# 03

# Justification for Inscription

# 3. Justification for Inscription

## 3.1.a. Brief Synthesis

### (i) A summary of factual information

Tomioka Silk Mill and Related Sites comprise a singular technological ensemble designed for raw silk production that represents the international interchange responsible for revolutionary innovation in silkworm rearing and silk reeling technologies, instigating mass production of high-quality raw silk at a time when the world economy was rapidly unified through trade, from the latter half of 19th century into the 20th century. Such movements induced the worldwide development of the silk industry as well as popularization of silk clothing. The four components have been carefully selected to include those sites central to the mutual exchange of silk technology that occurred between Japan and numerous countries, resulting in the significant technological invention responsible for development of the modern global silk industry.

Modern silk industry is rooted in the historic production of silk fabric that began in China from around 3,000 B. C. when raw silk was processed by hand. The raw silk used to make thread for textile was derived through a delicate process from cocoons spun by mature silkworms raised on mulberry leaves. Though this process and related technology was later transferred to Europe and to Asian countries including Japan, silk clothing continued to be enjoyed only by the privileged. Eventually, as Europe entered into the industrial revolution, steam-powered mechanical reeling factories appeared in France and Italy and spread throughout Europe in the early 19th century. Production efficiency of raw silk increased and thus, Europe became the center of silk production. However, in the 1850s when mass rearing of silkworms lead to the diffusion of the pebrine disease, silkworm rearing waned, and it became necessary for the West to import raw silk from Asia. This was the beginning of global competition in raw silk production.

Meanwhile in the 18th century, raw silk production in Japan spread from the southwest to central and northeast regions following silkworm rearing promotion policies of the national government. By the 19th century, the largest silkworm rearing and silk reeling region was established in the heart of Japan, close to the capital city of Edo, presently known as Tokyo, where there was a large market. As commodity economy of the Edo period grew, so did demands for silk textiles. Production numbers for cocoons and raw silk increased annually in conjunction with advancements in silkworm rearing and silk reeling technology; and Gunma Prefecture was one of the centers of sericulture and related technological innovation.

Under such historical background, after opening of the ports in 1859, Japan became a member of the international economy. Induced by Europe's vigorous demands, raw silk became the country's largest export product. Since then, Japan's sericulture and silk reeling industries came to play a leading role in the development of

the global silk industry, as will be described below. In 1872, with the intent of producing increasing quantities of high quality raw silk, the newly formed Meiji government established the Tomioka Silk Mill as a model factory introducing modern technology and factory systems from the West. It was an excellent example for the country's industries that were just on the verge of modernity. In fact, the foreign currency earned through silk trade contributed greatly to the modernization of Japan. Such new technology spread to private establishments as well. At the same time, developments made in the field of silkworm breeding by private establishments such as the Tajima farm and Takayama-sha, realized a stable production of cocoons. As a result, by the end of 19th century, Japan became an exporter of raw silk in line with the world's leading countries of China and Italy.

Stimulated by competitive silk exports at the turn of the century, technological development in both silkworm rearing and silk-reeling led by the private sector were seen in Japan. Regarding silkworm rearing, in early 20th century, the government, private silk-reeling entities and silkworm farmers collaborated in nationwide dissemination of methods for obtaining high quality cocoons and for enabling multiple rearing seasons, resulting in the mass provision of standardized cocoons. In silk-reeling, cutting-edge facilities such as the automatic cocoon drying machine and multi-end reeling machine were put into practical use for mass production of high quality raw silk. Due to such technological innovations, Japan became the world's top exporter of raw silk and induced dramatic development in the global silk industry as well as popularization of silk textile consumption.

Finally, in the latter half of the 20th century, the automatic reeling machine, the long awaited "dream machine," was put into practical use, responding the worldwide automation of manufacturing industries. This automation technology was disseminated from Japan to the entire world, together with domestically developed efficient sericulture techniques, and laid the technological foundations for today's modern silk industry. Popularization of silk textiles in turn set the stage for the later invention of affordable synthetic fibers such as rayon and nylon and their wide acceptance as an alternative to silk.

Tomioka Silk Mill forms the core of the four sites which represent the history of silk production. From its establishment, Tomioka Silk Mill was central to Japan's silk industry and became the location where technological transfers and innovations were actively made.

The three sites that played significant roles in technological innovation in silkworm rearing are: Tajima Yahei Sericulture Farm (S2) which is the origin of innovations in silkworm breeding rooms with a focus on ventilation, Takayama-sha Sericulture School (S3) which was an educational institute for sericulture that headed the development and dissemination of a standard silkworm rearing method making use of temperature control by thermal power in addition to ventilation, and Arafune Cold Storage (S4) where a storage system for silkworm eggs utilizing natural cold airflow was established. In the early 20th century, Tomioka Silk Mill cooperated with the management of each of these facilities; together they developed a produc-

tion technique for obtaining superior cocoons of a singular species,[1] essential for mass production of raw silk, and disseminated this method throughout Japan. As a result, an ample provision of high-quality cocoons was achieved and a mass production system for high-quality raw silk was established by the early 20th century. These integral sites became models for facilities for silk reeling and silkworm rearing throughout Japan.

1. See p.93 column.

The technological advancements in silk production increased Japan's raw silk export volume exponentially to dominate a share of 80% in the global export market in the 1930s.

Japan became not only the center of raw silk export, but also technological developments in the global silk industry. Since then, the new technology developed in Japan, with those developed at the four component sites of the nominated property at the forefront, was transferred worldwide and contributed to the expansion of the silk industry. Silk production technology that had been transferred from Asia to Europe since the ancient times to the Middle Ages was brought back to Asia in the latter half of the 19th century as mechanical reeling technology. Furthermore, one hundred years later in the latter half of the 20th century, it was transferred back to the world from Japan. Such technology continues to support the contemporary silk industry centered on leading silk producing countries such as China and India.

### (ii) A summary of qualities

The significant qualities of the nominated property, are seen in the series of four interrelated production facilities centered on Tomioka Silk Mill, each responsible for developing certain aspects of production systems for high-quality raw silk. These facilities became models for achievements in silkworm rearing and silk-reeling throughout Japan and together fostered mutual exchange between Japan and various countries. Essential components for conveying the unrivaled technological advancements in cultivation of silkworm eggs, silkworm rearing, and silk reeling are included in this property.

Tomioka Silk Mill (S1), the focal point of this nomination, is a silk reeling factory that played a pivotal role in technological innovation through adaptation of imported Western technology. Established by the national government in 1872, the mill was the first example in Japan of a full-scale introduction of Western steam-powered mechanical silk reeling technology and factory system. Until this time, reeling was done by traditional manual labor. A predominant characteristic of the mill structure is the style derived from merging Western and traditional Japanese building technique and material. The extraordinary factory buildings were built using the most advanced architectural techniques available in Japan at the time. It is notable that today, 140 years after construction, all major original mill buildings are preserved in pristine condition. Auxiliary structures within the factory complex are also in an excellent state of repair, including houses for workers and their families and dormitories for female workers built based on ideas brought from the West. It is the first example of a boarding mill in Japan, and is further evidence of the profound impact of international interchange.

