and contains several rock art petroglyphs. It has a number of occupation layers, all prior to Spanish contact, dating to the Tzacualli phase (0-200 CE), the Teotihuacan culture (200-600 CE) and Mazapa phase, and later complex Aztec phases. This site component does not contain any elements typical for water distribution systems.

History and development

After a shorter early presence in the years 1527-1540, the Franciscan friars settled in Otumba in 1553 under their guardian Francisco de Tembleque, who committed to assist the community of Zempoala and pay 20 annual pesos in exchange for water to be transported to Otumba via an aqueduct. The construction was commenced at a time during which Bernardino de Sahagún was collecting material for an anthropological text, which is considered an indispensable source for our knowledge of Mesoamerican cultures. This climate allowed local workers in the construction of the aqueduct to share their tangible and intangible expressions of local culture with the supervising friars.

Already a decade earlier, a smaller aqueduct had been built under the supervision of Andrés de Olmos in Tepeapulco between 1541 and 1545. This structure consisted of a rather simple sewage pipe, covered by lime and stone, predominantly underground with one visible arcade, located in the site component of Tepeapulco. However, only fragments of this earlier structure have survived until the present.

From 1553 onwards 17 whole years were dedicated to the construction of the aqueduct bringing water to Zempoala and Otumba. The construction was executed in close cooperation and with more than 400 stone masons and workers from the communities of Zacuala, Tlaquilpa, Zempoala and Otumba, working solely on the basis of their ancestral tradition of social work organization known as *tequio*. In particular the

construction of arcades was also based on local knowledge and techniques of the so-called Mestizo System, first building supporting structures of adobe and gradually raising the stone constructions, which allowed workers horizontal movement, rather than working with scaffolds or formworks. The local workers also left their signature on the structure by decorating keystones and spandrels with symbols corresponding to Mesoamerican cosmogony.

Following the hydraulic system's completion in 1571, regular maintenance and conservation works had to be coordinated among the four concerned communities as canals continued to clog or fracture over the centuries. Whilst initially the canal was intended to provide drinking water to the urban inhabitants, the demand for water for agricultural needs in the haciendas rose significantly in the 18th century, leading to conflicts over distribution rights. Following the independence of Mexico in the early 19th century further conflicts lead to the partial abandonment of the aqueduct, in particular of the Otumba branch. In 1851 the engineer Francisco Garay travelled along the canal system and pointed out the need for urgent conservation, which was finally decreed by the Emperor in 1865. However, conservation works were not carried out until the heritage value of the aqueduct was acknowledged in the early 20th century. Only in the last years of the 20th century, has a project to recover and restore the historic canal been initiated by the National Institute of Anthropology and History (INAH), funded by resources provided by the World Monuments Fund, the Ambassadors Fund and the US Congress. As the conservation works are only partially completed, the aqueduct is not yet once more operational along its full course.

3 Justification for inscription, integrity and authenticity

Comparative analysis

The property has been identified as best comparable in the typological framework of water management systems and in the chronological context of the Colonial period of Mesoamerica, whilst recognizing some cross-references to the European Renaissance and Roman period with regard to hydraulic architectural achievements. The comparative analysis accordingly aims to compare the property with hydraulic complexes of similar character – in particular examples already recognized on the World Heritage List or tentative lists –, with other aqueducts at a national or regional level, and with the most important European achievements of aqueduct construction from the Roman through to the Renaissance period.

Among the aqueducts already inscribed on the World Heritage List or located within larger contexts of some World Heritage Sites, the comparison highlights earlier structures such as the Pont du Gard, France (1985, (i), (iii) and (iv)), the Aqueduct of Segovia, Spain (1985, (i), (iii) and (iv)), the aqueducts of Los Milagros and San Lázaro in the Archaeological Ensemble of Mérida, Spain (1993, (iii) and (iv), the Amoreira Aqueduct in Elvas, Portugal (2012, (iv)), the Agua da Prata Aqueduct in Évora, Portugal (1986, (ii) and (iv)), or the Los Pegões Aqueduct in Tomar, Portugal (1983, (i) and (vi)).

However, also later structures which have been inscribed as important examples of hydraulic water systems have been compared including the Pontcysyllte Aqueduct, United Kingdom (2009, (i), (ii) and (vi)), the Carolina Aqueduct of Vanvitelli in the 18th century Royal Palace at Caserta, Italy (1997, (i), (ii), (iii) and (vi)) or three Mexican examples, the Aqueduct of Morelia (1991, (ii), (iv) and (vi)), the Aqueduct of Querétaro (1996, (ii) and (iv)) or the Aqueduct of Zacatecas (1993, (ii) and (iv)).

ICOMOS considers that this part of the comparison is unfortunately exclusively focused on the height of single arches in aqueducts to prove the point that the aqueduct at Tepeyahualco provides the highest elevation for a single arch. As a result the larger features of the water distribution system, its preservation of functional elements or construction details, have not been compared to other examples of water management systems, although some are briefly mentioned, such as the Shustar Historical Hydraulic System, Iran (2009, (i), (ii) and (v)), the Dujiangyan Irrigation System, China (2000, (ii), (iv) and (vi)) or the *Aflaj* Irrigation Systems of Oman (2006, (v)).

Other examples of aqueducts in France, Italy, Portugal, Turkey and Spain are likewise reduced to the comparison of height and illustrate that the Aguas Livres Aqueduct in Lisbon, Portugal is indeed a single level arch structure of about double the height of the aqueduct of Tepeyahualco and accordingly referred to as the highest historic aqueduct built in stone masonry. It dates to about two centuries later than the Padre Tembleque hydraulic system and was constructed from 1748 onwards.

In the regional chronological analysis, it is recognized that at present three Mexican aqueducts from the Colonial period in Mesoamerica have been included in the World Heritage List. However, all three have not been nominated as hydraulic water systems but were components of a city or archaeological site that was inscribed.

ICOMOS notes that the comparative analysis does not discuss the selection of serial components. ICOMOS further notes that all comparisons discussed are focused exclusively on the features in component 01 Aqueduct of Padre Tempeque Hydraulic Complex and associative sites of the property and do not reference the features included in the two other components, which have in the meantime been withdrawn at the recommendation of ICOMOS. However, even with regard to the first component, ICOMOS considers that the comparative analysis falls short of comparing the water distribution system of the Aqueduct of Padre Tembleque with relevant

similar examples of hydraulic systems and likewise lacks comparison with other structures created using similar adobe techniques merging local and European building traditions. Nevertheless, ICOMOS was able to confirm the exceptionality of the hydraulic water system included in the first serial component initially proposed by consulting its expert networks across the region.

ICOMOS considers that despite several gaps in the comparative analysis the first serial component proposed qualifies to be considered for the World Heritage List.

Justification of Outstanding Universal Value

The nominated property is considered by the State Party to be of Outstanding Universal Value as a cultural property for the following reasons:

- The hydraulic system is an outstanding example of a heritage canal because its main arcaded aqueduct at Tepeyahualco reaches a total height of 39.65m with its central arch of 33.84m height, which is the highest aqueduct ever constructed at that time with a single level of arches;
- The heritage canal initiated by Padre Tembleque and built with support from the local communities is a unique representation of the ingenious fusion of Mesoamerican and European construction traditions, combining the mestizo tradition with the tradition of Roman hydraulics;
- The hydraulic complex is directly associated with the maguey landscape, an ancestral landscape of unique character, as well as to the birth of American anthropological sciences following the work of Bernardino de Sahagún, which is considered an indispensable source of knowledge of the old Mesoamerican cultures.

ICOMOS considers that this justification exclusively refers to component 01 of the three serial components presented in this nomination and identifies a justification for Outstanding Universal Value which components 02 and 03 make no distinctive contribution towards. In consequence, ICOMOS recommended excluding components 02 and 03 from the nomination proposal. These were subsequently withdrawn by the State Party.

In ICOMOS' view component 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites demonstrates Outstanding Universal Value as an early and unique example of an hydraulic system in the Mesoamerican context which is exceptionally well preserved, as well as an example of a unique fusion of ingenious Mesoamerican and European construction traditions. However, ICOMOS considers that this potential does not apply to the surrounding maguey landscape in the context of this nomination proposal and consequently cannot accept the landscape approach to justification of Outstanding Universal Value provided by the State Party.

Integrity and authenticity

Integrity

The initial component 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites retains the complete hydraulic system over a distance of approximately 48 kilometres. Its landscape setting is predominantly rural characterized by distinctive maguey plantations, with the canal system either historically buried and enclosed in stone with fired tile pipework in some sections, or built on the ground surface, either open or covered by stone. The six sections of aqueduct with 137 visible arches represent less than five percent of the total hydraulic system. All elements of the system are included in the component 01, which illustrates a high degree of integrity in reference to the historic extension and functionality of the hydraulic system. Components 02 and 03 did not seem to add to this completeness.

Extremely few threats of development or land-use seem to affect the Aqueduct of Padre Templeque. The rural landscape setting provides a high level of integrity with only occasional interruption by roads or power lines. The historic urban centres of Zempoala and Otumba have been encroached upon by some unsympathetic new constructions but these have little impact on the attributes of the hydraulic system. ICOMOS considers that component 01 includes all elements which are necessary to illustrate the Outstanding Universal Value proposed by the State Party.

ICOMOS considers that the integrity of component site 01 has been justified.

Authenticity

The physical manifestations of the hydraulic system are well preserved in its various elements, including *ojos de agua* (springs), *apantles* (water canals), *aljibes* (cisterns), arches, fountains, water tanks, and other water features. They retain authenticity in form and design, material and substance as well as location and setting. The hydraulic system also partially retains authenticity of use and function in the six-kilometre segment of Zempoala, which currently carries water supporting non-potable uses such as washing clothes, irrigation, etc. It is intended to regain completely authenticity of use and function by re-enabling the passage of water through the other branch of the system that connects to the town of Otumba, at a distance of 39 km. ICOMOS recommends that any measures to regain usability of this branch should be carefully supervised by heritage professionals and evaluated in terms of their potential negative impact to the authenticity of the property by means of Heritage Impact Assessments (HIAs).

Authenticity in traditions, techniques and management system is illustrated by the continuing maintenance and management by the local communities, during which repairs are undertaken in traditional construction techniques and materials. To a certain extent, the site still evokes feelings which could be related to its original time

of construction. This applies in particular where arches of the system exist and where one can see the hundreds of visible glyphs that were incorporated in the aqueduct's construction by the indigenous populations, underscoring that the spectacular engineering work was a collaborative effort between the indigenous population and the Spanish clergy.

ICOMOS considers that in regard to Outstanding Universal Value the authenticity of site component 01 has been demonstrated.

In conclusion, ICOMOS considers that the conditions of integrity and authenticity have been justified for component 01 of the initially submitted series.

Criteria under which inscription is proposed
The property is nominated on the basis of cultural criteria (i), (ii), (iv), (v) and (vi).

Criterion (i): *represent a masterpiece of human creative genius;*

This criterion is justified by the State Party on the grounds that the aqueduct is a masterpiece of Renaissance hydraulics in the New World which represents the realization of the ideal perfection proposed by Renaissance doctrines in American lands. It further integrates the highest single-level arcade ever built in aqueducts from Roman times until the middle of the 16th century, achieved as a result of the ingenius use of an adobe formwork as alternative to scaffolding.

ICOMOS considers that the monumental aqueduct arcade which bridges the Tepeyahualco Ravine and the Papalote River could be considered a masterpiece in the sense of criterion (i), and that this allows for its application to the remaining components of the hydraulic system, despite the fact that these combine construction technologies that had previously been developed in Europe or local contexts respectively.

ICOMOS considers that this criterion has been justified for serial component 01.

Criterion (ii): *exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;*

This criterion is justified by the State Party on the grounds that the hydraulic system exhibits an important interchange of European tradition in terms of the knowledge of Roman hydraulics evidenced in the canals' gradual slope through the irregular topography, and Mesoamerican culture represented by the use of the traditional social organization of collective working, the utilization and adaptation of local methods of adobe construction as well as the presence of glyphs illustrating preHispanic symbols and cosmology in several arcade structures. Also, the fusing of the humanist ideals of the Franciscan order with the local collective traditions promoted common wellbeing and an impressive construction achievement over 17 years.

ICOMOS considers that for component 01 the conjunction of the Roman heritage of masonry aqueducts, hydraulic management techniques inspired by Arab-Andalusian know-how and pre-Hispanic indigenous traditions for adobe construction is indeed exceptional, with clear material evidence. Although the use of adobe brick instead of wood was applied elsewhere in Mexico, it wasn't often and certainly not with the same dramatic effect as in the aqueduct which bridges the Tepeyahualco Ravine and the Papalote River.

ICOMOS considers that this criterion has been justified for component 01.

Criterion (iv): *be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;*

This criterion is justified by the State Party on the grounds that the aqueduct represents an outstanding example of hydraulic water architecture, based on in-depth knowledge of Roman and Renaissance hydraulic engineering and integrated with local Mesoamerican construction knowledge. This combination created the highest ever single-arch arcaded aqueduct, which, using the same technology, was neither achieved earlier nor reproduced later and reached a surprising scale which continues to lack comparators.

ICOMOS considers that, as in previous criteria, the justification presented applies exclusively to component 01 and cannot be considered relevant for the other two serial components. In relation to the first component, more important than the maximum height of the arches, which is emphasized in the nomination, are the specific techniques and regional materials used in construction which created a unique type of hydraulic system at the time of Mesoamerican-European encounters. ICOMOS considers that a comparative analysis which considers the construction technology provides a basis to justify this criterion for component 01.

ICOMOS considers that this criterion has been justified for component 01.

Criterion (v): *be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;*

This criterion is justified by the State Party on the grounds that the maguey landscape is representative of the interaction with the rural natural environment around the aqueduct and has supported an agave agriculture of

preHispanic origin. The cultivations, which are defined by parallel lines of plots and terraces, are utilized to produce a fermented drink called *pulque*. The ancestral maguey landscape has recently become vulnerable to agricultural and urban economic development.

ICOMOS considers that the boundaries of the site components contain very limited features of the maguey landscape which cannot be said to be of Outstanding Universal Value in comparison to several other agricultural landscapes in the Mesoamerican region. It has also not been illustrated in which way this ancestral landscape is linked or provides support to the hydraulic system presented at the core of this nomination and how its landscape features could be integrated in the wider context of this nomination.

ICOMOS considers that this criterion has not been justified.

Criterion (vi): *be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance;*

This criterion is justified by the State Party on the grounds that the aqueduct of Padre Tembleque is directly associated with the birth of ethnographic and anthropological science in America, more specifically with the writing of *Los Primeros Memoriales, Historia general de las cosas de la Nueva España* by Bernadino de Sahagún. The construction elements further illustrate the associations with preHispanic collective memory with regard to religious cosmogony, language and traditions as evidenced in the stones of the hydraulic complex which show various carved symbols.

ICOMOS considers that whilst the works of Bernadino de Sahagún may have had an important impact on the history of Mesoamerican anthropology, the fact that his researches were based in close vicinity to the canal's construction landscape and also coincided with the beginning of the construction under Francisco de Tembleque are not sufficient to illustrate a direct association that could be said to be of Outstanding Universal Value. ICOMOS further considers that while the symbols engraved in the hydraulic architecture do reference the integration of the workers' preHispanic cosmogony, these symbols are not of outstanding character in themselves but rather function as a reference to the integration of different traditions and cosmologies, which is better acknowledged under criterion (ii).

ICOMOS considers that this criterion has not been justified.

ICOMOS considers that the initial serial approach was not justified and recommended reducing the property to just component 01, which was agreed to by the State Party.

In conclusion, ICOMOS considers that criteria (i), (ii) and (iv) have been justified for component 01 and that authenticity and integrity have been demonstrated.

Description of the attributes

The attributes of Outstanding Universal Value comprise all elements of component 01 of the hydraulic system, including springs, main and secondary canals, distribution tanks, several arcaded aqueduct bridges, reservoirs and other auxiliary elements, extending over a distance of 48.22 kilometres. The elaborate techniques and cultural exchanges become specifically visible in the mastery of the monumental arcade bridging the Tepeyahualco Ravine and the Papalote River, which is constructed in 68 round arches the largest of which reaches a height of 38 metres.

4 Factors affecting the property

The Aqueduct of Padre Tembleque is located in a rural landscape dominated by agriculture and at present development pressures are low. However, ICOMOS considers that further gradual expansion of Mexico City can impact the integrity if proper management controls are not adopted. Important view lines could eventually be affected by urban sprawl from Mexico City, a city of over 20 million people located at only one hour's distance (62 km). The same risk could arise from a possible expansion of the industrial complex of Ciudad Sahagún, located at approximately 9 kilometre's distance to the aqueduct and currently shielded from view by a small mountain. New regional and local roads are still being planned in the property and ICOMOS considers that they will need to be controlled in terms of visual impact and construction methods in the vicinity of the hydraulic system.

The property receives few visitors today but given the proximity to the capital visitor numbers may rise considerably. With the majority of the hydraulic system being subterranean, the visitors will likely peak at the few visible and impressive architectural structures, in particular the grand arcaded aqueduct with its 68 arches. ICOMOS considers that it will be important to carefully plan and control the establishment of visitor infrastructure in these areas. Likewise, because large sections of the hydraulic system are underground, and thus are not visible, education and public awareness will be paramount in order to not cause inadvertent damage to these sections. Rows of maguey plants are currently planted alongside all sections to indicate the course of the aqueduct.

Under environmental pressures the State Party indicates the risk of pollution which could lead to contamination of the aquifers of El Tecajete Hill and would reduce the water quality and with it the means of use of the hydraulic system. Few natural risks affect the property but man-made risks can be identified. ICOMOS considers that a key threat is posed by unauthorized access of vehicles in the immediate vicinity of the key architectural structures. These not only adversely affect

the setting but also cause real risks to the physical structures.

ICOMOS considers that the main threats to the property are urban sprawl, vehicular access to the aqueduct, development of inappropriate visitor infrastructure and water pollution.

5 Protection, conservation and management

Boundaries of the nominated property and buffer zone

The boundaries of the remaining property component 01 and its buffer zone seem adequate in both its rural and urban areas. It is obvious that care was taken when establishing the boundaries to take advantage of topographic features (mountains, hills, and ridges) which will help protect the visual characteristics of the surrounding landscape. All boundaries are marked using GIS coordinates and are clearly delineated in the maps provided.

ICOMOS considers that the boundaries of the nominated property component 01 and of its buffer zone are adequate.

Ownership

The majority of land in the property is agricultural fields in the rural areas and residential properties in the urban components. Of these, 96% are in private ownership, 3.8% are communally owned and just 0.2% belong to the public administration. In the additional information that the State Party provided at the request of ICOMOS, it clarified that this 0.2% covers the key architectural structures, such as the Tembleque aqueduct. It was also specified that according to the General Water Act, waterways – including canals – are under federal administration and management, even if they pass through private land.

Protection

In the additional information that the State Party provided at the request of ICOMOS, it affirmed that all elements of the property are covered by the Federal Law on Archaeological, Artistic and Historic Monuments and Areas promulgated in 1972 as Historic Monuments by Determination of Law so that these do not require any specific decree or declaration.

This implies that in order to initiate any changes to the current condition of the property and its immediate setting, permission by the National Coordination of Historic Monuments of the INAH and from the Hidalgo and State of Mexico INAH Centres is required. The immediate setting has been defined as the buffer zone, which aims to preserve the characteristic maguey landscape as the property setting. Concerted efforts made by the federal, state, and municipal authorities to work together to achieve trans-governmental awareness and proper protection for the hydraulic system are still very recent and ICOMOS considers it difficult to judge the effectiveness of these efforts at the present stage.

ICOMOS considers that the legal protection in place is adequate and that the application of protective measures will be adequate if consistently committed to.

Conservation

The elements and attributes included in component 01 of the property have recently been inventoried and described. The state of conservation of the hydraulic system is impressive, although several canals are not presently operational because they are filled with earth or dirt. The branch to Zempoala has been cleaned and restored and is fully operational to date. According to the additional information provided at the request of ICOMOS, it is planned to further restore the function of the Otumba branch.

Conservation works are currently ongoing in several sections of the aqueduct, including at the main arcade of Tepeyahualco, which is being conserved with funding made available by the US Ambassadors Fund. In ICOMOS' view the conservation is being implemented by well-trained specialists, who are using state-of-the-art techniques to conserve the large aqueduct section, by using time-proven traditional materials and techniques, coupled with modern analytical techniques. High-quality preservation and conservation projects are also being undertaken at other sections of the hydraulic system by Conaculta, INAH, and the Patronato Acueducto Tembleque A.C. Following on from the conservation projects, continuous repair, cleaning and maintenance is undertaken by trained individuals from the local communities. ICOMOS considers that the conservation measures are of high quality and very effective.

ICOMOS considers that the state of conservation is adequate and that conservation measures and maintenance schemes are commendable.

Management

Management structures and processes, including traditional management processes

The property falls into two states and five municipalities which share the administration of the hydraulic system and the development controls for its setting. The nomination dossier highlights that a management unit for inter-institutional coordination and follow up of the management plan, will coordinate federal, state (States of Mexico and Hidalgo) and municipal (Tepeapulco, Zempoala, Axapusco, Nopaltepec and Otumba) levels as well as agricultural and citizen associations. A two-stage approach is envisaged to establish such coordination. At the first stage, all government and other stakeholders shall agree on the implementation of a management plan, which is currently in preparation. Following this first agreement, the management unit will be set up to steer the inter-governmental implementation in September 2015.

In the intervening time, the Interstate Technical Commission for the nomination of the Aqueduct of Padre Tembleque Hydraulic Complex to the UNESCO World Heritage List, which coordinated the preparation of the nomination and management plan, acts as the executive management unit. The required funding for the establishment and operation of a management unit at this stage does not seem to have been estimated or identified. ICOMOS initially noted that risk preparedness measures did not feature prominently in the management mechanisms, although the planting of rows of maguey provides a first protection against risks caused by agricultural and other vehicles. However, in the additional information submitted on 16 February 2015, the State Party highlighted a number of measures undertaken to prevent damage in case of earthquakes and highlighted the national reference frameworks for the development of detailed disaster and risk management plans.

Policy framework: management plans and arrangements, including visitor management and presentation

A management plan has been submitted with the nomination dossier. The management plan follows a general, and several specific, objectives and introduces guidelines for the specific heritage categories included in the property. It further provides guidelines on how more operational management procedures can be established over the forthcoming years. A few actions/activities – called indicators – have been included under different categories. It is assumed that, as the management plan is considered an evolving document, these will be further detailed and presented with specific timeframes, responsibilities and indicators in a later operational version of the management plan.

At present the aqueduct is not a key visitor attraction and does not yet have considerable visitor infrastructure. However, the Department of Tourism and Culture of the State of Hidalgo and the Department of Tourism of the State of Mexico have teamed up for a promotional campaign to increase visitor numbers to the heritage site and intend to create a suitable visitor infrastructure in the future. The only infrastructure currently in place consists of recently installed interpretative panels placed at the most significant elements of the system. Unfortunately, these have sometimes been placed a little too close to the actual historic property and so negatively impact their setting.

ICOMOS notes that any future visitor infrastructure needs to be carefully selected, as well as be sensitive to the characteristics of the site and its setting. ICOMOS considers that although visitor numbers are low at present, these can significantly increase, as the nearby pyramids of Teotihuacan, a World Heritage Site, which are within view of the hydraulic complex, receive four million visitors a year and tourism officials will seek to capitalize on the proximity to this existing visitor attraction. In ICOMOS' view, visitor management considerations will have to be strengthened to be prepared for such visitor numbers.

Involvement of the local communities

Although the Patronato Acueducto Tembleque A.C. – a civil association supporting the aqueduct – has been involved in the preparation of the nomination dossier, the outreach to the general population seems limited. However, the Patronato itself has undertaken impressive work over the past two decades in not only educating the public, but also in organizing work projects with local inhabitants to restore and maintain various sections of the system under professional conservation guidance. In particular, the Patronato has succeeded in imparting an appreciation of the system to school children through various activities including art projects that depict the large aqueduct and the importance of water to our daily lives.

ICOMOS considers that the management efforts and arrangements are evolving and will likely be effective once the formal management unit and with it cooperation mechanisms with the states and municipalities have been established by September 2015.

In conclusion, ICOMOS considers that, at present, the management system for the overall serial property is still evolving but will be adequate once the management unit is established and the management plan has been reviewed and augmented to include operational management procedures for site management.

6 Monitoring

The management plan foresees that monitoring is undertaken on an annual basis. While it is foreseen to establish detailed qualified indicators for this process, the nomination already identifies some areas in which the indicators need to be established, including the periodicity for monitoring as well as the responsible agencies and location of records. The monitoring processes are divided according to the heritage category concerned, i.e. urban, archaeological, landscape heritage etc.

With the additional information submitted on 16 February 2015, the State Party submitted further indicators and guidelines for the monitoring procedures. The information also indicated how Periodic Reporting processes would be undertaken on site. ICOMOS considers that, whilst the envisaged monitoring procedures might be sufficient, the process of undertaking these exercises has only just started and might have to be fine-tuned over time. However, the hydraulic system has been monitored over centuries by means of regular maintenance procedures which continue in particular in the functional branch to Zempoala.

ICOMOS considers that the monitoring indicators and methodologies presented are adequate.

7 Conclusions

The Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America was initially nominated as a serial property of three component sites. However, ICOMOS did not see a consistent theme and approach to Outstanding Universal Value within these three sites and recommended to the State Party to withdraw the submission of component sites 02 and 03 to allow for a stronger case to be made. The State Party followed this recommendation and withdrew the two components by letter of 16 February 2015. ICOMOS considers that the justification for Outstanding Universal Value is adequate when exclusively referring to component 01, the Aqueduct of Padre Templeque Hydraulic Complex and associative sites.

ICOMOS accordingly considers that component 01 demonstrates Outstanding Universal Value and meets criteria (i), (ii) and (iv). ICOMOS considers that this component represents in an exceptional way the interchange between European hydraulic technologies based on Roman tradition and incorporating Andalusian influences, and the Mesoamerican building tradition. ICOMOS also considers that the specific techniques and regional materials used in construction have created a unique type of hydraulic system at the time of Mesoamerican-European encounters. While these aspects have not been fully supported by an adequate comparative analysis comparing the water distribution system of the Aqueduct of Padre Tembleque with relevant similar examples of hydraulic systems and with other structures created in similar adobe techniques merging local and European building traditions, ICOMOS, based on information from its expert advisers, was able to acknowledge the exceptionality of this property in a global context.

The Aqueduct of Padre Templeque Hydraulic Complex and associative sites retains the complete hydraulic system over a distance of approximately 48 kilometres and therefore a high degree of integrity. The physical manifestations of the hydraulic system are well preserved in its various elements, and retain authenticity in form and design, material and substance as well as location and setting. The key factors affecting the property are urban sprawl from the capital Mexico City, inappropriate vehicular access to the aqueduct including the underground components, the potential development of inappropriate visitor infrastructure, and water pollution.

With a view to protection and management, ICOMOS considers that both will be adequate and effective once the cooperation between the two federal states and five municipalities concerned is formally guided by the establishment of an official attribution of mandate to the Site Management Unit in September 2015. Active conservation works of high quality are currently ongoing in several sections of the aqueduct, including at the main arcade of Tepeyahualco.

A management plan has been submitted with the nomination. This initial management plan is described as an evolving document and is currently being augmented to include operational aspects of site management. The State Party provided additional information on aspects of risk preparedness, visitor management and quality assessment, which were lacking in the initial draft. The property is currently not extensively visited but authorities have started promotional campaigns envisaging increased visitor numbers. ICOMOS notes that any future visitor infrastructure needs to be carefully selected, as well as sensitive to the characteristics of the site and its setting. With regards to the monitoring system, ICOMOS considers that the necessary monitoring processes and indicators established following the methodology described in the nomination are adequate.

8 Recommendations

Recommendations with respect to inscription

ICOMOS recommends that the Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America, Mexico, with the exception of the following site components 02 Town, Convent, Aqueduct and Water Tank of Tepeapulco and 03 Archaeological Site of Xihuingo, be inscribed on the World Heritage List on the basis of **criteria (i), (ii) and (iv)**.

Recommended Statement of Outstanding Universal Value

Brief synthesis

The aqueduct of Padre Tembleque, named after the friar Francisco de Tembleque, was constructed between 1554 and 1571 and constitutes an hydraulic system located between the states of Mexico and Hidalgo in the Mexican Central Plateau. The heritage canal system encompasses its water catchment area, springs, main and secondary canals, distribution tanks, arcaded aqueduct bridges, reservoirs and other auxiliary elements, which extend over a maximum distance of 48.22 kilometres. The aqueduct structures were built with supporting structures of earthen adobes in the Mesoamerican construction tradition, but at the same time referencing European models of water conduction developed during the Roman era.

The hydraulic system is an outstanding example of water conduction in the Americas and integrates along its 48 kilometres' extent impressive architectural structures, such as the main arcaded aqueduct at Tepeyahualco, which reaches a total height of 39.65m, with its central arch of 33.84m height. The system was built by Franciscan friars with support from the local communities and as a result is a unique representation of the ingenious fusion of Mesoamerican and European construction traditions, combining the mestizo tradition with the tradition of Roman hydraulics. As an ensemble of canals and auxiliary structures, the system is exceptionally well-preserved and one branch remains operational up until today.

Since it is the complexity of the system and the human exchange which created it which contribute to the Outstanding Universal Value, all features of this hydraulic system, including springs, main and secondary canals, distribution tanks, several arcaded aqueduct bridges, reservoirs and other auxiliary elements, are attributes documenting this exceptional construction. The elaborate techniques and cultural exchanges become specifically visible in the mastery of the monumental arcade bridging the Tepeyahualco Ravine and the Papalote River, which is made up of 68 round arches.

Criterion (i): The aqueduct bridge of Tepeyahualco is an architectural masterpiece integrating the highest single-level arcade ever built in aqueducts from Roman times until the middle of the 16th century, achieved as a result of the ingenious use of an adobe formwork as an alternative to scaffolding. Although the use of adobe brick instead of wood was applied elsewhere in Mexico, it wasn't often and certainly not with the same dramatic effect as in the aqueduct, which bridges the Tepeyahualco Ravine and the Papalote River.

Criterion (ii): The hydraulic system of Padre Tembleque exhibits an important interchange of European tradition in terms of the conjunction of the Roman heritage of masonry aqueducts, hydraulic management techniques inspired by Arab-Andalusian know-how, and pre-Hispanic indigenous tradition as well as Mesoamerican culture, represented by the use of the traditional social organization of collective working, the utilization and adaptation of local methods of adobe construction as well as the presence of glyphs illustrating symbols and cosmology in several arcade structures. It is a monument fusing the humanist ideals of the Franciscan order with the local collective traditions, aimed at promoting common wellbeing through an impressive construction achievement over 17 years.

Criterion (iv): The aqueduct of Padre Tembleque represents an outstanding example of hydraulic water architecture, based on in-depth knowledge of Roman and Renaissance hydraulic engineering which was integrated with local Mesoamerican construction knowledge. The specific techniques and regional materials used in the construction created a unique type of hydraulic system at the time of Mesoamerican-European encounters.

Integrity

The Aqueduct of Padre Tempeque Hydraulic Complex retains the complete hydraulic system over a distance of approximately 48 kilometres. Its landscape setting is predominantly rural characterized by distinctive maguey plantations, with the canal system either historically buried or enclosed in stone, either open or covered. The six impressive aqueduct bridges with 137 visible arches represent less than five percent of the total hydraulic system and hence the presence of all auxiliary elements of the system is a key to its integrity.

At present, few threats of development or land-use seem to affect the Aqueduct of Padre Tempeque. The rural landscape setting provides a high level of integrity with only occasional interruption by roads or power lines. It is important that this landscape integrity is retained in the future. The historic urban centres of Zempoala and Otumba have been encroached upon by some unsympathetic new constructions but these have fortunately had little impact on the attributes of the hydraulic system. Any future construction in these historic centres should be reviewed in terms of any potential negative impact which may occur.

Authenticity

The physical manifestations of the hydraulic system are well preserved in its various elements, including *ojos de agua* (springs), *apantles* (water canals), *aljibes* (cisterns), arches, fountains, water tanks, and other water features. These retain authenticity in form and design, material and substance as well as location and setting. The hydraulic system also partially retains authenticity of use and function in the six-kilometre segment of Zempoala, which currently carries water supporting non-potable uses such as washing clothes, irrigation, etc. It is intended to regain completely authenticity of use and function by re-enabling the passage of water through the other branch of the system that connects to the town of Otumba, at a distance of 39 km. However, such reactivation should be carefully supervised by heritage professionals and evaluated in terms of its potential negative impact to the authenticity of the property.

Authenticity in traditions, techniques and management system is illustrated by the continuing maintenance and management by the local communities, during which repairs are undertaken in traditional construction techniques and materials. To a certain extent, the site still evokes feelings which could be related to its original time of construction. This applies in particular where arches of the system exist and where one can see the hundreds of visible glyphs that were incorporated in the aqueduct's construction by the indigenous populations, underscoring that the spectacular engineering work was a collaborative effort between the indigenous population and the Spanish clergy.

Management and protection requirements

The property is protected under the Federal Law on Archaeological, Artistic and Historic Monuments and Areas promulgated in 1972 as an Historic Monument. This implies that in order to initiate any changes to the current condition of the property and its immediate setting, permission by the National Coordination of Historic Monuments of the INAH and from the Hidalgo and State of Mexico INAH Centres is required. The immediate setting has been defined as the buffer zone, which aims to preserve the integrity of the characteristic maguey landscape.

The property falls into two states and five municipalities which share the administration of the hydraulic system. A

Management Unit for inter-institutional coordination and follow-up of the management plan coordinates federal, state and municipal levels as well as agricultural and citizen associations. The management as well as maintenance of the property builds strongly on the cooperation with the local communities and citizen organizations. Any visitor infrastructure planned to be created for the property needs to be carefully selected, as well as be sensitive to the characteristics of the site and its setting.

Additional recommendations

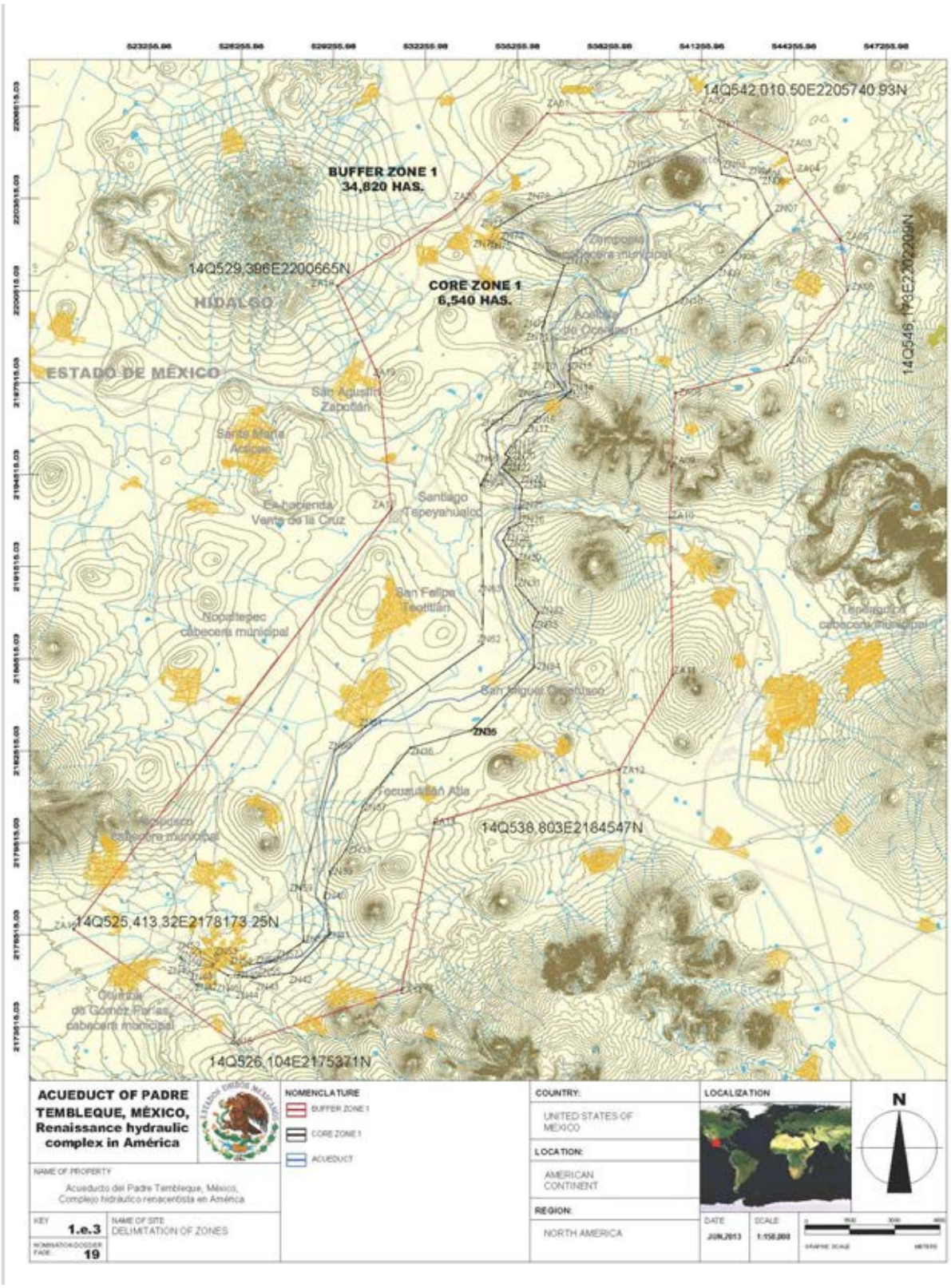
ICOMOS further recommends that the State Party give consideration to the following:

- Finalizing the establishment and attribution of mandate to the management unit by September 2015 to guide cooperation between the concerned federal and municipal administrations;

- Augmenting the management plan to include operational management procedures and finalize its operational version, integrating the strategies for risk and visitor management;

- Ensuring that any future visitor infrastructure be carefully selected, as well as sensitive to the characteristics of the site and its setting and be subject to a Heritage Impact Assessment before any approval is granted.