Well into the early 20th century, Tomioka Silk Mill maintained its position as Japan's model factory for establishing a mass production system for raw silk; and technical advancements continued with introduction of the automatic reeling machine in the mid-20th century. Fortunately, there remain numerous structures pertaining to the significant story in development of silk industry, starting from introduction of Western technology. These structures are further enhanced by major production facilities and machinery, from the time the factory ceased operation in 1987, that are retained in situ. Like a rare industrial time capsule, the integrity of Tomioka Silk Mill is exceptionally high.

The Related Sites are a group of three facilities devoted to silkworm rearing, composed of structures bearing physical evidence of the technological innovation that occurred in modern Japan, which was the key to success in mass production of raw silk. The characteristic feature at Tajima Yahei Sericulture Farm (S2), is the innovative structural composition of the silkworm breeding room with a focus on ventilation; at Takayama-sha Sericulture School (S3), it is improvements made to the structure of the ventilated silkworm rearing room, which included use of a thermal-powered system with brazier for temperature and humidity control and resulted in establishment of a standard rearing method, as well as the group of facilities of the educational institute from where this method was avidly disseminated; while at Arafune Cold Storage (S4), it is the functional structure of a modern silkworm egg storage facility making use of natural cold airflow.

In summary, these defining characteristics are what make Tomioka Silk Mill and Related Sites important examples of the international exchange and technological innovation in silkworm rearing and silk reeling that contributed to the realization of mass production of high-quality raw silk.

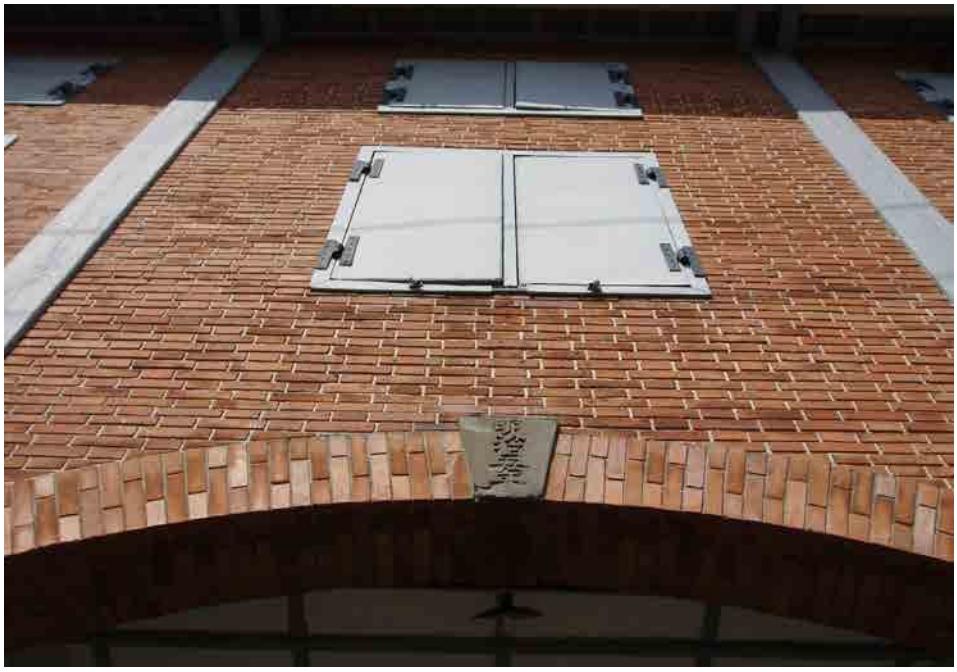


Photo 3-1 S1 East cocoon warehouse with a keystone inscribed with the construction year, Tomioka Silk Mill

## 3.1.b. Criteria under which Inscription is Proposed (and Justification for Inscription under these Criteria)

### (i) Type of property

Tomioka Silk Mill and Related Sites are considered as sites, as described in article 1 of the Convention for the Protection of the World Cultural and Natural Heritage and paragraph 45 of the Operational Guidelines for the Implementation of the World Heritage Convention (Hereafter, Operational Guidelines).

### (ii) Proposed criteria

For the following reasons, criteria (ii) and (iv) are proposed to justify the inscription of the nomination of "Tomioka Silk Mill and Related Sites."

**Paragraph 77 of the Operational Guidelines, criterion (ii)**
Nominated properties shall 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.

**Application of criterion (ii)**
Tomioka Silk Mill and Related Sites exhibit an important interchange of scientific knowledge between Japan and various countries, on developments in silk production technology. This group of sites well exemplifies mutual exchange of industrial technology on a global scale that resulted in mass production of high-quality raw silk by the early 20th century, and brought about a uniquely modern consumer culture in which silk may be consumed by the general public. Western technology and full-scale factory systems were first introduced in Japan at the government established Tomioka Silk Mill. The mill spearheaded development in silk reeling technology and dissemination throughout Japan, and promoted advancement in silkworm cultivation in conjunction with three related sites. This was followed by the worldwide transfer of modern sericulture technology together with the effective silk production machinery perfected in Japan, which continue to support raw silk production to this day.

**Supplemental explanation**
**[Mutual interchange]**
Mutual interchange is seen in the historic transference of traditional silk reeling technology from Asia to Europe, returning to Asia in the latter half of 19th century as mechanical reeling technology, improved in Japan and ultimately disseminated worldwide. As Europe experienced the industrial revolution, mills adopting steam-powered mechanical reeling machines appeared in France in the early 19th century and raw silk came to be mass produced in factories. However, as demands for silk textile grew, there was a shortage of cocoons, the essential ingredient for producing raw silk, due to the widespread of the pebrine disease among silkworms. In those days, seeking alternative sources for raw silk, Western countries in the pro-

cess of colonizing Asia attempted to import low-priced raw silk and establish modern silk-reeling factories in Asian countries.

Under such circumstances, what distinguished Japan was that it remained independent, and rejected founding of factories on its soil by Western countries. Thus, Tomioka Silk Mill was established in 1872 by the national government itself, using imported silk production technology from Europe. The mill introduced into the Japanese society Western architectural technology, silk production methods, and factory systems. It is a pioneering example of a European industrial community transposed in Japan, adapted, and improved.

International trade induced improvements in cocoon production methods in Japan. Silk reeling establishments represented by Tomioka Silk Mill, not only produced raw silk, but also collaborated with silkworm raising farmers and became involved in advancements in silkworm rearing facilities, development and dissemination of rearing methods, and development of technology for silkworm egg storage. The four nominated components of Tomioka Silk Mill and Related Sites represent this cooperative effort. Working toward a shared goal, this group of sites contributed greatly to dissemination of newly developed technology throughout Japan as well as to East Asian countries. As a result, the amount of cocoons supplied for reeling in Japan nearly quadrupled in 30 years,[2] bringing forth Japan as the world's largest exporter of raw silk in 1909, and eventually dominating global raw silk exports, with over 80 percent of the market in the 1930s.