ICOMOS also recommends that the name of the property be changed to “Aqueduct of Padre Tembleque Hydraulic System”.



Revised map showing the boundaries of the nominated property

Monumental arcade of Tepeyahualco, aerial view

Monumental arcade of Tepeyahualco

Hacienda Los Arcos, aerial view

Cistern at Zempoala Church

Aqueduct of Padre Tembleque (Mexico)
No 1463

Official name as proposed by the State Party
Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America

Location
Districts of Tepeapulco, Zempoala and Otumba
State of Hidalgo, State of Mexico
Mexico

Brief description
The aqueduct of Padre Tembleque, named after the friar Francisco de Tembleque, was constructed between 1554 and 1571 and constitutes an hydraulic system located between the states of Mexico and Hidalgo in the Mexican Central Plateau. The heritage canal system encompasses a water catchment area, springs, main and secondary canals, distribution tanks, arcaded aqueduct bridges, reservoirs and other auxiliary elements, which extend over a maximum distance of 48.22 kilometres. The aqueduct structures were built with supporting structures of earthen adobes in the Mesoamerican construction tradition, and reference European models of water conduction developed during the Roman period.

Category of property
In terms of categories of cultural property set out in Article I of the 1972 World Heritage Convention, this property was initially submitted as a serial nomination of 3 *sites*. At the recommendation of ICOMOS the State Party withdrew the nomination of 2 serial components by letter of 16 February 2015. The property accordingly remains a nomination of 1 *site*.

In terms of the *Operational Guidelines for the Implementation of the World Heritage Convention* (July 2013), Annex 3, the property is also nominated as a *heritage canal.*

1 Basic data

Included in the Tentative List
20 November 2001

International Assistance from the World Heritage Fund for preparing the Nomination
None

Date received by the World Heritage Centre
2 October 2013

Background
This is a new nomination.

Consultations
ICOMOS has consulted its International Scientific Committee on Earthen Architectural Heritage, TICCIH and several independent experts.

Technical Evaluation Mission
An ICOMOS technical evaluation mission visited the property from 9 to 12 September 2014.

Additional information received by ICOMOS
ICOMOS sent a letter to the State Party on 22 August 2014 requesting additional information with regard to the exact location of features described in the nomination dossier, the description of all features proposed for nomination, the justification for the serial contribution as well as the history and development of components 02 and 03, the justification of criterion (v), future conservation plans and operation of the aqueduct, ownership details as well as the protective designation of the property. The State Party provided additional information in response to the questions raised as well as further aspects on 24 October 2014

Following its World Heritage Panel, ICOMOS sent a second letter on 22 December 2014 recommending a reduction in number of the serial properties and requesting additional information with regard to management and monitoring. ICOMOS and the State Party further arranged an online conference call to have some dialogue with the technical experts concerned on 13 January 2015 and a meeting on 22 January 2015. The second additional information letter sent by the State Party on 16 February 2015 responded to some of the aspects discussed during this online meeting.

The additional information has been included under the relevant sections below.

Date of ICOMOS approval of this report
12 March 2015

2 The property

Description
Nominated as a heritage canal, the property presents the key components of an hydraulic system of water aqueducts located in the Mexican Central Plateau. The property was initially composed of three site components comprising an overall property area of 6,560.3 ha. These have been reduced by the withdrawal of site components 02 and 03, which are described below, which reduces the size of the property to 6,540 ha.

The first component, indicated as 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites, covers these 6,540 ha and includes the key elements of the hydraulic system along a distance of 48.22 km. It is surrounded by a buffer zone of 34,820 ha. Component 02,

Town, Convent, Aqueduct and Water Tank of Tepeapulco, initially designated the second site component, was 17.7 ha in size. It shared a mutual buffer zone of 555 ha with the third site component entitled 03 Archaeological Site of Xihuingo, which covered an area of 2.6 hectares. The currently proposed and the two withdrawn components remain described separately below:

01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites

The key elements of the hydraulic system are located in this largest site component, which includes to the north the water source of the system in the form of the volcanic mountain El Tecajete, which acts as a water catchment area. In its vicinity are a series of springs, so-called *ojos de agua*, which are diverted into a main water canal. This main water canal covers the first 3.37km of the system up to the diverter or slit tank of El Tecajete, which divides the canal into two main branches, the branch to Zempoala of 5.98km length, and the branch towards Otumba which extends furthest south for 38.87km.

One of the key architectural features on the initially shared main canal is the aqueduct of the Hacienda el Tacajete, an arcaded structure carrying the water across 55 round arcades over a distance of several hundred meters. The branch towards Zempoala is frequently an underground canal cut to a depth of 1.2 meters into the hilly landscape. In Zempoala this branch splits again into two terminal 16th century square cisterns, which provided water to the key complexes in Zempoala, such as the Main House or the Todos los Santos Convent.

The branch towards Otumba heads largely south-west, passing by a number of haciendas, which are provided with water through smaller diverter tanks along the course. To reach the Hacienda of Guadalupe de Arcos an aqueduct of 14 round arches carries the water across the lake at Guadalupe de Arcos. Between the southern borders of the municipality of Zempoala and the northern borders of the municipality of Nopaltepec, one finds the key structures which facilitate the functioning of the southern hydraulic system, the monumental arcade which bridges the Tepeyahualco Ravine and the Papalote River. The aqueduct bridge is constructed of 68 round arches of stone masonry with lime-sand mortar, the tallest of which reaches to a height of 38 metres.

In the central section of this branch a number of haciendas are connected to the water canal before the hydraulic system enters the municipality of Otumba, such as the Hacienda of Santa Inés and the Haciendas of San Miguel Ometusco and Zoapayuca in the municipality of Axapusco. The town of Otumba marks the southern end of the hydraulic system, once more integrating several diverter tanks and water storage tanks. Their provision can still be understood in some architectural structures, such as the House of Culture, the House of Viceroys or the Convent of La Purísima Concepción.

02 Town, Convent, Aqueduct and Water Tank of Tepeapulco (withdrawn by letter of 16 February 2015)

The second site component is entirely located in the Town of Tepeapulco, about 12 kilometres east of the first site component. It contributes fragments of an antecedent to the aqueduct of Padre Tembleque, the aqueduct of Tepeapulco completed in 1545. In contrast to the first site component, this structure is limited to its urban and somewhat fragmented features and includes a small arcade, a water tank, a reception pond and communal laundries as well as an atrium and the terminal cistern. Of the previous 27km extension of the aqueduct of Tepeapulco, only around 600 meters of water canal and structures are included in this site component.

03 Archaeological Site of Xihuingo (withdrawn by letter of 16 February 2015)

This third site component, Xihuingo Archaeological Site, is located 5 kilometres north of the second and likewise circa 12 kilometres east of the first site component. The archaeological site comprises a walled settlement built for astronomical and calendar observation and contains several rock art petroglyphs. It has a number of occupation layers, all prior to Spanish contact, dating to the Tzacualli phase (0-200 CE), the Teotihuacan culture (200-600 CE) and Mazapa phase, and later complex Aztec phases. This site component does not contain any elements typical for water distribution systems.

History and development

After a shorter early presence in the years 1527-1540, the Franciscan friars settled in Otumba in 1553 under their guardian Francisco de Tembleque, who committed to assist the community of Zempoala and pay 20 annual pesos in exchange for water to be transported to Otumba via an aqueduct. The construction was commenced at a time during which Bernardino de Sahagún was collecting material for an anthropological text, which is considered an indispensable source for our knowledge of Mesoamerican cultures. This climate allowed local workers in the construction of the aqueduct to share their tangible and intangible expressions of local culture with the supervising friars.

Already a decade earlier, a smaller aqueduct had been built under the supervision of Andrés de Olmos in Tepeapulco between 1541 and 1545. This structure consisted of a rather simple sewage pipe, covered by lime and stone, predominantly underground with one visible arcade, located in the site component of Tepeapulco. However, only fragments of this earlier structure have survived until the present.

From 1553 onwards 17 whole years were dedicated to the construction of the aqueduct bringing water to Zempoala and Otumba. The construction was executed in close cooperation and with more than 400 stone masons and workers from the communities of Zacuala, Tlaquilpa, Zempoala and Otumba, working solely on the basis of their ancestral tradition of social work organization known as *tequio*. In particular the

construction of arcades was also based on local knowledge and techniques of the so-called Mestizo System, first building supporting structures of adobe and gradually raising the stone constructions, which allowed workers horizontal movement, rather than working with scaffolds or formworks. The local workers also left their signature on the structure by decorating keystones and spandrels with symbols corresponding to Mesoamerican cosmogony.

Following the hydraulic system's completion in 1571, regular maintenance and conservation works had to be coordinated among the four concerned communities as canals continued to clog or fracture over the centuries. Whilst initially the canal was intended to provide drinking water to the urban inhabitants, the demand for water for agricultural needs in the haciendas rose significantly in the 18th century, leading to conflicts over distribution rights. Following the independence of Mexico in the early 19th century further conflicts lead to the partial abandonment of the aqueduct, in particular of the Otumba branch. In 1851 the engineer Francisco Garay travelled along the canal system and pointed out the need for urgent conservation, which was finally decreed by the Emperor in 1865. However, conservation works were not carried out until the heritage value of the aqueduct was acknowledged in the early 20th century. Only in the last years of the 20th century, has a project to recover and restore the historic canal been initiated by the National Institute of Anthropology and History (INAH), funded by resources provided by the World Monuments Fund, the Ambassadors Fund and the US Congress. As the conservation works are only partially completed, the aqueduct is not yet once more operational along its full course.

3 Justification for inscription, integrity and authenticity

Comparative analysis

The property has been identified as best comparable in the typological framework of water management systems and in the chronological context of the Colonial period of Mesoamerica, whilst recognizing some cross-references to the European Renaissance and Roman period with regard to hydraulic architectural achievements. The comparative analysis accordingly aims to compare the property with hydraulic complexes of similar character – in particular examples already recognized on the World Heritage List or tentative lists –, with other aqueducts at a national or regional level, and with the most important European achievements of aqueduct construction from the Roman through to the Renaissance period.

Among the aqueducts already inscribed on the World Heritage List or located within larger contexts of some World Heritage Sites, the comparison highlights earlier structures such as the Pont du Gard, France (1985, (i), (iii) and (iv)), the Aqueduct of Segovia, Spain (1985, (i), (iii) and (iv)), the aqueducts of Los Milagros and San Lázaro in the Archaeological Ensemble of Mérida, Spain (1993, (iii) and (iv), the Amoreira Aqueduct in Elvas, Portugal (2012, (iv)), the Agua da Prata Aqueduct in Évora, Portugal (1986, (ii) and (iv)), or the Los Pegões Aqueduct in Tomar, Portugal (1983, (i) and (vi)).

However, also later structures which have been inscribed as important examples of hydraulic water systems have been compared including the Pontcysyllte Aqueduct, United Kingdom (2009, (i), (ii) and (vi)), the Carolina Aqueduct of Vanvitelli in the 18th century Royal Palace at Caserta, Italy (1997, (i), (ii), (iii) and (vi)) or three Mexican examples, the Aqueduct of Morelia (1991, (ii), (iv) and (vi)), the Aqueduct of Querétaro (1996, (ii) and (iv)) or the Aqueduct of Zacatecas (1993, (ii) and (iv)).

ICOMOS considers that this part of the comparison is unfortunately exclusively focused on the height of single arches in aqueducts to prove the point that the aqueduct at Tepeyahualco provides the highest elevation for a single arch. As a result the larger features of the water distribution system, its preservation of functional elements or construction details, have not been compared to other examples of water management systems, although some are briefly mentioned, such as the Shustar Historical Hydraulic System, Iran (2009, (i), (ii) and (v)), the Dujiangyan Irrigation System, China (2000, (ii), (iv) and (vi)) or the *Aflaj* Irrigation Systems of Oman (2006, (v)).

Other examples of aqueducts in France, Italy, Portugal, Turkey and Spain are likewise reduced to the comparison of height and illustrate that the Aguas Livres Aqueduct in Lisbon, Portugal is indeed a single level arch structure of about double the height of the aqueduct of Tepeyahualco and accordingly referred to as the highest historic aqueduct built in stone masonry. It dates to about two centuries later than the Padre Tembleque hydraulic system and was constructed from 1748 onwards.

In the regional chronological analysis, it is recognized that at present three Mexican aqueducts from the Colonial period in Mesoamerica have been included in the World Heritage List. However, all three have not been nominated as hydraulic water systems but were components of a city or archaeological site that was inscribed.

ICOMOS notes that the comparative analysis does not discuss the selection of serial components. ICOMOS further notes that all comparisons discussed are focused exclusively on the features in component 01 Aqueduct of Padre Tempeque Hydraulic Complex and associative sites of the property and do not reference the features included in the two other components, which have in the meantime been withdrawn at the recommendation of ICOMOS. However, even with regard to the first component, ICOMOS considers that the comparative analysis falls short of comparing the water distribution system of the Aqueduct of Padre Tembleque with relevant

similar examples of hydraulic systems and likewise lacks comparison with other structures created using similar adobe techniques merging local and European building traditions. Nevertheless, ICOMOS was able to confirm the exceptionality of the hydraulic water system included in the first serial component initially proposed by consulting its expert networks across the region.

ICOMOS considers that despite several gaps in the comparative analysis the first serial component proposed qualifies to be considered for the World Heritage List.

Justification of Outstanding Universal Value

The nominated property is considered by the State Party to be of Outstanding Universal Value as a cultural property for the following reasons:

- The hydraulic system is an outstanding example of a heritage canal because its main arcaded aqueduct at Tepeyahualco reaches a total height of 39.65m with its central arch of 33.84m height, which is the highest aqueduct ever constructed at that time with a single level of arches;
- The heritage canal initiated by Padre Tembleque and built with support from the local communities is a unique representation of the ingenious fusion of Mesoamerican and European construction traditions, combining the mestizo tradition with the tradition of Roman hydraulics;
- The hydraulic complex is directly associated with the maguey landscape, an ancestral landscape of unique character, as well as to the birth of American anthropological sciences following the work of Bernardino de Sahagún, which is considered an indispensable source of knowledge of the old Mesoamerican cultures.

ICOMOS considers that this justification exclusively refers to component 01 of the three serial components presented in this nomination and identifies a justification for Outstanding Universal Value which components 02 and 03 make no distinctive contribution towards. In consequence, ICOMOS recommended excluding components 02 and 03 from the nomination proposal. These were subsequently withdrawn by the State Party.

In ICOMOS' view component 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites demonstrates Outstanding Universal Value as an early and unique example of an hydraulic system in the Mesoamerican context which is exceptionally well preserved, as well as an example of a unique fusion of ingenious Mesoamerican and European construction traditions. However, ICOMOS considers that this potential does not apply to the surrounding maguey landscape in the context of this nomination proposal and consequently cannot accept the landscape approach to justification of Outstanding Universal Value provided by the State Party.

Integrity and authenticity

Integrity

The initial component 01 Aqueduct of Padre Templeque Hydraulic Complex and associative sites retains the complete hydraulic system over a distance of approximately 48 kilometres. Its landscape setting is predominantly rural characterized by distinctive maguey plantations, with the canal system either historically buried and enclosed in stone with fired tile pipework in some sections, or built on the ground surface, either open or covered by stone. The six sections of aqueduct with 137 visible arches represent less than five percent of the total hydraulic system. All elements of the system are included in the component 01, which illustrates a high degree of integrity in reference to the historic extension and functionality of the hydraulic system. Components 02 and 03 did not seem to add to this completeness.

Extremely few threats of development or land-use seem to affect the Aqueduct of Padre Templeque. The rural landscape setting provides a high level of integrity with only occasional interruption by roads or power lines. The historic urban centres of Zempoala and Otumba have been encroached upon by some unsympathetic new constructions but these have little impact on the attributes of the hydraulic system. ICOMOS considers that component 01 includes all elements which are necessary to illustrate the Outstanding Universal Value proposed by the State Party.

ICOMOS considers that the integrity of component site 01 has been justified.

Authenticity

The physical manifestations of the hydraulic system are well preserved in its various elements, including *ojos de agua* (springs), *apantles* (water canals), *aljibes* (cisterns), arches, fountains, water tanks, and other water features. They retain authenticity in form and design, material and substance as well as location and setting. The hydraulic system also partially retains authenticity of use and function in the six-kilometre segment of Zempoala, which currently carries water supporting non-potable uses such as washing clothes, irrigation, etc. It is intended to regain completely authenticity of use and function by re-enabling the passage of water through the other branch of the system that connects to the town of Otumba, at a distance of 39 km. ICOMOS recommends that any measures to regain usability of this branch should be carefully supervised by heritage professionals and evaluated in terms of their potential negative impact to the authenticity of the property by means of Heritage Impact Assessments (HIAs).