2 See p.91 Figure 2-36. Increased 3.77 times from 1878-1908

Furthermore, after World War II, Japan succeeded in developing the automatic reeling machine, the "dream machine," with increased productivity of more than ten times that of the multiple-thread reeling machine introduced in the Taisho period.[3] Tomioka Silk Mill, one of the earliest mills to employ this automatic machine, became a model factory for automatic silk-reeling. From the latter half of the 20th century, Japan began to generously export worldwide this innovative silk-reeling technology together with efficient and stable silkworm rearing methods, resulting in an exponential growth of the world's gross production of raw silk. Today, with China and India as centers of raw silk production, technology transferred from Japan continues to support the global silk industry.

3 Shimazaki 2000, p.50

**[New values created through interchange]**

The transition of major producers of the world's raw silk from China, to Europe, to Japan, and then to the entire world was accompanied by an epoch of technical innovation for realizing mass production, and every time there was a change in the main place of manufacture, production volume of raw silk increased. It is notable that technology developed since the latter half of the 19th century quickly spread throughout the world by means of interchange based on the international division of labor.

The United States, a major importer of Japanese raw silk from the end of 19th century, developed affordable silk products through the use of power looms and

created opportunities for consumption of silk products by the general public. It was raw silk exported from Japan to the United States that contributed greatly to the development of various fashions through popularization of silk, which was until then an exclusive luxury of the upper-class. Mass production of high-quality raw silk that was achieved through efforts centered on these nominated sites, in effect, lead a mass consumer culture with mass production characteristic to the modern society as a context.

Photo 3-2 S1 West cocoon warehouse (left) and Silk-reeling plant (right), Tomioka Silk Mill

**Paragraph 77 of the Operational Guidelines, criterion (iv)**
Nominated property shall be an outstanding example of a type of building, architectural, or technological ensemble or landscape which illustrate (a) significant stage(s) in human history.

**Application of Criterion (iv)**
Tomioka Silk Mill and Related Sites form an outstanding example of a technological ensemble that represents the significant stage in human history when mass production of raw silk was realized, from the late 19th century into the 20th century. This group of four sites consists of a large-scale factory and three small-scale breeding facilities responsible for developments in silkworm rearing and reeling technology that enabled mass production of raw silk. They vividly depict the progression from mechanical reeling machines introduced from the West, to the later Japanese invention of the automatic reeling machine, as well as the process of repeatedly attempted innovations in silkworm breeding technology and its dissemination. Such technological innovations played a pivotal role in the development of the modern global silk-industry during this time when the world market was unified through international trade.

**Supplemental explanation**
**[A significant stage in history]**
Development of a modern global silk industry occurred during the significant stage in human history when mass production of raw silk was realized due to a progression of events centering on Tomioka Silk Mill and Related Sites, beginning in the late 19th century.

Silk has long been considered a rare fiber because it was not easy to raise silkworms for cocoons and areas and seasons for rearing were limited. Also, because complicated processes for producing raw silk from cocoons were hard to mechanize, requiring skilled manual labor, and there were difficulties in storing cocoons and twisting (throwing) silk, making a rapid growth in silk production were difficult to achieve.

However, with the arrival of the 19th century, the industrial revolution in Europe generated advancements in mechanical technology. Silk reeling was one of the first fields to experience this change; procedures for boiling cocoons as well as rotating frames in silk-reeling were mechanized and centralized, while quantitative testing methods for raw silk quality was developed. This brought about technological innovations for effectively producing raw silk of consistent quality, realized through centralizing in modern-factories silk-reeling procedures which had until then been dispersed among silkworm farms and small-scale workshops.

Also, development of transportation systems during the 19th century linked the world into a single market, allowing materials and products to be distributed over borders and technologies to be exchanged over continents. A pioneering example

of this is Tomioka Silk Mill in Japan. Though silkworm rearing flourished in Japan owing to suitable climate conditions, silk reeling was done only by hand. Into such backgrounds, a modern European-style silk-reeling factory was introduced by the national government.

The introduction of this technology brought about great technological innovations in Japan's silk-reeling industry. At the same time, because of Japan's unique circumstance, where raw silk exports comprised the greater part of her trade revenues, this technological introduction brought a chance for the Japanese to become engaged in increasing raw silk production at a national scale. This occurrence continued from the 19th to the 20th century and strongly stimulated successive technological improvements in silkworm rearing. As the combined effect of advancements in both fields, the production of raw silk increased greatly in the early 20th century.

There were specifically three technological improvements in sericulture: 1) stable cocoon production through development of traditional silkworm rearing methods into scientific technology and systematic dissemination of scientific rearing methods, 2) increased production by adopting multiple rearing seasons, and 3) production of high-quality cocoons through selective breeding of silkworms.

On the other hand, in silk-reeling, improved production efficiency was achieved through the invention of the multi-ends reeling machine and automatic cocoon dryer.

Furthermore, Japan continued to develop reeling machines and by mid-20th century, a "dream machine" which enabled complete automatic reeling was realized. Through this achievement, all procedures in raw silk production were now automated. [4]

4 See Appendix 4-a Significant Technological Innovations in Sericulture and Silk Reeling

Raw silk production increased owing to such technological innovations that enlarged the market, and from the latter half of the 19th century into the 20th century, the world's silk industry experienced a great expansion. Furthermore in the latter half of the 20th century, this leading technology was exported from Japan to the world, bringing about modernization and popularization of the silk industry on a global scale.

**[A comprehensive ensemble of industrial technology]**

Components of Tomioka Silk Mill and Related Sites were the major scenes of significant technological innovations from the latter half of the 19th century into the 20th century. They were not only innovative facilities of the period individually, but also well exemplify a comprehensive ensemble of industrial technology from the fact that they functioned as one system working in tandem with one another.

Tajima Yahei Sericulture Farm (F2) and Takayama-sha Sericulture School (F3) represent scientific development of silkworm rearing technology and its systematic dissemination. At Tajima Yahei Sericulture Farm, a new style of silkworm raising

farmhouse was created, adopting devices for natural ventilation to control interior conditions such as temperature and humidity. This was not only the scene of silkworm breeding; This architectural innovation was documented in publications and studied by the many trainees accepted at the farm to be spread throughout the country. On the other hand, Takayama-sha Sericulture School was where the *seion-iku* silkworm rearing method was developed further improving Tajima's specially designed farmhouse for silkworm rearing. This *seion-iku* method, in effect, became the Japanese standard and was disseminated both nationally and abroad through the establishment of educational institutions.

Arafune Cold Storage (S4) depicts innovations in technology for silkworm egg storage using natural cold air. A cold storage facility was perfected by mustering up modern technologies in sericulture, meteorology, as well as architecture. Also, modern communication and transportation systems were relied on, allowing silkworm eggs to be brought for storage without delay in good condition and delivered timely, enabling multiple rearing cycles throughout Japan.

Tomioka Silk Mill (S1) played a central role in the following technological advancement in silk reeling. Firstly, it became the focal point in import and dissemination of European machine reeling technology; secondly, it introduced the multi-ends reeling machine and automatic cocoon-dryer and collaboration with silkworm farms in the early 20th century; and lastly, it became the earliest example of a large-scale introduction of automatic reeling machines.

The mill's collaboration with silkworm farms is especially important. Around the year 1900, Tomioka Silk Mill headed the movement for selective breeding of silkworms and standardization of cocoon quality, aiming at mass provision of high quality cocoons for silk reeling. A production system utilizing the practical application of the F1 hybrid silkworm was established with technical support from Tajima farm and Takayama-sha sericulture School and Arafune Cold Storage, the leading entities in silkworm-raising technology development. The materialization of mass production of high-quality raw silk was made possible through the cooperation of Tomioka Silk Mill, a large-scale factory, with smaller silkworm rearing facilities which, although small in scale, were responsible for fundamental aspects of the scientific advancement.  Together, they worked hand-in-hand.

Thus, Tomioka Silk Mill and Related Sites comprise an outstanding technological ensemble that collaborated mutually in establishing a mass production system for high-quality raw silk. This ensemble was instructive in leading technological innovations in silkworm rearing and silk reeling not only in Japan but also in the entire world.

## 3.1.c. Statement of Integrity

### (i) Composition of the property

Tomioka Silk Mill and Related Sites comprise four technological complexes, each indispensable for portraying the major technological innovations resulting from international interchange that contributed to the development of the world's silkworm rearing and silk-reeling industries. They are properties of exceptional historic value.

The impact Tomioka Silk Mill (S1) has made on mass production of raw silk, through the introduction of Western machine reeling technology and innovations that followed, is globally outstanding. In close collaboration with Tomioka Silk Mill, the three facilities related to silkworm rearing - Tajima Yahei Sericulture Farm (S2), Takayama-sha Sericulture School (S3), and Arafune Cold Storage (S4) - played important roles in the scientific innovations that led to a rapid growth in the cocoon production fundamental to mass production of raw silk. They exhibit in visual form, advancements in structures for silkworm rearing and development of stable silkworm rearing methods, as well as innovations in silkworm egg cold-storage facilities that enabled multi-seasonal rearing, all indispensable for increased cocoon production. They are properties of exceptional scale and state of preservation.

By highlighting this group of four interrelated sites, we are able to convey, through physical evidence, the entire production system in silkworm rearing and silk reeling that made mass production of high-quality raw silk possible.

### (ii) Individual component

Tomioka Silk Mill and Related Sites are appropriately delineated to include all buildings and structures including stonewalls necessary to convey the significance and characteristic of each component. Significant elements of each component are appropriately protected from possible adverse effects of development and/or neglect. Measures are being taken for preservation and management. Their integrity remains intact.

In the following paragraphs, notable conditions of each component will be explained.

#### S1 Tomioka Silk Mill

The proposed area for nomination is composed of the original factory premises at the time of establishment and surrounding water drains together with the lot later (1908) extended for silkworm egg production.

The main buildings of Tomioka Silk Mill are those from the time of establishment, constructed between 1872 to 1875 that depict the technological exchange from France and Japan. These timber-frame brick masonry structures including the silk-reeling plant, east and west cocoon warehouses, inspector's house, and director's house retain their original appearances. There are also facilities for production and

storage as well as various power facilities, adopting the newest technologies of the time, introduced by each of the factory managers in later periods. Though some have been added onto or altered, over all they remain in excellent condition. What needs to be noted is that facilities such as company residences for workers and their families, dormitories for female workers, and a clinic for workers were also constructed all within the same factory grounds. These are also basically preserved in the condition at the time the factory ceased operation in March 1987.

Furthermore, it is not only factory buildings but all production facilities and machinery then necessary for silk-reeling operation including those for water purification, power, storage, silk-reeling, sewage treatment, and finishing products that are all entirely preserved, very much like a time capsule. Thus, the area of nomination appropriately includes all production-related facilities and structures which exhibit working conditions of the time.[5] There are structures that have been removed due to the necessity of adding facilities while in operation. A bathhouse, Kabura dormitory to the southwest of the Brunat house, and silkworm egg production laboratory have been demolished due to difficulties in maintenance owing to severe damage that appeared after the factory ceased operation in 1987. Locations of these buildings have been clarified through historic drawings and photographs. The entire site including underground remains of such structures is protected.

5 See Chapter 2. a. ( iv ) Table 2-1 The list of existing buildings and subsidiary structures of Tomioka Silk Mill.

**S2 Tajima Yahei Sericulture Farm**

The proposed area for nomination is the entire residential premises on which Yahei lived and engaged in business, where descendants of Yahei Tajima now live. The site is centered on the main building with silkworm breeding rooms and includes additional facilities for raising silkworms and remains of other such structures.

The most significant attribute of Tajima Yahei Sericulture Farm is the structure of the silkworm rearing room of the main building which exhibits technological innovations in sericulture. This entirely two-storied architectural style with a tiled roof became a prototype of the typical modern farmhouse specially designed for sericulture in Japan, where the lower level is used as a residence and the upper level for silkworm rearing with a raised roof for ventilation. Another rare attribute of the structure is the addition of a room specially designed for using microscopes which also depicts international exchange between Japan and Europe through silkworm eggs.

Within the premises of Tajima Yahei Sericulture Farm, in addition to the main building, there are storehouses for mulberry leaves and silkworm eggs along with a well that was indispensable for silkworm rearing. There are also multiple stone foundation remnants of structures used exclusively for rearing and protected buildings and structures necessary for a silkworm rearing farmstead are included in the area of nomination.

### S3 Takayama-sha Sericulture School

The proposed area for nomination includes the premises of the Takayama family, where Chogoro Takayama developed the *seion-iku* silkworm rearing method and established a training center for its dissemination, as well as approach paths and channels next to the site. The area is centered on the main building which functioned as a rearing room as well. Also included are facilities and remains of structures for sericulture and a plot of land that once was a mulberry field.
The most significant attribute of Takayama-sha Sericulture School is the unique architectural structure of the main building used for practical education of a silkworm rearing method called *seion-iku* that played an outstanding role in stable provision of cocoons. In addition, buildings and stone foundation walls existing on site convey the function and form of the place when it was an educational institute for disseminating rearing methods. They are significant physical evidences that well depict the educational system at Takayama-sha Sericulture School.

At the main building, equipment for ventilation and heating, characteristic to the *seion-iku* rearing method, remain generally intact. Within the premises, outside toilet and a bathhouse/kitchen for students attending the institute remain. Stone basement walls of a mulberry storage areas remain untouched, though the building above ground no longer exists. Locations of other lost buildings used for educational purposes have been determined through historic documents. The entire site retaining traces of related facilities including mulberry fields is protected.

### S4 Arafune Cold Storage

The proposed area for nomination is comprised of the lot on which silkworm egg storage facilities are located as well as adjacent roads. It includes facilities No.1 to No.3, a site of administrative building, and nearby woods. The archaeological site is delineated to include the topographic features involved in creating cold air in order to protect the entire system, in addition to all areas within the lot line of the facilities.

The most significant feature of Arafune Cold Storage is its function for cool storage of silkworm eggs which enabled multiple rearing seasons. Arafune Cold Storage, the largest of its kind in Japan, is a representative cold storage facility for silkworm eggs that makes use of natural cold air. Though the above ground buildings of stone-walled storage spaces were unfortunately lost by 1955, naturally cold airflow from the stone walls at each storage facility can still be observed. Stone-walled foundations created to allow the large amount of cold air from storage facility No.1 located at a higher site to flow effectively down to the two lower facilities remain in good condition with their functions intact.