Authenticity in traditions, techniques and management system is illustrated by the continuing maintenance and management by the local communities, during which repairs are undertaken in traditional construction techniques and materials. To a certain extent, the site still evokes feelings which could be related to its original time

of construction. This applies in particular where arches of the system exist and where one can see the hundreds of visible glyphs that were incorporated in the aqueduct's construction by the indigenous populations, underscoring that the spectacular engineering work was a collaborative effort between the indigenous population and the Spanish clergy.

ICOMOS considers that in regard to Outstanding Universal Value the authenticity of site component 01 has been demonstrated.

In conclusion, ICOMOS considers that the conditions of integrity and authenticity have been justified for component 01 of the initially submitted series.

Criteria under which inscription is proposed
The property is nominated on the basis of cultural criteria (i), (ii), (iv), (v) and (vi).

Criterion (i): *represent a masterpiece of human creative genius;*

This criterion is justified by the State Party on the grounds that the aqueduct is a masterpiece of Renaissance hydraulics in the New World which represents the realization of the ideal perfection proposed by Renaissance doctrines in American lands. It further integrates the highest single-level arcade ever built in aqueducts from Roman times until the middle of the 16th century, achieved as a result of the ingenius use of an adobe formwork as alternative to scaffolding.

ICOMOS considers that the monumental aqueduct arcade which bridges the Tepeyahualco Ravine and the Papalote River could be considered a masterpiece in the sense of criterion (i), and that this allows for its application to the remaining components of the hydraulic system, despite the fact that these combine construction technologies that had previously been developed in Europe or local contexts respectively.

ICOMOS considers that this criterion has been justified for serial component 01.

Criterion (ii): *exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;*

This criterion is justified by the State Party on the grounds that the hydraulic system exhibits an important interchange of European tradition in terms of the knowledge of Roman hydraulics evidenced in the canals' gradual slope through the irregular topography, and Mesoamerican culture represented by the use of the traditional social organization of collective working, the utilization and adaptation of local methods of adobe construction as well as the presence of glyphs illustrating preHispanic symbols and cosmology in several arcade structures. Also, the fusing of the humanist ideals of the Franciscan order with the local collective traditions promoted common wellbeing and an impressive construction achievement over 17 years.

ICOMOS considers that for component 01 the conjunction of the Roman heritage of masonry aqueducts, hydraulic management techniques inspired by Arab-Andalusian know-how and pre-Hispanic indigenous traditions for adobe construction is indeed exceptional, with clear material evidence. Although the use of adobe brick instead of wood was applied elsewhere in Mexico, it wasn't often and certainly not with the same dramatic effect as in the aqueduct which bridges the Tepeyahualco Ravine and the Papalote River.

ICOMOS considers that this criterion has been justified for component 01.

Criterion (iv): *be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;*

This criterion is justified by the State Party on the grounds that the aqueduct represents an outstanding example of hydraulic water architecture, based on in-depth knowledge of Roman and Renaissance hydraulic engineering and integrated with local Mesoamerican construction knowledge. This combination created the highest ever single-arch arcaded aqueduct, which, using the same technology, was neither achieved earlier nor reproduced later and reached a surprising scale which continues to lack comparators.

ICOMOS considers that, as in previous criteria, the justification presented applies exclusively to component 01 and cannot be considered relevant for the other two serial components. In relation to the first component, more important than the maximum height of the arches, which is emphasized in the nomination, are the specific techniques and regional materials used in construction which created a unique type of hydraulic system at the time of Mesoamerican-European encounters. ICOMOS considers that a comparative analysis which considers the construction technology provides a basis to justify this criterion for component 01.

ICOMOS considers that this criterion has been justified for component 01.

Criterion (v): *be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;*

This criterion is justified by the State Party on the grounds that the maguey landscape is representative of the interaction with the rural natural environment around the aqueduct and has supported an agave agriculture of

preHispanic origin. The cultivations, which are defined by parallel lines of plots and terraces, are utilized to produce a fermented drink called *pulque*. The ancestral maguey landscape has recently become vulnerable to agricultural and urban economic development.

ICOMOS considers that the boundaries of the site components contain very limited features of the maguey landscape which cannot be said to be of Outstanding Universal Value in comparison to several other agricultural landscapes in the Mesoamerican region. It has also not been illustrated in which way this ancestral landscape is linked or provides support to the hydraulic system presented at the core of this nomination and how its landscape features could be integrated in the wider context of this nomination.

ICOMOS considers that this criterion has not been justified.

Criterion (vi): *be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance;*

This criterion is justified by the State Party on the grounds that the aqueduct of Padre Tembleque is directly associated with the birth of ethnographic and anthropological science in America, more specifically with the writing of *Los Primeros Memoriales, Historia general de las cosas de la Nueva España* by Bernadino de Sahagún. The construction elements further illustrate the associations with preHispanic collective memory with regard to religious cosmogony, language and traditions as evidenced in the stones of the hydraulic complex which show various carved symbols.

ICOMOS considers that whilst the works of Bernadino de Sahagún may have had an important impact on the history of Mesoamerican anthropology, the fact that his researches were based in close vicinity to the canal's construction landscape and also coincided with the beginning of the construction under Francisco de Tembleque are not sufficient to illustrate a direct association that could be said to be of Outstanding Universal Value. ICOMOS further considers that while the symbols engraved in the hydraulic architecture do reference the integration of the workers' preHispanic cosmogony, these symbols are not of outstanding character in themselves but rather function as a reference to the integration of different traditions and cosmologies, which is better acknowledged under criterion (ii).

ICOMOS considers that this criterion has not been justified.

ICOMOS considers that the initial serial approach was not justified and recommended reducing the property to just component 01, which was agreed to by the State Party.

In conclusion, ICOMOS considers that criteria (i), (ii) and (iv) have been justified for component 01 and that authenticity and integrity have been demonstrated.

Description of the attributes

The attributes of Outstanding Universal Value comprise all elements of component 01 of the hydraulic system, including springs, main and secondary canals, distribution tanks, several arcaded aqueduct bridges, reservoirs and other auxiliary elements, extending over a distance of 48.22 kilometres. The elaborate techniques and cultural exchanges become specifically visible in the mastery of the monumental arcade bridging the Tepeyahualco Ravine and the Papalote River, which is constructed in 68 round arches the largest of which reaches a height of 38 metres.

4 Factors affecting the property

The Aqueduct of Padre Tembleque is located in a rural landscape dominated by agriculture and at present development pressures are low. However, ICOMOS considers that further gradual expansion of Mexico City can impact the integrity if proper management controls are not adopted. Important view lines could eventually be affected by urban sprawl from Mexico City, a city of over 20 million people located at only one hour's distance (62 km). The same risk could arise from a possible expansion of the industrial complex of Ciudad Sahagún, located at approximately 9 kilometre's distance to the aqueduct and currently shielded from view by a small mountain. New regional and local roads are still being planned in the property and ICOMOS considers that they will need to be controlled in terms of visual impact and construction methods in the vicinity of the hydraulic system.

The property receives few visitors today but given the proximity to the capital visitor numbers may rise considerably. With the majority of the hydraulic system being subterranean, the visitors will likely peak at the few visible and impressive architectural structures, in particular the grand arcaded aqueduct with its 68 arches. ICOMOS considers that it will be important to carefully plan and control the establishment of visitor infrastructure in these areas. Likewise, because large sections of the hydraulic system are underground, and thus are not visible, education and public awareness will be paramount in order to not cause inadvertent damage to these sections. Rows of maguey plants are currently planted alongside all sections to indicate the course of the aqueduct.

Under environmental pressures the State Party indicates the risk of pollution which could lead to contamination of the aquifers of El Tecajete Hill and would reduce the water quality and with it the means of use of the hydraulic system. Few natural risks affect the property but man-made risks can be identified. ICOMOS considers that a key threat is posed by unauthorized access of vehicles in the immediate vicinity of the key architectural structures. These not only adversely affect

the setting but also cause real risks to the physical structures.

ICOMOS considers that the main threats to the property are urban sprawl, vehicular access to the aqueduct, development of inappropriate visitor infrastructure and water pollution.

5 Protection, conservation and management

Boundaries of the nominated property and buffer zone

The boundaries of the remaining property component 01 and its buffer zone seem adequate in both its rural and urban areas. It is obvious that care was taken when establishing the boundaries to take advantage of topographic features (mountains, hills, and ridges) which will help protect the visual characteristics of the surrounding landscape. All boundaries are marked using GIS coordinates and are clearly delineated in the maps provided.

ICOMOS considers that the boundaries of the nominated property component 01 and of its buffer zone are adequate.

Ownership

The majority of land in the property is agricultural fields in the rural areas and residential properties in the urban components. Of these, 96% are in private ownership, 3.8% are communally owned and just 0.2% belong to the public administration. In the additional information that the State Party provided at the request of ICOMOS, it clarified that this 0.2% covers the key architectural structures, such as the Tembleque aqueduct. It was also specified that according to the General Water Act, waterways – including canals – are under federal administration and management, even if they pass through private land.

Protection

In the additional information that the State Party provided at the request of ICOMOS, it affirmed that all elements of the property are covered by the Federal Law on Archaeological, Artistic and Historic Monuments and Areas promulgated in 1972 as Historic Monuments by Determination of Law so that these do not require any specific decree or declaration.

This implies that in order to initiate any changes to the current condition of the property and its immediate setting, permission by the National Coordination of Historic Monuments of the INAH and from the Hidalgo and State of Mexico INAH Centres is required. The immediate setting has been defined as the buffer zone, which aims to preserve the characteristic maguey landscape as the property setting. Concerted efforts made by the federal, state, and municipal authorities to work together to achieve trans-governmental awareness and proper protection for the hydraulic system are still very recent and ICOMOS considers it difficult to judge the effectiveness of these efforts at the present stage.

ICOMOS considers that the legal protection in place is adequate and that the application of protective measures will be adequate if consistently committed to.

Conservation

The elements and attributes included in component 01 of the property have recently been inventoried and described. The state of conservation of the hydraulic system is impressive, although several canals are not presently operational because they are filled with earth or dirt. The branch to Zempoala has been cleaned and restored and is fully operational to date. According to the additional information provided at the request of ICOMOS, it is planned to further restore the function of the Otumba branch.

Conservation works are currently ongoing in several sections of the aqueduct, including at the main arcade of Tepeyahualco, which is being conserved with funding made available by the US Ambassadors Fund. In ICOMOS' view the conservation is being implemented by well-trained specialists, who are using state-of-the-art techniques to conserve the large aqueduct section, by using time-proven traditional materials and techniques, coupled with modern analytical techniques. High-quality preservation and conservation projects are also being undertaken at other sections of the hydraulic system by Conaculta, INAH, and the Patronato Acueducto Tembleque A.C. Following on from the conservation projects, continuous repair, cleaning and maintenance is undertaken by trained individuals from the local communities. ICOMOS considers that the conservation measures are of high quality and very effective.

ICOMOS considers that the state of conservation is adequate and that conservation measures and maintenance schemes are commendable.

Management

Management structures and processes, including traditional management processes

The property falls into two states and five municipalities which share the administration of the hydraulic system and the development controls for its setting. The nomination dossier highlights that a management unit for inter-institutional coordination and follow up of the management plan, will coordinate federal, state (States of Mexico and Hidalgo) and municipal (Tepeapulco, Zempoala, Axapusco, Nopaltepec and Otumba) levels as well as agricultural and citizen associations. A two-stage approach is envisaged to establish such coordination. At the first stage, all government and other stakeholders shall agree on the implementation of a management plan, which is currently in preparation. Following this first agreement, the management unit will be set up to steer the inter-governmental implementation in September 2015.

In the intervening time, the Interstate Technical Commission for the nomination of the Aqueduct of Padre Tembleque Hydraulic Complex to the UNESCO World Heritage List, which coordinated the preparation of the nomination and management plan, acts as the executive management unit. The required funding for the establishment and operation of a management unit at this stage does not seem to have been estimated or identified. ICOMOS initially noted that risk preparedness measures did not feature prominently in the management mechanisms, although the planting of rows of maguey provides a first protection against risks caused by agricultural and other vehicles. However, in the additional information submitted on 16 February 2015, the State Party highlighted a number of measures undertaken to prevent damage in case of earthquakes and highlighted the national reference frameworks for the development of detailed disaster and risk management plans.

Policy framework: management plans and arrangements, including visitor management and presentation

A management plan has been submitted with the nomination dossier. The management plan follows a general, and several specific, objectives and introduces guidelines for the specific heritage categories included in the property. It further provides guidelines on how more operational management procedures can be established over the forthcoming years. A few actions/activities – called indicators – have been included under different categories. It is assumed that, as the management plan is considered an evolving document, these will be further detailed and presented with specific timeframes, responsibilities and indicators in a later operational version of the management plan.

At present the aqueduct is not a key visitor attraction and does not yet have considerable visitor infrastructure. However, the Department of Tourism and Culture of the State of Hidalgo and the Department of Tourism of the State of Mexico have teamed up for a promotional campaign to increase visitor numbers to the heritage site and intend to create a suitable visitor infrastructure in the future. The only infrastructure currently in place consists of recently installed interpretative panels placed at the most significant elements of the system. Unfortunately, these have sometimes been placed a little too close to the actual historic property and so negatively impact their setting.

ICOMOS notes that any future visitor infrastructure needs to be carefully selected, as well as be sensitive to the characteristics of the site and its setting. ICOMOS considers that although visitor numbers are low at present, these can significantly increase, as the nearby pyramids of Teotihuacan, a World Heritage Site, which are within view of the hydraulic complex, receive four million visitors a year and tourism officials will seek to capitalize on the proximity to this existing visitor attraction. In ICOMOS' view, visitor management considerations will have to be strengthened to be prepared for such visitor numbers.

Involvement of the local communities

Although the Patronato Acueducto Tembleque A.C. – a civil association supporting the aqueduct – has been involved in the preparation of the nomination dossier, the outreach to the general population seems limited. However, the Patronato itself has undertaken impressive work over the past two decades in not only educating the public, but also in organizing work projects with local inhabitants to restore and maintain various sections of the system under professional conservation guidance. In particular, the Patronato has succeeded in imparting an appreciation of the system to school children through various activities including art projects that depict the large aqueduct and the importance of water to our daily lives.

ICOMOS considers that the management efforts and arrangements are evolving and will likely be effective once the formal management unit and with it cooperation mechanisms with the states and municipalities have been established by September 2015.

In conclusion, ICOMOS considers that, at present, the management system for the overall serial property is still evolving but will be adequate once the management unit is established and the management plan has been reviewed and augmented to include operational management procedures for site management.

6 Monitoring

The management plan foresees that monitoring is undertaken on an annual basis. While it is foreseen to establish detailed qualified indicators for this process, the nomination already identifies some areas in which the indicators need to be established, including the periodicity for monitoring as well as the responsible agencies and location of records. The monitoring processes are divided according to the heritage category concerned, i.e. urban, archaeological, landscape heritage etc.

With the additional information submitted on 16 February 2015, the State Party submitted further indicators and guidelines for the monitoring procedures. The information also indicated how Periodic Reporting processes would be undertaken on site. ICOMOS considers that, whilst the envisaged monitoring procedures might be sufficient, the process of undertaking these exercises has only just started and might have to be fine-tuned over time. However, the hydraulic system has been monitored over centuries by means of regular maintenance procedures which continue in particular in the functional branch to Zempoala.

ICOMOS considers that the monitoring indicators and methodologies presented are adequate.

7 Conclusions

The Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America was initially nominated as a serial property of three component sites. However, ICOMOS did not see a consistent theme and approach to Outstanding Universal Value within these three sites and recommended to the State Party to withdraw the submission of component sites 02 and 03 to allow for a stronger case to be made. The State Party followed this recommendation and withdrew the two components by letter of 16 February 2015. ICOMOS considers that the justification for Outstanding Universal Value is adequate when exclusively referring to component 01, the Aqueduct of Padre Templeque Hydraulic Complex and associative sites.

ICOMOS accordingly considers that component 01 demonstrates Outstanding Universal Value and meets criteria (i), (ii) and (iv). ICOMOS considers that this component represents in an exceptional way the interchange between European hydraulic technologies based on Roman tradition and incorporating Andalusian influences, and the Mesoamerican building tradition. ICOMOS also considers that the specific techniques and regional materials used in construction have created a unique type of hydraulic system at the time of Mesoamerican-European encounters. While these aspects have not been fully supported by an adequate comparative analysis comparing the water distribution system of the Aqueduct of Padre Tembleque with relevant similar examples of hydraulic systems and with other structures created in similar adobe techniques merging local and European building traditions, ICOMOS, based on information from its expert advisers, was able to acknowledge the exceptionality of this property in a global context.

The Aqueduct of Padre Templeque Hydraulic Complex and associative sites retains the complete hydraulic system over a distance of approximately 48 kilometres and therefore a high degree of integrity. The physical manifestations of the hydraulic system are well preserved in its various elements, and retain authenticity in form and design, material and substance as well as location and setting. The key factors affecting the property are urban sprawl from the capital Mexico City, inappropriate vehicular access to the aqueduct including the underground components, the potential development of inappropriate visitor infrastructure, and water pollution.

With a view to protection and management, ICOMOS considers that both will be adequate and effective once the cooperation between the two federal states and five municipalities concerned is formally guided by the establishment of an official attribution of mandate to the Site Management Unit in September 2015. Active conservation works of high quality are currently ongoing in several sections of the aqueduct, including at the main arcade of Tepeyahualco.

A management plan has been submitted with the nomination. This initial management plan is described as an evolving document and is currently being augmented to include operational aspects of site management. The State Party provided additional information on aspects of risk preparedness, visitor management and quality assessment, which were lacking in the initial draft. The property is currently not extensively visited but authorities have started promotional campaigns envisaging increased visitor numbers. ICOMOS notes that any future visitor infrastructure needs to be carefully selected, as well as sensitive to the characteristics of the site and its setting. With regards to the monitoring system, ICOMOS considers that the necessary monitoring processes and indicators established following the methodology described in the nomination are adequate.

8 Recommendations

Recommendations with respect to inscription

ICOMOS recommends that the Aqueduct of Padre Tembleque, Renaissance Hydraulic Complex in America, Mexico, with the exception of the following site components 02 Town, Convent, Aqueduct and Water Tank of Tepeapulco and 03 Archaeological Site of Xihuingo, be inscribed on the World Heritage List on the basis of **criteria (i), (ii) and (iv)**.