The proposed area is protected for the purpose not only to include the storage facilities but also to keep the geographical structures which are essential for cold airflow.

Photo 3-3 S4 Cold airflow,
Arafune Cold Storage

## 3.1.d. Statement of Authenticity

### (i) Overall property

International interchange and technological innovation in the silkworm rearing and silk-reeling industries which form the core of the outstanding universal value of Tomioka Silk Mill and Related Sites are depicted by the form, design, material, substance, use, and function of each component, while the origin of these values resides in tradition and technique of the silkworm rearing and silk-reeling industries. Furthermore, the location and setting of each component convey their historic backgrounds respectively.

All significant structures remaining at each of the components of the nominated property, Tomioka Silk Mill and Related Sites, typically retain their original structural composition and material. Though a few facilities have experienced later alterations or additions in accordance with change of use, they basically have not affected the essence of their qualities as cultural properties. All repairs have been handled with regard to retaining authenticity of original form and design, material, substance, use, and function. The transition of most structures can be confirmed through the abundantly preserved documents and photographs pertaining to construction, establishment, and repairs. For these reasons, the atmosphere and sprit of the place as sites related to raw silk production remain to this day.

In the following paragraphs, notable attributes of each component will be explained.

### (ii) Individual component

#### S1 Tomioka Silk Mill

At Tomioka Silk Mill, the timber-frame brick masonry buildings of the silk-reeling plant, east and west cocoon warehouses as well as steam boiler plant, iron water tank, Director's house (Brunat house), dormitory for female instructors, inspector's house and brick drain are preserved as they were originally built. They were all completed between 1872 and 1875, the year when the factory's facilities were installed. Factory facilities and structures for workers and managers, constructed in later years, which supported the raw silk production period until the present day, also remain typically untouched to convey the history of the factory complex.

Though the factory ceased operation in 1987, it continued to be owned by Katakura Industries Co., Ltd. who basically continued to maintain the premises in working condition. After the factory was nationally designated a Historic Site in 2005, it came into the hands of Tomioka City and is now appropriately treated and preserved as a cultural property.

**Form, design, material, and substance**

In the buildings from the time of foundation exhibiting the integration of Western technology introduced by French engineers and traditional technology of the Japa-

nese master carpenters, structure and material which portray such interchange are retained in their original conditions. Examples of such technologies are the wood-frame brick masonry structure and truss system, Japanese roof tiles, bricks made in Japan, and plaster used for pointing. Though some changes have been made in the altered sections of the silk-reeling plant (windows), east cocoon warehouse (staircase addition), west cocoon warehouse (wall addition), as well as interior alterations due to change of use in the Director's house, dormitory for female instructors, and former inspector's house, they are minor changes that do not alter the nature of the original structure or material.

Structures that directly exemplify the introduction of steam-powered reeling into Japan are the iron water tank, steam boiler plant, and chimney base. The original iron chimney shaft and the later brick shaft have been lost and that of reinforced concrete built in 1939 remains. The iron water tank itself is an original from 1875. The west and central section of the steam boiler plant remain while the east section was lost as function change.

Buildings and structures from other periods employ materials (such as brick, lumber, sheet iron, and glass) commonly seen in factory buildings of each period respectively. There have been multiple alterations done on these properties to provide necessary working spaces brought about by developments in raw silk production technology. Major alterations can be seen in reeling plant which later became a re-reeling plant and was extended repeatedly. Such changes cannot be avoided in places of production and the process of these changes can be traced through historic documents.

Since the mill has been managed by Tomioka City, repairs are done as required with due consideration for appropriate form, design, material, and substance.

**Use, function, tradition, and technique**

Tomioka Silk Mill continued to be used as a silk mill for 115 years, from the time of establishment to when operation ceased, and thus maintains authenticity in building use and function.

Regarding production facilities, it is not only buildings but also machinery inside these structures, essential for conveying silk reeling processes and functions of the property, that are preserved in their states at the time the factory ceased operation in 1987.[6]

Residences for the French engineers, such as the Brunat house, dormitory for female instructors, and inspector's house, after they returned to their country, were converted into dormitories, a school for women workers, dining room, and offices necessary for factory operation. They are presently used for managerial purposes and publicity activities of Tomioka Silk Mill.

Meanwhile, a dormitory system for female workers was adopted when the mill was established. Though the wood frame dormitory buildings were relocated within the

6 Regarding silk reeling technology, mechanical automated reeling is continued today at a nearby reeling factory belonging to Usui Silk Reeling Agricultural Cooperative, employing the same style of reeling machine and manufacturing processes as those of Tomioka Silk mill.

premises or altered due to structural deterioration or changes in number of workers, this system was continued until the factory closed. Today, dormitory buildings built during the period of 1896 to 1940 remain.

The numerous historic documents and plans that had been handed down are archived in the mill.

**Location and setting**
The location of Tomioka Silk Mill has not changed since its establishment. The surrounding area of the mill, town lined with residences and eateries, is the same as it was when the mill in operation.

### S2 Tajima Yahei Sericulture Farm

**Form, design, material, and substance**
The partially-raised roof for ventilation on the upper floor remain nearly in its original condition and authenticity of form and design essential for depicting its value is intact. Roof tiles have been replaced and damaged areas of the building have been repaired without change in material. Though openings of the raised roof have been sealed with tin plate to improve interior living conditions, the original structure is completely preserved within. Alterations to walls and windows can easily be restored based on historic documents. The residential area of the main building has been slightly altered to adapt for living only in a way as to not affect any significant elements of the structure.

Facilities for silkworm egg production and silkworm rearing as well as mulberry storage and silkworm egg storehouse, have been constructed at different periods and employ respectively form and design, as well as material and substance of the time they were built.

**Use, function, tradition, and technique**
Although the family is no longer involved in silkworm rearing, the main building is used as a residence today, ventilation devices for silkworm rearing are still intact.

Descendants of Yahei Tajima who contributed greatly to silkworm egg production continue to reside at Tajima Yahei Sericulture Farm. The present family head has been dispatched to India in the past for an Official Development Assistance project of the Japanese government to provide technical guidance.

Numerous historic documents and artifacts that convey traditions of the silkworm-rearing industry including printing blocks for the influential literature, *Yosan Shinron* [New Theory of Sericulture] by Yahei Tajima are preserved at the residence.

**Location and setting**
Neither the location nor the boundaries of Tajima Yahei Sericulture Farm has changed since the middle of 19th century. The premises is surrounded by a farming community featuring a number of silkworm farmhouses influenced by Tajima's structure which together create a distinctive local landscape.