Recommended Statement of Outstanding Universal Value

Brief synthesis

The aqueduct of Padre Tembleque, named after the friar Francisco de Tembleque, was constructed between 1554 and 1571 and constitutes an hydraulic system located between the states of Mexico and Hidalgo in the Mexican Central Plateau. The heritage canal system encompasses its water catchment area, springs, main and secondary canals, distribution tanks, arcaded aqueduct bridges, reservoirs and other auxiliary elements, which extend over a maximum distance of 48.22 kilometres. The aqueduct structures were built with supporting structures of earthen adobes in the Mesoamerican construction tradition, but at the same time referencing European models of water conduction developed during the Roman era.

The hydraulic system is an outstanding example of water conduction in the Americas and integrates along its 48 kilometres' extent impressive architectural structures, such as the main arcaded aqueduct at Tepeyahualco, which reaches a total height of 39.65m, with its central arch of 33.84m height. The system was built by Franciscan friars with support from the local communities and as a result is a unique representation of the ingenious fusion of Mesoamerican and European construction traditions, combining the mestizo tradition with the tradition of Roman hydraulics. As an ensemble of canals and auxiliary structures, the system is exceptionally well-preserved and one branch remains operational up until today.

Since it is the complexity of the system and the human exchange which created it which contribute to the Outstanding Universal Value, all features of this hydraulic system, including springs, main and secondary canals, distribution tanks, several arcaded aqueduct bridges, reservoirs and other auxiliary elements, are attributes documenting this exceptional construction. The elaborate techniques and cultural exchanges become specifically visible in the mastery of the monumental arcade bridging the Tepeyahualco Ravine and the Papalote River, which is made up of 68 round arches.

Criterion (i): The aqueduct bridge of Tepeyahualco is an architectural masterpiece integrating the highest single-level arcade ever built in aqueducts from Roman times until the middle of the 16th century, achieved as a result of the ingenious use of an adobe formwork as an alternative to scaffolding. Although the use of adobe brick instead of wood was applied elsewhere in Mexico, it wasn't often and certainly not with the same dramatic effect as in the aqueduct, which bridges the Tepeyahualco Ravine and the Papalote River.

Criterion (ii): The hydraulic system of Padre Tembleque exhibits an important interchange of European tradition in terms of the conjunction of the Roman heritage of masonry aqueducts, hydraulic management techniques inspired by Arab-Andalusian know-how, and pre-Hispanic indigenous tradition as well as Mesoamerican culture, represented by the use of the traditional social organization of collective working, the utilization and adaptation of local methods of adobe construction as well as the presence of glyphs illustrating symbols and cosmology in several arcade structures. It is a monument fusing the humanist ideals of the Franciscan order with the local collective traditions, aimed at promoting common wellbeing through an impressive construction achievement over 17 years.

Criterion (iv): The aqueduct of Padre Tembleque represents an outstanding example of hydraulic water architecture, based on in-depth knowledge of Roman and Renaissance hydraulic engineering which was integrated with local Mesoamerican construction knowledge. The specific techniques and regional materials used in the construction created a unique type of hydraulic system at the time of Mesoamerican-European encounters.

Integrity

The Aqueduct of Padre Tempeque Hydraulic Complex retains the complete hydraulic system over a distance of approximately 48 kilometres. Its landscape setting is predominantly rural characterized by distinctive maguey plantations, with the canal system either historically buried or enclosed in stone, either open or covered. The six impressive aqueduct bridges with 137 visible arches represent less than five percent of the total hydraulic system and hence the presence of all auxiliary elements of the system is a key to its integrity.

At present, few threats of development or land-use seem to affect the Aqueduct of Padre Tempeque. The rural landscape setting provides a high level of integrity with only occasional interruption by roads or power lines. It is important that this landscape integrity is retained in the future. The historic urban centres of Zempoala and Otumba have been encroached upon by some unsympathetic new constructions but these have fortunately had little impact on the attributes of the hydraulic system. Any future construction in these historic centres should be reviewed in terms of any potential negative impact which may occur.

Authenticity

The physical manifestations of the hydraulic system are well preserved in its various elements, including *ojos de agua* (springs), *apantles* (water canals), *aljibes* (cisterns), arches, fountains, water tanks, and other water features. These retain authenticity in form and design, material and substance as well as location and setting. The hydraulic system also partially retains authenticity of use and function in the six-kilometre segment of Zempoala, which currently carries water supporting non-potable uses such as washing clothes, irrigation, etc. It is intended to regain completely authenticity of use and function by re-enabling the passage of water through the other branch of the system that connects to the town of Otumba, at a distance of 39 km. However, such reactivation should be carefully supervised by heritage professionals and evaluated in terms of its potential negative impact to the authenticity of the property.

Authenticity in traditions, techniques and management system is illustrated by the continuing maintenance and management by the local communities, during which repairs are undertaken in traditional construction techniques and materials. To a certain extent, the site still evokes feelings which could be related to its original time of construction. This applies in particular where arches of the system exist and where one can see the hundreds of visible glyphs that were incorporated in the aqueduct's construction by the indigenous populations, underscoring that the spectacular engineering work was a collaborative effort between the indigenous population and the Spanish clergy.

Management and protection requirements

The property is protected under the Federal Law on Archaeological, Artistic and Historic Monuments and Areas promulgated in 1972 as an Historic Monument. This implies that in order to initiate any changes to the current condition of the property and its immediate setting, permission by the National Coordination of Historic Monuments of the INAH and from the Hidalgo and State of Mexico INAH Centres is required. The immediate setting has been defined as the buffer zone, which aims to preserve the integrity of the characteristic maguey landscape.

The property falls into two states and five municipalities which share the administration of the hydraulic system. A

Management Unit for inter-institutional coordination and follow-up of the management plan coordinates federal, state and municipal levels as well as agricultural and citizen associations. The management as well as maintenance of the property builds strongly on the cooperation with the local communities and citizen organizations. Any visitor infrastructure planned to be created for the property needs to be carefully selected, as well as be sensitive to the characteristics of the site and its setting.

Additional recommendations

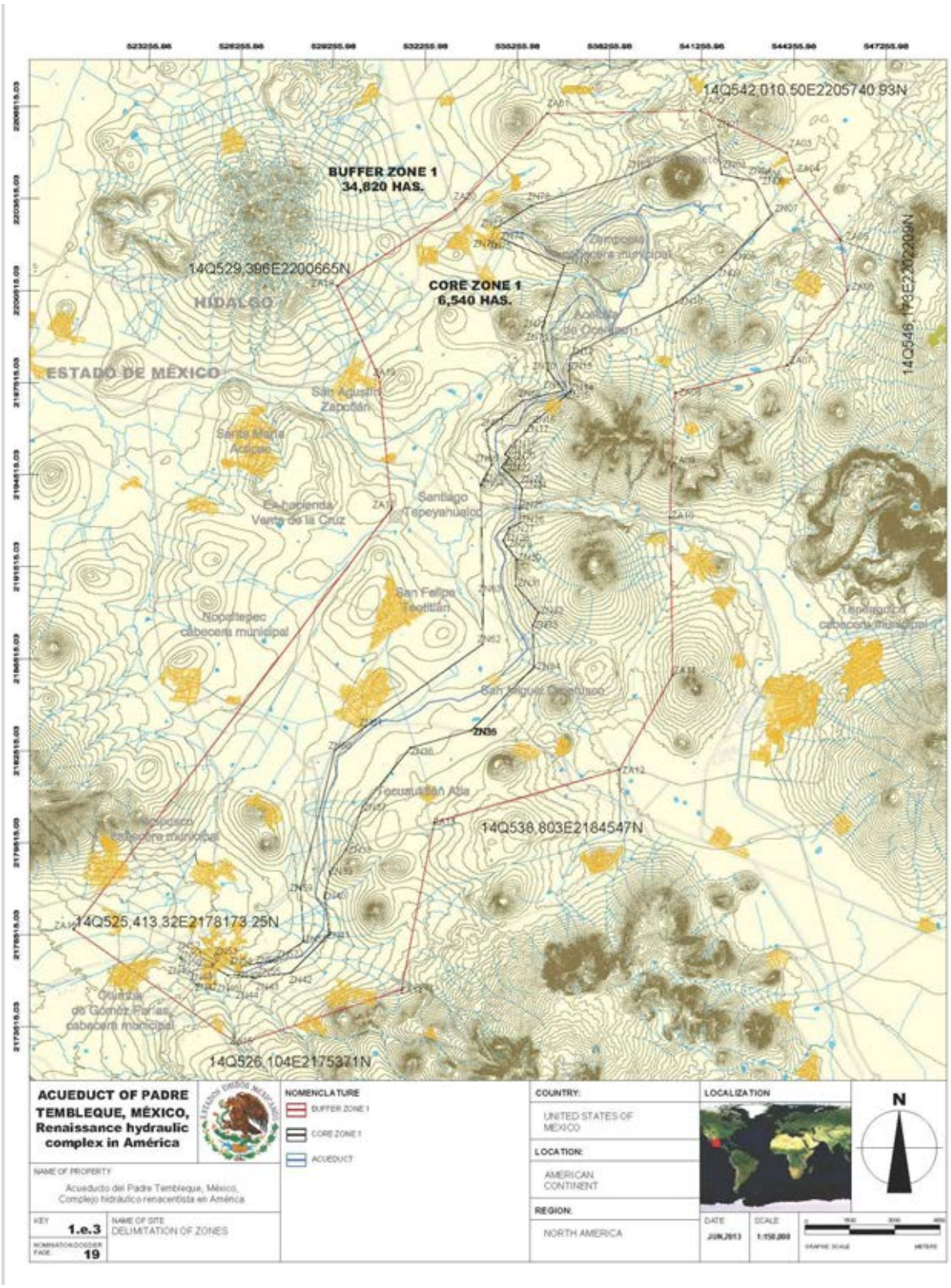
ICOMOS further recommends that the State Party give consideration to the following:

- Finalizing the establishment and attribution of mandate to the management unit by September 2015 to guide cooperation between the concerned federal and municipal administrations;

- Augmenting the management plan to include operational management procedures and finalize its operational version, integrating the strategies for risk and visitor management;

- Ensuring that any future visitor infrastructure be carefully selected, as well as sensitive to the characteristics of the site and its setting and be subject to a Heritage Impact Assessment before any approval is granted.

ICOMOS also recommends that the name of the property be changed to “Aqueduct of Padre Tembleque Hydraulic System”.



Revised map showing the boundaries of the nominated property

Monumental arcade of Tepeyahualco, aerial view

Monumental arcade of Tepeyahualco

Hacienda Los Arcos, aerial view

Cistern at Zempoala Church

Aqueduc de Padre Tembleque (Mexique)
No 1463

Nom officiel du bien tel que proposé par l'État partie
Aqueduc de Padre Tembleque, complexe hydraulique de la Renaissance en Amérique

Lieu
Districts de Tepeapulco, Zempoala et Otumba
État d'Hidalgo, État de Mexico
Mexique

Brève description
L'aqueduc de Padre Tembleque (qui porte le nom du frère Francisco de Tembleque), construit entre 1554 et 1571, constitue un système hydraulique situé entre l'État de Mexico et l'État d'Hidalgo, sur le plateau central mexicain. Ce réseau de canaux du patrimoine comprend une zone de captage des eaux, des sources, des canaux principaux et secondaires, des réservoirs de distribution, des ponts-aqueducs à arcades, des réservoirs et autres éléments auxiliaires, qui s'étendent sur une distance maximale de 48,22 kilomètres. Les structures de l'aqueduc ont été bâties grâce à des structures de soutènement en adobe, dans la tradition de construction mésoaméricaine, et elles font référence aux modèles européens d'acheminement de l'eau élaborés à l'époque romaine.

Catégorie de bien
En termes de catégories de biens culturels, telles qu'elles sont définies à l'article premier de la Convention du patrimoine mondial de 1972, ce bien a été initialement soumis en tant que proposition d'inscription en série de 3 *sites.* Sur recommandation de l'ICOMOS, l'État partie a retiré la proposition d'inscription de 2 éléments de la série, par lettre du 16 février 2015. Le bien reste donc une proposition d'inscription d'1 *site.*

Aux termes des *Orientations devant guider la mise en œuvre de la Convention du patrimoine mondial* (juillet 2013), Annexe 3, le bien est aussi proposé pour inscription en tant que *canal du patrimoine.*

1 Identification

Inclus dans la liste indicative
20 novembre 2001

Assistance internationale au titre du Fonds du patrimoine mondial pour la préparation de la proposition d'inscription
Aucune

Date de réception par le Centre du patrimoine mondial
2 octobre 2013

Antécédents
Il s'agit d'une nouvelle proposition d'inscription.

Consultations
L'ICOMOS a consulté son Comité scientifique international sur le patrimoine de l'architecture en terre, le TICCIH et plusieurs experts indépendants.

Mission d'évaluation technique
Une mission d'évaluation technique de l'ICOMOS s'est rendue sur le bien du 9 au 12 septembre 2014.

Information complémentaire reçue par l'ICOMOS
L'ICOMOS a envoyé une lettre à l'État partie le 22 août 2014 pour lui demander des informations complémentaires sur l'emplacement exact d'éléments décrits dans le dossier de proposition d'inscription, la description de tous les éléments proposés pour inscription, la justification de la contribution à la série, ainsi que l'histoire et le développement des éléments 02 et 03, la justification du critère (v), les futurs plans de conservation et le fonctionnement de l'aqueduc, les détails du droit de propriété, ainsi que le classement de protection du bien. L'État partie a fourni des informations complémentaires en réponse aux questions soulevées, ainsi qu'à d'autres aspects, le 24 octobre 2014.

Après la réunion de sa Commission pour le patrimoine mondial, l'ICOMOS a envoyé une seconde lettre le 22 décembre 2014, recommandant une réduction du nombre des biens en série et demandant des informations complémentaires au sujet de la gestion et du suivi. L'ICOMOS et l'État partie ont de plus organisé une conférence en ligne pour dialoguer avec les experts techniques concernés, le 13 janvier 2015, et une réunion, le 22 janvier 2015. La deuxième lettre d'informations complémentaires envoyée par l'État partie le 16 février 2015 répondait à certains aspects débattus durant la réunion en ligne.

Les informations complémentaires ont été incluses dans les sections concernées ci-après.

Date d'approbation de l'évaluation par l'ICOMOS
12 mars 2015

2 Le bien

Description
Proposé pour inscription en tant que canal du patrimoine, le bien présente les éléments clés d'un système hydraulique d'aqueducs, situé sur le plateau central mexicain. Le bien était à l'origine composé de trois éléments, la surface totale du bien couvrant 6 560,3 hectares. Cette surface s'est trouvée réduite du fait du retrait des éléments 02 et 03, qui sont décrits ci-après, ce qui a réduit la taille du bien à 6 540 hectares.

Le premier élément, indiqué comme 01 Complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés, couvre ces 6 540 hectares et inclut les éléments essentiels du système hydraulique, sur une distance de 48,22 kilomètres. Il est entouré par une zone tampon de 34 820 hectares. L'élément 02, Ville, couvent, aqueduc et réservoir d'eau de Tepeapulco, désigné à l'origine comme le deuxième élément du bien, avait une surface de 17,7 hectares. Il partageait une zone tampon commune de 555 hectares avec le troisième élément du bien, intitulé 03 Site archéologique de Xihuingo, qui couvrait une surface de 2,6 hectares. L'élément proposé à l'heure actuelle, et les deux éléments retirés, restent décrits séparément ci-après :

01 Complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés

Les éléments essentiels du système hydraulique se trouvent dans ce site qui est le plus grand du bien et inclut, au nord, la source d'eau du système, sous la forme de la montagne volcanique d'El Tecajete, qui fait office de zone de captage des eaux. Dans ses environs, se trouve une série de sources, nommées *ojos de agu*a, qui sont détournées vers un canal principal. Ce canal principal couvre les 3,37 premiers kilomètres du système, jusqu'à la dérivation, ou réservoir fendu d'El Tecajete, qui divise le canal en deux branches principales, la branche qui mène à Zempoala, d'une longueur de 5,98 kilomètres, et la branche en direction d'Otumba, qui s'étend le plus au sud sur 38,87 kilomètres.

L'une des caractéristiques architecturales essentielles du canal principal, partagé à l'origine, est l'aqueduc de l'Hacienda el Tacajete, une structure à arcades, qui achemine l'eau à travers 55 arcades en plein cintre, sur une distance de plusieurs centaines de mètres. L'embranchement qui va vers Zempoala prend fréquemment la forme d'un canal souterrain, creusé à une profondeur d'1,2 m dans le paysage vallonné. À Zempoala, cet embranchement se divise de nouveau pour se déverser dans deux citernes terminales carrées, datant du XVIe siècle, qui approvisionnaient en eau les complexes essentiels de Zempoala, comme l'habitation principale ou le couvent de Todos los Santos.

L'embranchement menant à Otumba se dirige en général vers le sud-ouest, en passant près de plusieurs haciendas, qui sont approvisionnées en eau grâce à des réservoirs de dérivation plus petits le long de son cours. Pour atteindre l'hacienda de Guadalupe de Arcos, un aqueduc à 14 arches en plein cintre transporte l'eau de l'autre côté du lac de Guadalupe de Arcos. Entre les limites sud de la municipalité de Zempoala et les limites nord de la municipalité de Nopaltepec, on trouve les structures principales qui facilitent le fonctionnement du système hydraulique méridional, l'arcade monumentale qui enjambe le ravin de Tepeyahualco et la rivière Papalote. Le pont-aqueduc est composé de 68 arches en plein cintre, en maçonnerie de pierre, avec un mortier de chaux-sable, dont la plus grande atteint 38 mètres de hauteur.

Dans la section centrale de cet embranchement, un certain nombre d'haciendas sont reliées au canal, avant que le système hydraulique pénètre dans la municipalité d'Otumba, comme l'hacienda de Santa Inés et les haciendas de San Miguel Ometusco et de Zoapayuca, dans la municipalité d'Axapusco. La ville d'Otumba marque l'extrémité sud du système hydraulique, et intègre de nouveau plusieurs réservoirs de dérivation et réservoirs de stockage de l'eau. On peut encore comprendre leur approvisionnement dans certaines structures architecturales, comme la maison de la culture, la maison des vice-rois ou le couvent de La Purísima Concepción.