### S3 Takayama-sha Sericulture School

**Form, design, material, and substance**

The main building remain intact, in which descendants of Chogoro Takayama, the founder of Takayama-sha Sericulture School, continued to live until 2010. In the upper-story silkworm rearing room, essential for depicting its value, facilities and equipment for ventilation and heating that characterize the ideal rearing room for the *seion-iku* method generally remain intact and authenticity in form, design, material, and substance is retained. The exterior of the lower residential level is now covered with metal siding or calcium silicate board and some interiors have been modernized. While the appearance at the time of original construction has mostly been clarified through historic documents such as drawings and photographs.

The form and material of the stone walls created as foundations for the premises, stone basement walls of the mulberry leaves storage area, as well as stone remains for measuring off building plots have not been changed and still indicate the placement of buildings when the site was used as a practical school of Takayama-sha. Detailed surveys on remains of lost buildings are to be conducted so that authenticity of location and environment can be maintained.

Regarding the outside toilet and bathhouse/kitchen, repairs using appropriate materials are planned with consideration for maintaining their original form and design at the time of construction.

**Use, function, tradition, and technique**

It was only up to the early 1960s that silkworm rearing was continued at this site and afterwards, the main building came to be used as a residence. Today, it is being prepared for presentation purposes as a national Historic Site in order to convey

Photo 3-4
Archaeological survey, Foundation for sericulture building, Takayama-sha Sericulture School

the history of the silkworm rearing industry. As mentioned earlier, ventilation and heating functions for silkworm rearing of the main building are still intact.

The numerous documents on the *seion-iku* rearing method which Takayama-sha Sericulture School disseminated in Japan and internationally are collected and archived at such institutions as the Gunma Prefectural Museum of History. A deeper understanding of this rearing method can be acquired by studying this documented information together with the actual Takayama-sha Sericulture School Site where a complete set of necessary facilities created particularly for practical training in the *seion-iku* method remains.

**Location and setting**

Neither the location nor the boundaries of Takayama-sha Sericulture School has changed since the latter half of 19th century. The premises surrounded by a mountainous farming area have not changed greatly and generally remain the same to this day.

### S4 Arafune Cold Storage

**Form, design, material, and substance**

Though the upper buildings of Arafune Cold Storage were removed by 1955 for safety reasons, the stone foundation walls essential for utilizing natural cooling effects retain their fundamental structures with original stones and plaster. Some parts of stone walls have recently caved in and are being restored[7] by placing the fallen stones back in their original positions, as a rule, to retain authenticity of form, design, material, and substance. Excavations and surveys are to be executed to prepare for restoration.

7 See appendix 7-c

Photo 3-5 Reinstatement of stone walls, Arafune Cold Storage

**Use, function, tradition, and technique**

Arafune Cold Storage is presently managed as a national historic site and is no longer used for storage of silkworm eggs. Cold airflow can still be observed. The system for sending in cold air, passageways for cold air connecting the three cold storage facilities, and ingenious structures with sealed pointing to confine cold air all remain in complete form, retaining the original function of the storage facility.

**Location and setting**

There have been neither large-scale changes nor man-caused alterations in the source of cold air, a force of nature, with voids in ancient land formations formed by collapsed plutonic rocks.

## 3.1.e. Protection and Management Requirements

### (i) Means of implementing protective measures for properties

Each component has been nationally designated a Historic Site under the national Cultural Properties Protection Law and is fully protected. The major buildings of Tomioka Silk Mill have been designated as National Important Cultural Properties, to be doubly protected.

Under the aforementioned law, property owners are primarily responsible for management of designated cultural properties, with guidance and support for management available from local municipalities and the national government. Among the nominated sites, Tomioka Silk Mill, Takayama-sha Sericulture School, and Arafune Cold Storage are owned by city or town municipalities, while Tajima Yahei Sericulture Farm is privately owned, with Isesaki City acting as a custodial body stipulated by law for the protection of cultural properties.

The law requires any person who intend to alter the present state or to carry out restorative repairs to receive prior permission from the commissioner of the Agency for Cultural Affairs. The commissioner consults the Council for Cultural Affairs on relevant issues regarding alteration of the present state for thorough academic reviews and permission is granted only after having passed this process.

National and prefectural systems for financial and technical support are available to property owners or managing organizations in executing preservation projects, preparing for public access, or installing fire prevention facilities.

### (ii) Means of implementing protective measures in buffer zones

Within buffer zones, construction of buildings or other structures, topographic change, or felling of trees and vegetation are regulated under laws such as the City Planning Act and Landscape Act or ordinances enforced by each of the municipalities in charge. Prior application for permission or notification by the property owner is necessary according to scale, form, and structure of the action and appropriate guidance is provided based on guidelines of the organizations in charge so that the cultural values of properties would not be significantly diminished (Regarding buildings and other structures, regulations on such factors as height and color of exterior wall are included.).
A list of related laws and ordinances along with regulatory details can be found in 5c (iii).

### (iii) Comprehensive protection and management of properties and buffer zones

Gunma Prefecture, Tomioka City, Isesaki City, Fujioka City, and Shimonita Town have cooperatively formulated and enacted a comprehensive preservation and management plan to cover all components as can be seen in the Appendix 7 to this

nomination. Cooperation of adjacent city, Honjo City and Saitama Prefecture is achieved. Appropriate management is in effect in the delineated areas of each of the components and their buffer zones in accordance with this plan. “Coordinating Committee for Tomioka Silk Mill and Related Sites” has been established centered on the governing bodies of the prefecture, cities, and town with appropriate collaborative efforts being made in site protection and management, following such regulations as those mentioned in the above sections (i) and (ii).
Additionally, appropriate indicators according to the present state of protection (4.a.) and factors affecting each component (4.b.) have been set for regular systematic monitoring to be executed on the property and buffer zone.[8]

8 See 6.a. for monitoring indicators and 6.b. for monitoring systems in Chapter 6

### (iv) Long-term challenges and strategy

Possible major threats to these properties are natural disasters as shown in the following paragraph. Careful preventive measures against damage by such causes are being taken and long-term measures have been drawn up based on detailed surveys by professionals.

Possible major threats to the nominated sites: Caving in of stone walls at Arafune Cold Storage (Restoration is being undertaken). Possible threats in buffer zones: Landslide, flooding, etc. (Preventive plans by prefecture, city, or town will be available).

In order to continuously protect these sites into the future, development and other acts on the delineated areas of each component and their buffer zones are appropriately regulated by ordinances of the municipal governments in charge. Public access to each of these components is made available in accordance with its carrying capacity. Property protection is reinforced by the collaborative efforts of volunteer groups and local citizens involved in preservation and promotion of these resources.

Gunma Silk Heritage Network Project is underway, for registering numerous cultural properties, tangible and intangible, as “Gunma Silk Heritage Sites” to promote protection and adaptive use. This program would make it possible to inherit the culture of the entire silk industry and heighten the cultural values of this nominated property.

Photo 3-6 Cleaning activities by volunteers

## 3.2. Comparative Analysis

### (i) Principles of comparative analysis

The key focus of this comparative analysis is the outstanding universal value that "Tomioka Silk Mill and Related Sites" is believed to have, the contribution to achieve the "mass production of high-quality raw silk" from the late 19th century to the 20th century through "international exchange and technological innovation in sericulture and silk-reeling." Based on this point of view, we would like to show what kind of excellent values this property has in comparison with similar properties. Therefore, we conduct several studies on machine reeling mills similar to Tomioka Silk Mill, sericulture farmhouses and cold storage for silkworm eggs, to identify the targets and analyze their state of conservation and historic background, especially relation to innovation and development on the industry.