02 Ville, couvent, aqueduc et réservoir d'eau de Tepeapulco (retirés par lettre du 16 février 2015).

Le deuxième élément du bien est entièrement situé dans la ville de Tepeapulco, à environ 12 kilomètres à l'est du premier élément du bien. Il apporte des fragments d'un ancêtre de l'aqueduc de Padre Tembleque, l'aqueduc de Tepeapulco, achevé en 1545. Contrairement au premier élément du bien, cette structure est limitée à ses caractéristiques urbaines et quelque peu fragmentées, et comprend une petite arcade, un réservoir d'eau, un bassin de réception et des lavoirs collectifs, ainsi qu'un atrium et la citerne terminale. Sur la précédente extension de 27 kilomètres de l'aqueduc de Tepeapulco, environ 600 mètres seulement de canaux et de structures sont inclus dans cet élément du bien.

03 Site archéologique de Xihuingo (retiré par lettre du 16 février 2015)

Ce troisième élément du bien, le site archéologique de Xihuingo, est situé à 5 kilomètres au nord du second, et lui aussi à environ 12 kilomètres à l'est du premier élément du bien. Le site archéologique comprend un établissement fortifié, construit pour l'observation astronomique et calendaire, et contient plusieurs pétroglyphes. Il présente un certain nombre de couches d'occupation, toutes antérieures au contact avec les Espagnols, datant de la phase Tzacualli (0-200 apr. J.-C.), de la culture de Teotihuacan (200-600 apr. J.-C.) et de la phase Mazapa, puis de phases aztèques complexes ultérieures. Cet élément du bien ne contient aucun élément typique des systèmes de distribution d'eau.

Histoire et développement

Après s'être installés une première fois plus brièvement dans les années 1527-1540, les frères franciscains s'établirent à Otumba en 1553, sous la direction de leur responsable, Francisco de Tembleque, qui s'engagea à aider la communauté de Zempoala et à payer annuellement 20 pesos en échange d'un acheminement de l'eau jusqu'à Otumba via un aqueduc. La construction débuta au moment où Bernardino de Sahagún recueillait une documentation pour un texte anthropologique, qui est considéré comme une source indispensable pour notre connaissance des cultures mésoaméricaines. Ce contexte permit aux ouvriers locaux qui construisaient l'aqueduc de partager leurs expressions matérielles et immatérielles de

la culture locale avec les frères qui supervisaient les travaux.

Une décennie plus tôt, un aqueduc plus petit avait déjà été construit sous la supervision d'Andrés de Olmos, à Tepeapulco, entre 1541 et 1545. Cette structure était formée d'un tuyau d'égout assez simple, recouvert de chaux et de pierres, principalement souterrain, avec une arcade visible, situé dans l'élément du bien de Tepeapulco. Cependant, seuls des fragments de cette structure plus ancienne ont survécu jusqu'à aujourd'hui.

À partir de 1553, 17 années complètes furent consacrées à la construction de l'aqueduc acheminant l'eau jusqu'à Zempoala et Otumba. La construction fut réalisée en coopération étroite avec 400 maçons et ouvriers des communautés de Zacuala, Tlaquilpa, Zempoala et Otumba, travaillant uniquement sur la base de leur tradition ancestrale d'une organisation sociale du travail connue sous le nom de *tequio*. En particulier, la construction des arcades reposait également sur les connaissances et techniques locales d'un système dit « mestizo », qui revenait à bâtir d'abord des structures de soutènement en adobe, puis à élever progressivement les constructions en pierre, ce qui permettait aux ouvriers des faire des mouvements horizontaux, au lieu de travailler avec des échafaudages ou des coffrages. Les ouvriers locaux ont également laissé leur signature sur la structure, en décorant les clés de voûte et les tympans avec des symboles correspondant à la cosmogonie mésoaméricaine.

Après l'achèvement du système hydraulique, en 1571, des travaux réguliers d'entretien et de conservation durent être coordonnés entre les quatre communautés concernées, car les canaux continuaient à se boucher ou à se fendre au fil des siècles. Même si le canal était initialement destiné à fournir de l'eau potable aux habitants urbains, la demande en eau pour répondre aux besoins agricoles dans les haciendas augmenta de façon significative au XVIIIe siècle, menant à des conflits au sujet des droits de distribution. Après l'indépendance du Mexique, au début du XIXe siècle, de nouveaux conflits conduisirent à l'abandon partiel de l'aqueduc, et en particulier de l'embranchement d'Otumba. En 1851, l'ingénieur Francisco Garay parcourut le réseau de canaux et souligna un besoin de conservation urgent, qui fut finalement décrété par l'empereur en 1865. Cependant, les travaux de conservation ne furent pas réalisés avant que la valeur patrimoniale de l'aqueduc soit reconnue, au début du XXe siècle. C'est seulement dans les dernières années du XXe siècle qu'un projet visant à reconquérir et restaurer le canal historique a été lancé par l'Institut national d'anthropologie et d'histoire (INAH), financé par des ressources fournies par le Fonds mondial pour les monuments, le Fonds des ambassadeurs et le Congrès des États-Unis. Comme les travaux de conservation ne sont que partiellement achevés, l'aqueduc n'est pas encore de nouveau opérationnel sur tout son parcours.

3 Justification de l'inscription, intégrité et authenticité

Analyse comparative

Le bien a été identifié comme étant le plus facilement comparable dans le cadre typologique des systèmes de gestion de l'eau et dans le contexte chronologique de la période coloniale en Mésoamérique, tout en reconnaissant des renvois à la Renaissance européenne et à l'époque romaine en ce qui concerne les réalisations architecturales hydrauliques. L'analyse comparative vise donc à comparer le bien avec des complexes hydrauliques de nature similaire, en particulier des exemples déjà reconnus par la Liste du patrimoine mondial ou les listes indicatives, avec d'autres aqueducs à un niveau national ou régional, et avec les réalisations européennes de construction d'aqueducs les plus importantes, de l'époque romaine à la Renaissance.

Parmi les aqueducs déjà inscrits sur la Liste du patrimoine mondial, ou situés au sein de contextes plus étendus de certains sites du patrimoine mondial, la comparaison met l'accent sur des structures plus anciennes, telles que le pont du Gard, France (1985, (i), (iii) et (iv)), l'aqueduc de Ségovie, Espagne (1985, (i), (iii) et (iv)), les aqueducs de Los Milagros et San Lázaro, dans l'ensemble archéologique de Mérida, Espagne (1993, (iii) et (iv)), l'aqueduc d'Amoreira, à Elvas, Portugal (2012, (iv)), l'aqueduc d'Agua da Prata, à Évora, Portugal (1986, (ii) et (iv)), ou l'aqueduc de Los Pegões, à Tomar, Portugal (1983, (i) et (vi)).

Cependant, des structures plus tardives, qui ont été inscrites en tant qu'exemples importants de systèmes hydrauliques, ont également été comparées, notamment l'aqueduc de Pontcysyllte, Royaume-Uni (2009, (i), (ii) et (vi)), l'aqueduc Carolino de Vanvitelli, dans le palais royal du XVIIIe siècle, à Caserte, Italie (1997, (i), (ii), (iii) et (vi)), ou trois exemples mexicains, l'aqueduc de Morelia (1991, (ii), (iv) et (vi)), l'aqueduc de Querétaro (1996, (ii) et (iv)), ou l'aqueduc de Zacatecas (1993, (ii) et (iv)).

L'ICOMOS considère que cette partie de la comparaison est malheureusement exclusivement centrée sur la hauteur des arches simples dans les aqueducs, pour apporter la preuve que l'aqueduc de Tepeyahualco offre la plus grande hauteur pour une arche simple. Par conséquent, les caractéristiques plus vastes du système de distribution de l'eau, la préservation de ses éléments fonctionnels ou des détails de construction, n'ont pas été comparées à d'autres exemples de systèmes de gestion de l'eau, même si certains sont brièvement mentionnés, comme le système hydraulique historique de Shushtar, Iran (2009, (i), (ii) et (v)), le système d'irrigation de Dujiangyan, Chine (2000, (ii), (iv) et (vi)), ou les systèmes d'irrigation *aflaj* d'Oman (2006, (v)).

D'autres exemples d'aqueducs en France, Italie, Portugal, Turquie et Espagne sont de même réduits à une comparaison de hauteur, et illustrent que l'aqueduc d'Aguas Livres, à Lisbonne, au Portugal, est effectivement une structure à arches sur un seul niveau qui fait environ

deux fois la hauteur de l'aqueduc de Tepeyahualco et auquel il est donc fait référence en tant que plus haut aqueduc historique construit en maçonnerie de pierre. Cet aqueduc date d'environ deux siècles plus tard que le système hydraulique de Padre Tembleque et a été construit à partir de 1748.

Dans l'analyse chronologique régionale, il est reconnu qu'à l'heure actuelle trois aqueducs mexicains de l'époque coloniale en Mésoamérique ont été inclus dans la Liste du patrimoine mondial. Cependant, tous les trois n'ont pas été proposés pour inscription en tant que systèmes hydrauliques, mais étaient des éléments d'une ville ou d'un site archéologique qui ont été inscrits.

L'ICOMOS note que l'analyse comparative ne traite pas de la sélection des éléments de la série. L'ICOMOS note également que toutes les comparaisons discutées se concentrent exclusivement sur les caractéristiques de l'élément du bien 01 Complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés, et ne font pas référence aux caractéristiques incluses dans les deux autres éléments, qui ont été retirés entre-temps, sur recommandation de l'ICOMOS. Cependant, même en ce qui concerne le premier élément, l'ICOMOS considère que l'analyse comparative ne parvient pas à comparer le système de distribution d'eau de l'aqueduc de Padre Tembleque avec des exemples similaires pertinents de systèmes hydrauliques, et, de la même façon, manque de comparaisons avec d'autres structures créées en utilisant des techniques d'adobe similaires, associant des traditions de construction locales et européennes. Néanmoins, l'ICOMOS a pu confirmer le caractère exceptionnel du système hydraulique inclus dans le premier élément de la série proposé initialement, en consultant ses réseaux d'experts dans la région.

L'ICOMOS considère que, malgré plusieurs lacunes dans l'analyse comparative, le premier élément de la série justifie d'envisager l'inscription de ce bien sur la Liste du patrimoine mondial.

Justification de la valeur universelle exceptionnelle

Le bien proposé pour inscription est considéré par l'État partie comme ayant une valeur universelle exceptionnelle en tant que bien culturel pour les raisons suivantes :

- Le système hydraulique est un exemple exceptionnel de canal du patrimoine, car son principal aqueduc à arcades, à Tepeyahualco, atteint une hauteur totale de 39,65 mètres, avec son arche centrale de 33,84 mètres de haut, ce qui en fait le plus haut aqueduc jamais construit à cette époque avec un seul niveau d'arches.
- Le canal du patrimoine, initié par le père Tembleque et construit avec le soutien des communautés locales, est une représentation unique de la fusion ingénieuse de traditions de construction mésoaméricaines et européennes, associant la tradition mestizo et la tradition des systèmes hydrauliques romains.
- Le complexe hydraulique est directement associé au paysage d'agaves, un paysage ancestral au caractère unique, ainsi qu'à la naissance des sciences anthropologiques américaines, à la suite des travaux de Bernardino de Sahagún, qui sont considérés comme une indispensable source de connaissances sur les anciennes cultures mésoaméricaines.

L'ICOMOS considère que cette justification renvoie exclusivement à l'élément 01 sur les trois éléments en série présentés dans cette proposition d'inscription, et identifie une justification de la valeur universelle exceptionnelle à laquelle les éléments 02 et 03 n'apportent aucune contribution distinctive. En conséquence, l'ICOMOS à recommandé d'exclure les éléments 02 et 03 de la proposition d'inscription. Ces éléments ont été retirés par la suite par l'État partie.

De l'avis de l'ICOMOS, l'élément 01 Complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés présente une valeur universelle exceptionnelle en tant qu'exemple ancien et unique d'un système hydraulique dans le contexte mésoaméricain, qui est exceptionnellement bien conservé, et constitue un exemple de fusion unique d'ingénieuses traditions de construction mésoaméricaines et européennes. Cependant, l'ICOMOS considère que ce potentiel ne s'applique pas au paysage d'agaves environnant dans le contexte de cette proposition d'inscription, et par conséquent ne peut pas accepter l'approche paysagère de la justification de la valeur universelle exceptionnelle fournie par l'État partie.

Intégrité et authenticité

Intégrité

L'élément initial 01 Complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés conserve la totalité du système hydraulique, sur une distance d'environ 48 kilomètres. Son environnement paysager, principalement rural, est caractérisé par des plantations d'agaves typiques, le système de canaux étant soit traditionnellement enfoui et entouré par des pierres, avec des conduites en carreaux de terre cuite pour certaines sections, soit construit à la surface du sol, à ciel ouvert ou recouvert de pierres. Les six sections de l'aqueduc, avec 137 arches visibles, représentent moins de cinq pour cent du système hydraulique total. Tous les éléments du système sont inclus dans l'élément 01, ce qui illustre un haut degré d'intégrité en ce qui concerne l'extension historique et la fonctionnalité du système hydraulique. Les éléments 02 et 03 ne semblaient rien ajouter à cet état complet.

Les menaces dues au développement ou à l'occupation des sols pesant sur l'aqueduc de Padre Tembleque semblent extrêmement rares. Le paysage rural environnant assure un haut degré d'intégrité, avec

seulement quelques interruptions dues à des routes ou des lignes électriques. De nouvelles constructions peu respectueuses ont empiété sur les centres urbains historiques de Zempoala et Otumba, mais ces constructions ont peu d'impact sur les attributs du système hydraulique. L'ICOMOS considère que l'élément 01 inclut tous les éléments nécessaires pour illustrer la valeur universelle exceptionnelle proposée par l'État partie.

L'ICOMOS considère que l'intégrité de l'élément 01 du bien a été justifiée.

Authenticité

Les manifestations physiques du système hydraulique sont bien conservées dans les divers éléments de ce système, y compris les *ojos de agua* (sources), *apantles* (canaux), *aljibes* (citernes), les arches, fontaines, réservoirs d'eau, et autres caractéristiques liées à l'eau. Ces manifestations conservent leur authenticité dans leur forme et leur conception, leurs matériaux et leur substance, ainsi que leur emplacement et leur environnement. Le système hydraulique conserve également en partie son authenticité en matière d'usage et de fonction dans le tronçon de six kilomètres de Zempoala, qui achemine à l'heure actuelle de l'eau non potable destinée à des usages tels que le lavage du linge, l'irrigation, etc. Il est prévu qu'il retrouve une authenticité complète d'usage et de fonction quand le passage de l'eau sera de nouveau rendu possible à travers l'autre embranchement du système, qui est relié à la ville d'Otumba, à une distance de 39 kilomètres. L'ICOMOS recommande que toutes les mesures destinées à rétablir l'exploitabilité de cet embranchement soient supervisées avec soin par des professionnels du patrimoine, et évaluées en ce qui concerne leur impact négatif potentiel sur l'authenticité du bien, au moyen d'études d'impact sur le patrimoine (EIP).

L'authenticité en termes de traditions, techniques et système de gestion est illustrée par l'entretien et la gestion continus assurés par les communautés locales, à l'occasion desquels des réparations sont effectuées avec des techniques de construction et des matériaux traditionnels. Dans une certaine mesure, le site suscite encore des impressions qui pourraient être reliées à son époque de construction initiale. Ceci s'applique en particulier là où les arches du système subsistent, et où l'on peut voir les centaines de glyphes visibles qui ont été intégrés dans la construction de l'aqueduc par les populations autochtones, soulignant que cet ouvrage de génie civil spectaculaire était un effort collaboratif entre la population autochtone et le clergé espagnol.

L'ICOMOS considère que, concernant la valeur universelle exceptionnelle, l'authenticité de l'élément 01 du bien a été démontrée.

En conclusion, l'ICOMOS considère que les conditions d'intégrité et d'authenticité ont été justifiées pour l'élément 01 de la série soumise à l'origine.

Critères selon lesquels l'inscription est proposée
Le bien est proposé pour inscription sur la base des critères culturels (i), (ii), (iv), (v) et (vi).

Critère (i) : *représenter un chef-d'œuvre du génie créateur humain ;*

Ce critère est justifié par l'État partie au motif que l'aqueduc est un chef-d'œuvre des sciences hydrauliques de la Renaissance dans le Nouveau Monde, qui représente la réalisation de la perfection idéale proposée par les doctrines de la Renaissance sur les terres américaines. De plus, le bien intègre la plus haute arcade sur un seul niveau jamais construite dans un aqueduc, depuis l'époque romaine jusqu'au milieu du XVIe siècle, arcade réalisée grâce à l'emploi ingénieux d'un coffrage en adobe à la place d'échafaudages.

L'ICOMOS considère que l'arcade monumentale de l'aqueduc qui enjambe le ravin de Tepeyahualco et la rivière Papalote pourrait être considérée comme un chef-d'œuvre dans le sens du critère (i), et que cela permet l'application de ce critère aux éléments restants du système hydraulique, bien que ceux-ci combinent des technologies de construction qui avaient été mises au point précédemment en Europe ou dans leurs contextes locaux respectifs.

L'ICOMOS considère que ce critère a été justifié pour l'élément 01 de la série.

Critère (ii) : *témoigner d'un échange d'influences considérable pendant une période donnée ou dans une aire culturelle déterminée, sur le développement de l'architecture ou de la technologie, des arts monumentaux, de la planification des villes ou de la création de paysages ;*

Ce critère est justifié par l'État partie au motif que le système hydraulique témoigne d'un échange d'influences considérable entre tradition européenne (en matière de connaissance des systèmes hydrauliques romains, mise en évidence dans les inclinaisons graduelles à travers la topographie irrégulière) et culture mésoaméricaine, représentée par l'emploi d'une organisation sociale traditionnelle du travail collectif, l'utilisation et l'adaptation de méthodes locales de construction avec de l'adobe, ainsi que la présence de glyphes illustrant des symboles et une cosmologie préhispaniques dans plusieurs structures d'arcades. En outre, la fusion des idéaux humanistes de l'ordre franciscain et des traditions collectives locales a encouragé le bien-être commun et la réalisation d'une construction impressionnante en 17 années.

L'ICOMOS considère que, pour l'élément 01, la conjonction du patrimoine romain des aqueducs en maçonnerie, des techniques de gestion hydraulique

inspirées du savoir-faire arabo-andalou et des traditions autochtones préhispaniques pour les constructions en adobe est effectivement exceptionnelle, avec des preuves matérielles claires. Bien que l'emploi de briques en adobe, au lieu de bois, ait été appliqué ailleurs au Mexique, cela n'a pas été fréquemment le cas, et certainement pas avec un effet aussi spectaculaire que dans l'aqueduc qui enjambe le ravin de Tepeyahualco et la rivière Papalote.

L'ICOMOS considère que ce critère a été justifié pour l'élément 01.

Critère (iv) : *offrir un exemple éminent d'un type de construction ou d'ensemble architectural ou technologique ou de paysage illustrant une période ou des périodes significative(s) de l'histoire humaine ;*

Ce critère est justifié par l'État partie au motif que l'aqueduc représente un exemple exceptionnel d'architecture hydraulique, basée sur une connaissance approfondie de l'ingénierie hydraulique romaine et de la Renaissance, et associée à des connaissances mésoaméricaines locales en matière de construction. Cette combinaison a donné naissance au plus haut aqueduc à arcades avec des arches simples, ce qui, en faisant usage de la même technologie, n'a pas été accompli avant ni reproduit ensuite, et qui a atteint une échelle surprenante manquant toujours d'équivalents comparables.

L'ICOMOS considère que, comme pour le critère précédent, la justification présentée s'applique exclusivement à l'élément 01, et ne peut pas être considérée comme pertinente pour les deux autres éléments de la série. En ce qui concerne le premier élément, les techniques spécifiques et les matériaux régionaux utilisés dans la construction, qui ont donné naissance à un type de système hydraulique unique à l'époque des rencontres entre Mésoaméricains et Européens, sont plus importants que la hauteur maximale des arches, qui est soulignée dans la proposition d'inscription. L'ICOMOS considère qu'une analyse comparative examinant la technologie de construction fournit une base pour justifier ce critère pour l'élément 01.

L'ICOMOS considère que ce critère a été justifié pour l'élément 01.

Critère (v) *: être un exemple éminent d'établissement humain traditionnel, de l'utilisation traditionnelle du territoire ou de la mer, qui soit représentatif d'une culture (ou de cultures), ou de l'interaction humaine avec l'environnement, spécialement quand celui-ci est devenu vulnérable sous l'impact d'une mutation irréversible ;*

Ce critère est justifié par l'État partie au motif que le paysage d'agaves est représentatif de l'interaction avec l'environnement naturel rural autour de l'aqueduc, et qu'il a permis une agriculture des agaves d'origine préhispanique. Les cultures, qui sont définies par des alignements parallèles de parcelles et de terrasses, servent à produire une boisson fermentée, appelée *pulque*. Le paysage d'agaves ancestral est récemment devenu vulnérable face au développement agricole et économique urbain.

L'ICOMOS considère que les délimitations des éléments de site englobent des caractéristiques très limitées du paysage d'agaves, dont on ne peut pas dire qu'elles aient une valeur universelle exceptionnelle, comparées à plusieurs autres paysages agricoles de la région mésoaméricaine. De plus, la façon dont ce paysage ancestral est lié ou apporte un soutien au système hydraulique présenté au cœur de cette proposition d'inscription n'a pas été mise en évidence, pas plus que la façon dont les caractéristiques paysagères du système hydraulique pourraient être intégrées dans le contexte plus large de cette proposition d'inscription.

L'ICOMOS considère que ce critère n'a pas été justifié.

Critère (vi) : *être directement ou matériellement associé à des événements ou des traditions vivantes, des idées, des croyances ou des œuvres artistiques et littéraires ayant une signification universelle exceptionnelle ;*

Ce critère est justifié par l'État partie au motif que l'aqueduc de Padre Tembleque est directement associé à la naissance des sciences ethnographiques et anthropologiques en Amérique, et plus particulièrement à la rédaction de *Los Primeros Memoriales, Historia general de las cosas de la Nueva España* par Bernadino de Sahagún. Les éléments de construction illustrent de plus les associations avec la mémoire collective préhispanique en ce qui concerne la cosmogonie religieuse, la langue et les traditions, comme attesté sur les pierres du complexe hydraulique, qui portent divers symboles gravés.

L'ICOMOS considère que si les œuvres de Bernadino de Sahagún ont pu avoir un impact important sur l'histoire de l'anthropologie mésoaméricaine, le fait que ces recherches étaient basées à proximité du paysage de construction du canal, et qu'elles ont également coïncidé avec le début de la construction sous la responsabilité de Francisco de Tembleque, n'est pas suffisant pour illustrer une association directe dont on pourrait dire qu'elle a une valeur universelle exceptionnelle. L'ICOMOS considère également que si les symboles gravés dans l'architecture hydraulique font bien référence à l'intégration de la cosmogonie préhispanique des ouvriers, ces symboles n'ont pas un caractère exceptionnel en eux-mêmes, mais plutôt qu'ils fonctionnent comme une référence à l'intégration de différentes traditions et cosmologies, qui est mieux reconnue selon le critère (ii).

L'ICOMOS considère que ce critère n'a pas été justifié.

L'ICOMOS considère que l'approche en série initiale n'était pas justifiée et a recommandé de réduire le bien à l'élément 01, ce qui a été accepté par l'État partie.

En conclusion, l'ICOMOS considère que les critères (i), (ii) et (iv) ont été justifiés pour l'élément 01 et que l'authenticité et l'intégrité ont été démontrées.

Description des attributs de la valeur universelle exceptionnelle

Les attributs de la valeur universelle exceptionnelle comprennent tous les composants de l'élément 01 du système hydraulique, y compris les sources, les canaux principaux et secondaires, les réservoirs de distribution, plusieurs ponts-aqueducs à arcades, les réservoirs et autres éléments auxiliaires, s'étendant sur une distance de 48,22 kilomètres. Les techniques élaborées et les échanges culturels deviennent particulièrement visibles dans la maîtrise de l'arcade monumentale enjambant le ravin de Tepeyahualco et la rivière Papalote, qui est construite avec 68 arches en plein cintre, dont la plus grande atteint 38 mètres de hauteur.

4 Facteurs affectant le bien

L'aqueduc de Padre Tembleque est situé dans un paysage rural dominé par l'agriculture, et, à l'heure actuelle, les pressions dues au développement sont faibles. Cependant, l'ICOMOS considère qu'une expansion progressive supplémentaire de Mexico peut avoir un impact sur l'intégrité si des mécanismes de contrôle de gestion appropriés ne sont pas adoptés. Des lignes de vue importantes pourraient à terme être affectées par l'expansion urbaine de Mexico, ville de plus de 20 millions d'habitants, située à seulement une heure de distance (62 km). Le même risque pourrait émaner d'une éventuelle expansion du complexe industriel de Ciudad Sahagún, situé à environ 9 kilomètres de l'aqueduc, à l'heure actuelle masqué par une petite montagne. De nouvelles routes régionales et locales sont encore en cours de planification dans le bien, et l'ICOMOS considère qu'elles devront être contrôlées en termes d'impact visuel et de méthodes de construction dans les environs du système hydraulique.

Le bien accueille peu de visiteurs aujourd'hui, mais, étant donné la proximité de la capitale, le nombre de visiteurs peut augmenter considérablement. La majeure partie du système hydraulique étant souterrain, les visiteurs seront probablement les plus nombreux là où se trouvent les quelques structures architecturales visibles et impressionnantes, en particulier le majestueux aqueduc à arcades avec ses 68 arches. L'ICOMOS considère qu'il sera important de planifier et de contrôler soigneusement l'établissement d'infrastructures destinées aux visiteurs dans ces zones. De même, parce que de grandes sections du système hydraulique se trouvent sous terre, et ne sont donc pas visibles, l'éducation et la sensibilisation du public seront essentielles, afin de ne pas endommager par inadvertance ces sections. Des rangées d'agaves sont à l'heure actuelle plantées le long de toutes les sections pour indiquer le parcours de l'aqueduc.

En ce qui concerne les contraintes liées à l'environnement, l'État partie mentionne le risque de pollution, qui pourrait conduire à la contamination des aquifères de la colline d'El Tecajete, et réduirait la qualité de l'eau et donc les moyens d'utilisation du système hydraulique. Le bien est peu affecté par des risques naturels, mais des risques liés à l'activité humaine peuvent être identifiés. L'ICOMOS considère que l'accès sans autorisation des véhicules dans les environs immédiats des principales structures architecturales représente une menace importante. Non seulement ces véhicules ont un effet négatif sur l'environnement, mais ils font courir des risques réels aux structures physiques.

L'ICOMOS considère que les principales menaces pesant sur le bien sont l'expansion urbaine, l'accès des véhicules à l'aqueduc, le développement d'une infrastructure destinée aux visiteurs inappropriée et la pollution de l'eau.

5 Protection, conservation et gestion

Délimitations du bien proposé pour inscription et de la zone tampon

Les délimitations de l'élément restant du bien 01 et de sa zone tampon semblent appropriées, dans ses zones rurales comme urbaine. Il est évident qu'un grand soin a été apporté à l'établissement des délimitations, pour tirer parti des caractéristiques topographiques (montagnes, collines et crêtes), ce qui contribuera à protéger les caractéristiques visuelles du paysage environnant. Toutes les délimitations sont indiquées à l'aide de coordonnées SIG, et sont clairement définies sur les cartes fournies.

L'ICOMOS considère que les délimitations de l'élément 01 du bien proposé pour inscription et de sa zone tampon sont appropriées.

Droit de propriété

La majorité des terres du bien sont des champs agricoles dans les zones rurales, et des propriétés résidentielles dans les éléments urbains. 96 % de ces terres sont des propriétés privées, 3,8 % des propriétés communales, et seulement 0,2 % appartiennent à l'administration publique. Les informations complémentaires que l'État partie a fournies à la demande de l'ICOMOS indiquent que ces 0,2 % couvrent les principales structures architecturales, comme l'aqueduc de Tembleque. Il est également spécifié que, conformément à la loi générale sur l'eau, les cours d'eau, y compris les canaux, dépendent de l'administration et de la gestion fédérales, même quand ils traversent des terres privées.

Protection

Dans les informations complémentaires que l'État partie a fournies à la demande de l'ICOMOS, l'État partie a affirmé que tous les éléments du bien étaient couverts par la loi

fédérale sur les monuments et zones archéologiques, artistiques et historiques promulguée en 1972, en tant que monuments historiques par décision légale, de sorte que ces éléments ne nécessitent pas de décret ou de déclaration spécifique.

Cela implique que pour engager toute modification de l'état actuel du bien et de son environnement immédiat, une autorisation de la Coordination nationale des monuments historiques de l'INAH et des Centres de l'INAH dans l'État d'Hidalgo et dans l'État de Mexico est nécessaire. L'environnement immédiat a été défini comme la zone tampon, ce qui vise à préserver le paysage d'agaves caractéristique en tant qu'environnement du bien. Les efforts concertés faits par les autorités fédérales, étatiques et municipales pour travailler conjointement, afin de parvenir à une prise de conscience trans-gouvernementale et une protection appropriée du système hydraulique, sont encore très récents, et l'ICOMOS considère qu'il est difficile de juger de l'efficacité de ces efforts au stade actuel.

L'ICOMOS considère que la protection légale en place est appropriée et que l'application des mesures de protection du bien sera appropriée si les engagements sont toujours tenus.

Conservation

Les composants et attributs inclus dans l'élément 01 du bien ont été récemment inventoriés et décrits. L'état de conservation du système hydraulique est impressionnant, même si plusieurs canaux ne sont pas opérationnels à l'heure actuelle, parce qu'ils sont remplis de terre ou de poussière. L'embranchement qui mène à Zempoala a été nettoyé et restauré et est pleinement opérationnel actuellement. Selon les informations complémentaires fournies à la demande de l'ICOMOS, il est prévu que la fonction de l'embranchement d'Otumba soit davantage restaurée.

Des travaux de conservation sont en cours à l'heure actuelle dans plusieurs sections de l'aqueduc, y compris l'arcade principale de Tepeyahualco, dont la conservation est effectuée grâce à un financement mis à disposition par le Fonds des ambassadeurs des États-Unis. De l'avis de l'ICOMOS, la conservation est mise en œuvre par des spécialistes bien formés, qui utilisent des techniques de pointe pour conserver la grande section de l'aqueduc, à l'aide de matériaux et techniques traditionnels éprouvés, associés à des techniques analytiques modernes. Des projets de préservation et de conservation de grande qualité sont également entrepris dans d'autres sections du système hydraulique par le Conaculta, l'INAH et le Patronato Acueducto Tembleque A.C. Dans la lancée des projets de conservation, des opérations de réparation, nettoyage et entretien permanentes sont effectuées par des particuliers formés, issus des communautés locales. L'ICOMOS considère que les mesures de conservation sont de grande qualité et très efficaces.

L'ICOMOS considère que l'état de conservation est approprié et que les mesures de conservation et les programmes d'entretien sont louables.

Gestion

Structures et processus de gestion, y compris les processus de gestion traditionnels

Le bien dépend de deux États et de cinq municipalités, qui se partagent l'administration du système hydraulique et les mécanismes de contrôle du développement pour son environnement. Le dossier de proposition d'inscription souligne qu'une unité de gestion, chargée de la coordination interinstitutionnelle et du suivi du plan de gestion, coordonnera les niveaux fédéral, étatique (États de Mexico et d'Hidalgo) et municipal (Tepeapulco, Zempoala, Axapusco, Nopaltepec et Otumba), ainsi que les associations agricoles et citoyennes. Une approche en deux phases est envisagée pour établir cette coordination. Dans la première phase, le gouvernement et les autres parties prenantes s'accorderont sur la mise en œuvre d'un plan de gestion, qui est actuellement en préparation. Après ce premier accord, l'unité de gestion sera formée pour diriger la mise en œuvre intergouvernementale en septembre 2015.

Entre-temps, la Commission technique inter-États chargée de la proposition d'inscription du complexe hydraulique de l'aqueduc de Padre Tembleque sur la Liste du patrimoine mondial de l'UNESCO, qui a coordonné la préparation de la proposition d'inscription et du plan de gestion, fait office d'unité de gestion exécutive. Le financement nécessaire à la création et au fonctionnement d'une unité de gestion à ce stade ne semble pas avoir été estimé ou identifié. Initialement, l'ICOMOS a noté que les mesures de préparation aux risques ne figuraient pas au premier plan dans les mécanismes de gestion, même si la plantation de rangées d'agaves apportait une première protection contre les risques liés aux véhicules, agricoles et autres. Cependant, dans les informations complémentaires soumises le 16 février 2015, l'État partie a souligné un certain nombre de mesures prises pour prévenir les dégâts en cas de tremblement de terre, et mis l'accent sur les cadres de référence nationaux en ce qui concerne l'élaboration de plans détaillés de gestion des catastrophes et des risques.

Cadre de référence : plans et mesures de gestion, y compris la gestion des visiteurs et la présentation

Un plan de gestion a été soumis avec le dossier de proposition d'inscription. Le plan de gestion suit un objectif général et plusieurs objectifs spécifiques, et introduit des orientations pour les catégories de patrimoine spécifiques incluses dans le bien. Quelques actions/activités, dénommées indicateurs, ont été incluses dans ces diverses catégories. Le plan de gestion étant considéré comme un document en évolution, on peut supposer que ces catégories seront davantage détaillées, et présentées avec des délais d'exécution, des responsabilités et des

indicateurs spécifiques, dans une version opérationnelle ultérieure du plan de gestion.

À l'heure actuelle, l'aqueduc n'est pas une attraction touristique importante, et ne dispose pas encore d'infrastructures destinées aux visiteurs considérables. Cependant, le département du tourisme et de la culture de l'État d'Hidalgo et le département du tourisme de l'État de Mexico se sont associés pour mener une campagne de promotion, afin de faire croître le nombre de visiteurs sur le site du patrimoine, et ces instances ont l'intention de créer des infrastructures destinées aux visiteurs appropriées à l'avenir. La seule infrastructure actuellement en place est composée de panneaux d'interprétation récemment installés, placés près des éléments les plus importants du système. Malheureusement, ces panneaux ont parfois été placés un peu trop près du bien historique même, et ils ont donc un impact négatif sur l'environnement.

L'ICOMOS note que toute future infrastructure destinée aux visiteurs devra être soigneusement choisie, et être respectueuse des caractéristiques du site et de son environnement. L'ICOMOS considère que même si le nombre de visiteurs est faible actuellement, il peut augmenter de façon significative, étant donné que les pyramides de Teotihuacan, site du patrimoine mondial proche, à portée de vue du complexe hydraulique, accueillent quatre millions de visiteurs par an, et que les fonctionnaires du tourisme chercheront à tirer parti de la proximité de cette attraction touristique existante. De l'avis de l'ICOMOS, la prise en compte de la gestion des visiteurs devra être renforcée pour se préparer à un tel afflux de visiteurs.

Implication des communautés locales

Bien que le Patronato Acueducto Tembleque A.C., une association de soutien à l'aqueduc, ait participé à la préparation du dossier de proposition d'inscription, son impact sur la population en général semble limité. Cependant le Patronato lui-même a entrepris un travail impressionnant au cours des deux dernières décennies, non seulement en éduquant le public, mais aussi en organisant des projets de travaux avec les habitants de la région pour restaurer et entretenir diverses sections du système, sous la direction de professionnels de la conservation. En particulier, le Patronato a réussi à faire apprécier le système aux écoliers, grâce à diverses activités, comme des projets artistiques qui dépeignent le grand aqueduc et l'importance de l'eau dans notre vie quotidienne.

L'ICOMOS considère que les mesures et dispositions de gestion évoluent, et qu'elles seront probablement efficaces une fois que l'unité de gestion officielle, et avec elle les mécanismes de coopération avec les États et les municipalités, auront été établis, en septembre 2015.

En conclusion, l'ICOMOS considère qu'à l'heure actuelle le système de gestion de l'ensemble du bien en série évolue encore, mais qu'il sera approprié quand l'unité de gestion sera établie et que le plan de gestion aura été examiné et élargi pour inclure des procédures de gestion opérationnelle pour la gestion du site.

6 Suivi

Le plan de gestion prévoit que le suivi soit effectué sur une base annuelle. S'il est prévu d'établir des indicateurs qualifiés détaillés pour ce processus, la proposition d'inscription identifie déjà certains domaines dans lesquels les indicateurs doivent être établis, comme la périodicité du suivi, ainsi que les agences responsables et la localisation des archives. Les processus de suivi sont répartis selon la catégorie de patrimoine concernée, c'est-à-dire urbaine, archéologique, patrimoine paysager, etc.