As a method of analysis, we will first verify whether there are any similar properties on the World Heritage List or World Heritage Tentative List. We will then conduct a wide search for other similar properties in Japan and abroad, using relevant study regarding the listing of industrial heritage and cultural asset concerned. Furthermore, a tracing survey is conducted for important items listed in historical record s to find out whether they remain or not. Lastly we elucidate the importance of this nominated property based on a comparison with those other properties. In view of the above points, this comparison with other similar properties will be divided between the categories of machine reeling, silkworm-raising farmhouses, and cold storage.

Operational Guideline Annex 5 3.2 Comparative Analysis
EXPLANATORY NOTES
The property should be compared to similar properties, whether on the World Heritage List or not. The comparison should outline the similarities the nominated property has with other properties and the reasons that make the nominated property stand out. The comparative analysis should aim to explain the importance of the nominated property both in its national and international context (see Paragraph 132).

The purpose of the comparative analysis is to show that there is room on the List using existing thematic studies and, in the case of serial properties, the justification for the selection of the component parts.

### (ii) Identifying targets for comparison

**World Heritage sites**

First, we identified sites related to silk within the existing "UNESCO World Heritage List" for our comparison with inscribed World Heritage sites as of 2011.[9] Then we referred to the list prepared by ICOMOS, "Technical and Industrial Heritage in the World Heritage List" UNESCO-ICOMOS Documentation Centre 2011) to identify similar industrial heritage properties, mainly related to textile industry, for comparison.[10]

9 See Appendix 5-a

10 See Appendix 5-c

**Comparison with other similar properties (industrial heritage)**

Our first point of reference as worldwide industrial heritage research is a survey report entitled "International Context for Textile Sites,"[11] by the textile section of the International Committee for Conservation of the Industrial Heritage (TICCIH) as part of the collaboration agreement between ICOMOS and TICCIH.

11 See Watson 2000, revised in 2003, 2007 and 2010

We listed sites related to textile industry in this study and conducted an independent supplementary investigation of these heritage properties. Information on the status of these sites is summed up and added in Appendix 5-b.

Furthermore, to demonstrate the historical significance of the nominated property, an international comparison that looked at important heritages sites related to development and industrialization of silk industry was consigned to an international experts for industrial heritage consultancy, Koinetwork g.e.i.e. The result is in the Appendix.[12] Based on the history of silk industry development, this study will target Europe, including France and Italy, and China for comparison, and the U.S. and India will also be reviewed.

12 See Appendix 5-d

In order to make comparison with similar silk-related properties within Japan, we then identified from the national cultural property database created by the Agency for Cultural Affairs, which provides an exhaustive list of buildings and structures designated as cultural property by the government. We also analyzed the "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization", and the "Comprehensive Survey Report on Modern Japanese-Style Buildings,"compiled by each prefecture which extensively survey the whole of Japan in the context of a recent global rise of interest in industrial heritage and modern heritage.

Lastly, in view of points relating to silkworm raising farmhouses and sericulture facilities included in these components, we identify similar properties based on a literature review of "Comprehensive Report Collection of Japanese Folk-Houses," and the "National Cold Storage Research" and inquiries to governmental agencies. This is detailed in (iv)-2 of this chapter.

## (iii) Comparison with existing UNESCO World Heritage Sites

**1) Silk-related World Heritage sites**

We first identified properties related to silk among the 962 sites listed on the World Heritage List as of 2012. As seen in the result,[13] silk related properties identified on the list are mostly archaeological sites listed as an anchorage for the Silk Road such as Merv (Turkmenistan) or historic cities, such as Valencia La Lonja de la Seda Silk Exchange (Spain).

13 See Appendix 5-a

While these are linked by the keyword "silk," they mainly concern silk distribution and trade. Therefore, we were left with the five properties listed in the table 3-1, after filtering down those that relate to actual silk "production." We also confirmed

Table 3-1 Silk-related World Heritage sites

| Name | State Party | Main Feature and Criteria | Relation to Silk |
|---|---|---|---|
| Derwent Valley Mills [Photo 3-7, 8] | United Kingdom | Establishment of a modern factory system and industrial landscape around the cotton industry criteria ii and iv | Including silk throwing mil |
| Historic Villages of Shirakawa-go and Gokayama[Photo 3-9] | Japan | Villages in Shirakawago and Gokayama with Gassho-style house[14] criteria iv and v | Houses used for silkworm rearing |
| 18th century Royal Palace of Caserta, Aqueduct of Vanvitelli and the San Leucio Complex[Photo 3-10] | Italy | Monumental structures gathered around the royal palace criteria i, ii, iii, and iv | Experimental silk production facilities annexed to the Palace |
| Historic site of Lyon | France | Important historic commercial city criteria ii and iv | Relation to Silk fabric production and trade |
| Causses and the Cévennes, Mediterranean agro-pastoral Cultural Landscape | France | Cultural landscape of Mediterranean rural area[15] criteria iii and v | Houses used for silkworm rearing |

14 Its main feature is the gassho-zukuri style houses with a thatched roof, short eaves, and protruding beams to hold extended attic space. Its structure can withstand heavy snow and this style of house is unique to the Shirakawa-go and Gokayama districts. Even though the attic space was once used as a workplace for silkworm rearing and a place to store mulberry leaves, the architectural style was not designed specifically for sericulture and it is not a place that demonstrates interchange and technological revolution in the technological development of sericulture

15 Cévennes, a major sericultural region of France, is included in this heritage site and it can be assumed that silkworms were raised at farmhouses included in the designated site.

Photo 3-7 Derwent Valley Mills, United Kingdom

Photo 3-8 Reconstruction model of Derby silk mill, Derwent Valley Mills, United Kingdom

Photo 3-9 Historic villages of Shirakawa-go and Gokayama, Japan

Photo 3-10 San Leucio Complex, 18th century Royal Palace of Caserta, Italy

properties in the tentative list based on their descriptions,[16] and only Silk Road-related heritage could be found, with no other properties related to production.

16 Published on the website of the World Heritage Centre, UNESCO

Furthermore, of the five silk industry-related properties, Derwent Valley Mills (UK) is the only one that is also included in the List of Technical and Industrial Heritage in the World Heritage List.[17]

17 See Appendix 5-c

In other words, it is the only technical or industrial heritage connected to silk that is included in the World Heritage List. The San Leucio Complex was established as an annex to the Royal Palace of Caserta and it was an experimental or idealistic facility from cocoon production to silk weaving. It is for such reason that it is believed not to have been listed as an industrial heritage property. Other silk-related World Heritage sites focus mainly on historic town, or rural landscapes rather than industry or technology.