Avec les informations complémentaires soumises le 16 février 2015, l'État partie a soumis des indicateurs et des orientations supplémentaires pour les procédures de suivi. Ces informations indiquaient également comment des processus de rapports périodiques seraient mis en œuvre sur le site. L'ICOMOS considère que, même si les procédures de suivi envisagées pourraient être suffisantes, le processus de mise en œuvre de ces exercices vient seulement de commencer, et qu'il pourrait devoir être affiné au fil du temps. Cependant, le système hydraulique a été suivi au fil des siècles grâce à des procédures d'entretien régulier, qui se poursuivent, en particulier en ce qui concerne l'embranchement fonctionnel menant à Zempoala.

L'ICOMOS considère que les indicateurs et les méthodologies de suivi présentés sont appropriés.

7 Conclusions

L'aqueduc de Padre Tembleque, complexe hydraulique de la Renaissance en Amérique, a été initialement proposé pour inscription en tant que bien en série composé de trois éléments constitutifs. Cependant, l'ICOMOS n'a pas distingué un thème et une approche cohérents de la valeur universelle exceptionnelle au sein de ces trois sites, et a recommandé à l'État partie de retirer la soumission des éléments du bien 02 et 03 pour faire valoir plus fortement ses arguments. L'État partie a suivi cette recommandation et a retiré les deux éléments par lettre du 16 février 2015. L'ICOMOS considère que la justification de la valeur universelle exceptionnelle est appropriée quand elle se réfère exclusivement à l'élément 01, le complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés.

L'ICOMOS considère par conséquent que l'élément 01 présente une valeur universelle exceptionnelle, et répond aux critères (i), (ii) et (iv). L'ICOMOS considère que cet élément représente de façon exceptionnelle l'échange entre les technologies hydrauliques européennes, basées sur la tradition romaine et qui intègrent des influences andalouses, et la tradition de construction

mésoaméricaine. L'ICOMOS considère également que les techniques et les matériaux régionaux spécifiques employés pour la construction ont engendré un type de système hydraulique unique à l'époque des rencontres entre Mésoaméricains et Européens. Bien que ces aspects n'aient pas été pleinement appuyés par une analyse comparative appropriée, confrontant le système de distribution d'eau de l'aqueduc de Padre Tembleque et des exemples similaires pertinents de systèmes hydrauliques, et d'autres structures réalisées avec des techniques d'adobe similaires, combinant des traditions de construction locales et européennes, l'ICOMOS, se basant sur des informations fournies par ses conseillers spécialisés, a pu reconnaître le caractère exceptionnel de ce bien dans un contexte global.

Le complexe hydraulique de l'aqueduc de Padre Tembleque et sites associés conserve le système hydraulique complet sur une distance approximative de 48 kilomètres, et par conséquent un haut degré d'intégrité. Les manifestations physiques du système hydraulique sont bien préservées dans les divers éléments du système, et conservent leur authenticité en termes de forme et de conception, de matériaux et de substance, ainsi que d'emplacement et d'environnement. Les principaux facteurs affectant le bien sont l'expansion urbaine de la capitale, Mexico, l'accès inapproprié des véhicules à l'aqueduc, y compris aux éléments souterrains, le développement potentiel d'infrastructures inappropriées destinées aux visiteurs, et la pollution de l'eau.

Dans l'optique de la protection et de la gestion, l'ICOMOS considère que ces deux aspects seront appropriés et efficaces quand la coopération entre les deux États fédéraux et les cinq municipalités concernés sera formellement guidée par la création d'une attribution de mandat officielle à l'unité de gestion du site, en septembre 2015. Des travaux de conservation énergiques, de grande qualité, sont en cours dans plusieurs sections de l'aqueduc, y compris l'arcade principale de Tepeyahualco.

Un plan de gestion a été soumis avec la proposition d'inscription. Ce plan de gestion initial est décrit comme un document en évolution, et, à l'heure actuelle, il est élargi pour inclure des aspects opérationnels de la gestion de site. L'État partie a fourni des informations complémentaires sur certains aspects de la préparation aux risques, de la gestion des visiteurs et de l'évaluation de la qualité, qui manquaient dans l'avant-projet initial. Le bien n'est pas beaucoup visité à l'heure actuelle, mais les autorités ont lancé des campagnes de promotion, en envisageant une augmentation du nombre de visiteurs. L'ICOMOS note que toute future infrastructure destinée aux visiteurs doit être choisie avec soin, et être respectueuse des caractéristiques du site et de son environnement. En ce qui concerne le système de suivi, l'ICOMOS considère que les processus de suivi et les indicateurs nécessaires, établis selon la méthodologie décrite dans la proposition d'inscription, sont appropriés.

8 Recommandations

Recommandations concernant l'inscription

L'ICOMOS recommande que l'aqueduc de Padre Tembleque, complexe hydraulique de la Renaissance en Amérique, Mexique, à l'exception des éléments suivants : 02 Ville, couvent, aqueduc et réservoir d'eau de Tepeapulco et 03 Site archéologique de Xihuingo, soit inscrit sur la Liste du patrimoine mondial sur la base des **critères (i), (ii) et (iv)**.

Déclaration de valeur universelle exceptionnelle recommandée

Brève synthèse

L'aqueduc de Padre Tembleque (qui porte le nom du frère Francisco de Tembleque), construit entre 1554 et 1571, constitue un système hydraulique situé entre l'État de Mexico et l'État d'Hidalgo, sur le plateau central mexicain. Le système de canaux du patrimoine comprend une zone de captage des eaux, des sources, des canaux principaux et secondaires, des réservoirs de distribution, des ponts-aqueducs à arcades, des réservoirs et autres éléments auxiliaires, qui s'étendent sur une distance maximale de 48,22 kilomètres. Les structures de l'aqueduc ont été bâties grâce à des structures de soutènement en adobe, dans la tradition de construction mésoaméricaine, mais elles font aussi référence aux modèles européens d'acheminement de l'eau élaborés à l'époque romaine.

Le système hydraulique est un exemple exceptionnel d'acheminement de l'eau dans les Amériques, et intègre, le long de ses 48 kilomètres d'étendue, des structures architecturales impressionnantes, comme le principal aqueduc à arcades, à Tepeyahualco, qui atteint une hauteur totale de 39,65 mètres, avec son arche centrale de 33,84 mètres de haut. Le système a été bâti par des frères franciscains, avec le soutien des communautés locales, et est donc une représentation unique de la fusion ingénieuse de traditions de construction mésoaméricaines et européennes, associant la tradition mestizo et la tradition des systèmes hydrauliques romains. En tant qu'ensemble de canaux et de structures auxiliaires, le système est exceptionnellement bien conservé, et un embranchement reste opérationnel encore aujourd'hui.

Puisque c'est la complexité du système, et les échanges humains à l'origine de ce système, qui contribuent à la valeur universelle exceptionnelle, toutes les caractéristiques du système hydraulique, y compris les sources, les canaux principaux et secondaires, les réservoirs de distribution, plusieurs ponts-aqueducs à arcades, les réservoirs et autres éléments auxiliaires, sont des attributs documentant cette construction exceptionnelle. Les techniques élaborées et les échanges culturels sont particulièrement perceptibles dans la maîtrise de l'arcade monumentale, formée de 68 arches en plein cintre, qui enjambe le ravin de Tepeyahualco et la rivière Papalote.

Critère (i) : Le pont-aqueduc de Tepeyahualco est un chef-d'œuvre architectural qui intègre la plus haute arcade sur un seul niveau jamais construite dans un aqueduc, depuis l'époque romaine jusqu'au milieu du XVIe siècle, arcade réalisée grâce à l'emploi ingénieux d'un coffrage en adobe à la place d'échafaudages. Bien que l'emploi de briques d'adobe, au lieu de bois, ait été appliqué ailleurs au Mexique, cela n'a pas été fréquemment le cas, et certainement pas avec un effet aussi spectaculaire que dans l'aqueduc qui enjambe le ravin de Tepeyahualco et la rivière Papalote.

Critère (ii) : Le système hydraulique de Padre Tembleque témoigne d'un échange d'influences important entre tradition européenne (du point de vue de la conjonction du patrimoine romain des aqueducs en maçonnerie, et des techniques de gestion hydraulique inspirées du savoir-faire arabo-andalou) et traditions autochtones préhispaniques, et culture mésoaméricaine (représentées par l'emploi d'une organisation sociale traditionnelle du travail collectif, l'utilisation et l'adaptation de méthodes locales de construction avec de l'adobe, ainsi que la présence de glyphes illustrant des symboles et une cosmologie préhispaniques dans plusieurs structures d'arcades). C'est un monument qui combine les idéaux humanistes de l'ordre franciscain et les traditions collectives locales, dans le but de promouvoir le bien-être commun par le biais de la réalisation d'une construction impressionnante en 17 années.

Critère (iv) : L'aqueduc de Padre Tembleque représente un exemple exceptionnel d'architecture hydraulique, basée sur une connaissance approfondie de l'ingénierie hydraulique romaine et de la Renaissance, qui a été associée à des connaissances mésoaméricaines locales en matière de construction. Les techniques spécifiques et les matériaux régionaux utilisés dans la construction ont donné naissance à un type de système hydraulique unique à l'époque des rencontres entre Mésoaméricains et Européens.

Intégrité

Le complexe hydraulique de l'aqueduc de Padre Tembleque conserve la totalité du système hydraulique sur une distance d'environ 48 kilomètres. Son environnement paysager, principalement rural, est caractérisé par des plantations d'agaves typiques, le système de canaux étant soit traditionnellement enfoui ou encloisonné par des pierres, soit à ciel ouvert ou recouvert. Les six ponts-aqueducs impressionnants, avec 137 arches visibles, représentent moins de cinq pour cent du système hydraulique total, et donc la présence de tous les éléments auxiliaires du système est la clé de son intégrité.

À l'heure actuelle, les menaces pesant sur l'aqueduc de Padre Tembleque dues au développement ou à l'occupation des sols semblent rares. Le paysage rural environnant assure un haut degré d'intégrité, avec seulement quelques interruptions dues à des routes ou des lignes électriques. Il est important que cette intégrité paysagère soit maintenue à l'avenir. De nouvelles constructions peu respectueuses ont empiété sur les centres urbains historiques de Zempoala et Otumba, mais ces constructions ont heureusement eu peu d'impact sur les attributs du système hydraulique. À l'avenir, toutes les constructions dans ces centres historiques devraient être examinées du point de vue de l'impact négatif potentiel qui pourrait se produire.

Authenticité

Les manifestations physiques du système hydraulique sont bien conservées dans les divers éléments de ce système, y compris les *ojos de agua* (sources), *apantles* (canaux), *aljibes* (citernes), les arches, fontaines, réservoirs d'eau, et autres caractéristiques liées à l'eau. Ces manifestations conservent leur authenticité dans leur leur forme et leur conception, leurs matériaux et leur substance, ainsi que leur emplacement et leur environnement. Le système hydraulique conserve également en partie son authenticité en matière d'usage et de fonction dans le tronçon de six kilomètres de Zempoala, qui achemine à l'heure actuelle de l'eau non potable destinée à des usages tels que le lavage du linge, l'irrigation, etc. Il est prévu qu'il retrouve une authenticité complète d'usage et de fonction quand le passage de l'eau sera de nouveau rendu possible à travers l'autre embranchement du système, qui est relié à la ville d'Otumba, à une distance de 39 kilomètres. Cependant, une telle réactivation devrait être supervisée avec soin par des professionnels du patrimoine, et évaluée en ce qui concerne son impact négatif potentiel sur l'authenticité du bien.

L'authenticité en termes de traditions, techniques et système de gestion est illustrée par l'entretien et la gestion continus assurés par les communautés locales, à l'occasion desquels des réparations sont effectuées avec des techniques de construction et des matériaux traditionnels. Dans une certaine mesure, le site produit encore des impressions qui pourraient être reliées à son époque de construction initiale. Ceci s'applique en particulier là où les arches du système subsistent, et où l'on peut voir les centaines de glyphes apparents qui ont été intégrés dans la construction de l'aqueduc par les populations autochtones, soulignant que cet ouvrage de génie civil spectaculaire était un effort collaboratif entre la population autochtone et le clergé espagnol.

Mesures de gestion et de protection

Le bien est protégé par la loi fédérale sur les monuments et zones archéologiques, artistiques et historiques promulguée en 1972 en tant que monument historique. Cela implique que pour engager toute modification de l'état actuel du bien et de son environnement immédiat, une autorisation de la Coordination nationale des monuments historiques de l'INAH et des Centres de l'INAH dans l'État d'Hidalgo et dans l'État de Mexico est nécessaire. L'environnement immédiat a été défini comme la zone tampon, ce qui vise à préserver le paysage d'agaves caractéristique.

Le bien dépend de deux États et de cinq municipalités, qui se partagent l'administration du système hydraulique. Une unité de gestion chargée de la coordination interinstitutionnelle et du suivi du plan de gestion coordonne les niveaux fédéral, étatique et municipal, ainsi que les associations agricoles et citoyennes. La gestion ainsi que l'entretien du bien s'appuient fortement sur la coopération avec les communautés locales et les associations citoyennes. Toute infrastructure destinée aux visiteurs qu'il est prévu de créer pour le bien doit être soigneusement choisie, et être respectueuse des caractéristiques du site et de son environnement.

Recommandations complémentaires

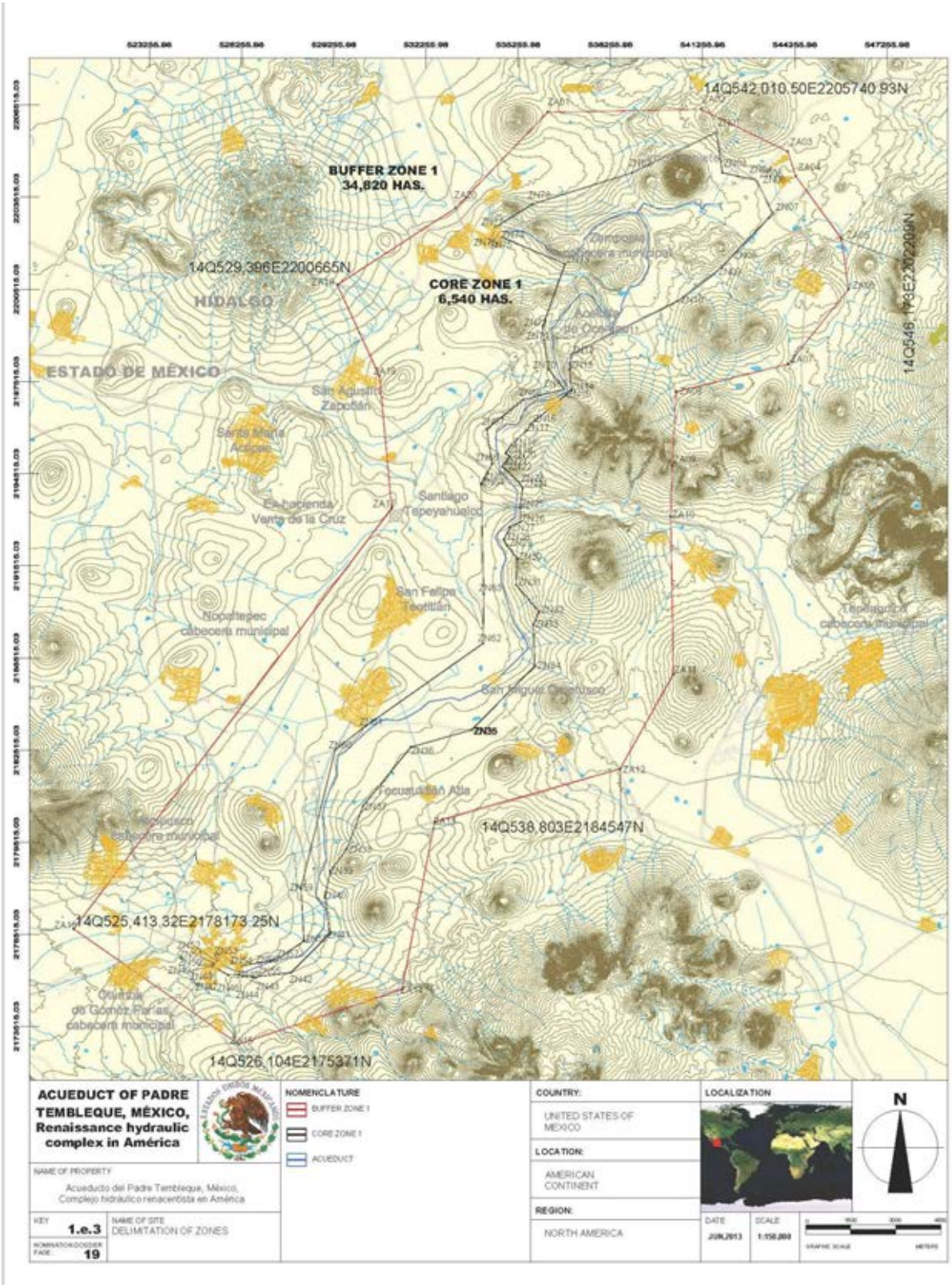
L'ICOMOS recommande que l'État partie prenne en considération les points suivants :

- finaliser l'établissement et l'attribution d'un mandat à l'unité de gestion d'ici à septembre 2015, pour guider la coopération entre les administrations fédérales et municipales concernées ;

- élargir le plan de gestion pour inclure des procédures de gestion opérationnelle, et finaliser sa version opérationnelle, en intégrant les stratégies de gestion des risques et des visiteurs ;

- s'assurer que toute future infrastructure destinée aux visiteurs soit soigneusement choisie et respectueuse des caractéristiques du site et de son environnement, et qu'elle fasse l'objet d'une étude d'impact sur le patrimoine avant que toute approbation soit accordée.

L'ICOMOS recommande également que le nom du bien devienne « système hydraulique de l'aqueduc de Padre Tembleque ».



Plan révisé indiquant les délimitations du bien proposé pour inscription

Vue aérienne de l’arcade monumentale de Tepeyahualco

Arcade monumentale de Tepeyahualco

Vue aérienne de l’hacienda Los Arcos

Citerne à l’église de Zempoala