Therefore, the Derwent Valley Mills should be examined in this section. The World Heritage site include a silk throwing mill remain among historic mills mainly of cotton spinning. The mill built in 1721 in Derby city center, is said to be the first modern factory in the United Kingdom. The value of the silk mill exhibits international interchange because the mill's throwing (twisting) technology was transferred from Italy where it was originated. It should be noted here that a silk throwing process is not a part of raw silk production process, of which this nominated property is concerned.[18]

18 See Silk production process in Japan at the beginning of this dossier.
Silk "throwing" comes from the Saxon word "thrawan" meaning to twist. It is the technical term used for the processes involved in making yarn from raw silk.
In throwing the main objective is to instill a twist into the raw silk and to double, or ply the thread into any desired size or count suitable for manufacturing into a weavable state for warp or weft.

However, the Derwent Valley Mills' focus is on inventor Richard Arclight's personal achievement and the industrial landscape (cultural landscape) centered on cotton industry along the Derwent River with mills using power created by a waterwheel.

Historically, the site represents the period when factory systems were established in Western Europe in the 18th to 19th century; it was the prior stage when factory systems were introduced to the Far East including Japan in the middle of the 19th century.

The largest difference is that the silk industry did not further develop at Derwent Valley and cotton spinning became the main focus. In other words, Derwent Valley Mills merely includes an industrial property related to silk and its central theme could not be determined to be silk. This differs in that Tomioka Silk Mill continued to be at the center of technological innovation in the Japanese silk industry. Another difference is that it was completely relied on imports of raw materials both silk and cotton, while Tomioka Silk Mill had close relationship with farmers and was deeply involved in cocoon productions.

The above analysis found that industrial heritage with a focus on the practical production of silk had never been inscribed as a World Heritage site. Therefore, there is no target to make comparisons in machine-reeling technology, silkworm egg storage, nor innovation and development in sericultural techniques.

**2) Textile-related World Heritage Sites**

From these analysis results, we then decided to expand the focus from the silk industry to modern industry as a whole. Firstly, we chose sites belonging to the textile industry sector that are inscribed on the World Heritage List as comparison targets from the "Technical and Industrial Heritage in the World Heritage List."[19]

19 See Appendix 5-c

They include the previously mentioned Derwent Valley Mills (UK) as well as New Lanark (UK) [Photo 3-11], Saltaire (UK), and Crespi d'Adda (Italy) [Table 3-2]. However, all of these heritage sites mainly relate to cotton. New Lanark was built intentionally as a model community that paid heed to workers' needs by Robert Owen. It is well-known as an "industrial settlement" or "industrial community" that incorporated a factory, housing, as well as public and educational facilities. Saltaire and Crespi d'Adda are typical examples of an "industrial town" or "company town" characterized by urban planning of a certain size of town in which factories and the town were co-developed. Although Tomioka Silk Mill was not a settlement nor a town rather a mill complex with a dormitory for female workers, we consider above mentioned European factories have a certain similarity. Considering that the factory system itself was completely new to Japan, European factory idea inevitably influenced the site in a way that workers' housing and production facilities are being built together; meaning factories, warehouses, power plants and workers' housing are all in one site.

On the other hand, while New Lanark was created individually by a private sector visionary, Tomioka Silk Mill was built by the national government facilitated by the introduction of technology from abroad. Additionally, the differences between silk and cotton in terms of products, era, and region gave birth to landscape and functional differences.

Table3-2 Textile-related World Heritage Sites

| Name | Stete pary | Main Feature and criteria |
|---|---|---|
| New Lanark | United Kingdom | Cotton industry. A model industrial community molded by Utopian idealist Robert Owen, with well-designed buildings and facilities for workers.<br>Criteria (ii) (iv) (vi) |
| Saltaire | United Kingdom | Cotton industry. A complete and well-preserved industrial village of the second half of the 19th century. It gives a vivid impression of Victorian philanthropic paternalism.<br>Criteria (ii) (iv) |
| Crespi d'Adda | Italy | Cotton indusrtry. An outstanding example of the 19th- and early 20th-century 'company towns' built by enlightened industrialists to meet the workers' needs.<br>Criteria (iv)(v) |

*See Table3-1 for Derwent Valley Mills

Photo 3-11 New Lanark, United Kingdom
Courtesy of Mark Watson

**COLUMN**

**<<Cotton and silk: Difference in Manufacturing Processes>>**

Technological advancements in modern industries originated in Europe and was then taken up in Asia. Although the textile industry played a pioneering role in the process of industrial modernization in both regions, Europe focused on cotton while Asia on silk. Furthermore, technological innovation in the silk industry that progressed successively from the 20th century onwards, the main theme of this nomination, is the earliest relevant example in which Asia became the forerunner of worldwide industrial innovation.

Moreover, there is a large difference between these two industries, in that the production processes for cotton "spinning" and "silk-reeling" are totally different. With spinning, short fibers are twisted together to make a single thread. Cotton spinning necessitates complex and multi-phased work from mixing raw cotton to ultimately spinning it into yarn, and large-scale spinning water mills or steam engines were used for this work. Major improvements in the cotton industry can be found in machines to handle various sorts of raw cotton and technologies to mix raw cotton. Technological innovation in this industry was advanced in the factories of Western Europe.

With silk, cocoons, the material for silk is made of a long single fiber. Reeling work mainly consists of cooking cocoons to disentangle them, drawing out one fiber from each cocoon, and then winding several fibers together on a reel to make a raw silk. This meant that handiwork once occupied the main component of silk reeling. Another characteristic of the silk reeling industry was that it was mainly located in silkworm-raising districts because of the procedures for cocoon preservation and transportation costs. A characteristic of the silk mill nominated here is that it was actively involved in the production of cocoons, with the mill and raw material producers collaborating in the deliberate and integrated advancement of technological innovation. Tomioka Silk Mill was not only a place where mechanical technology was introduced to silk production, but also a place for collaboration between the silk-reeling and silkworm-raising businesses that promoted technological innovation in the processing of raw silk.

**3) Other Industrial Heritage in the World Heritage List**

Additionally, we expanded our scope of study on the aspect of “break through” for an industry, not limited in to those related to textile. Most industrial heritage properties inscribed on the World Heritage List belong to the mining industry, followed by properties from the metalworking industry as well as the textile, transportation, and food industries. Justification for the inscription of these heritage sites varies but many apply largely to “significant stage of human history” (criteria (iv)).

Also, the most significant characteristic of Tomioka Silk Mill and Related Sites is its history of enriching clothing and fashion culture by dramatically increasing the production of silk, which had been limited due to the manual work that was previously involved, through the improvement of cocoon and raw silk production techniques. It is a typical example in which technological improvement had a large impact not only on industrial production but also on society. Such influences can be seen in the increased textile production through the flying shuttle textile invention by John Kay and the popularization of steam power owing to steam engine improvements made by James Watt. Therefore, we listed the following properties as key heritage sites whose justification for inscription represents technological innovation that signifies an important stage in human history among World Heritage sites.

We must note that the Ironbridge Gorge advanced the conversion of fuel from charcoal iron making to coal, which opened the door to mass production. Further, the Völklingen Ironworks site is well known as being the home to breakthroughs in industrial technology, such as opening the door to the mass production of steel in Europe due to the Thomas converter.

Technological breakthroughs similar to those that took place at these heritage sites are a principal theme of Tomioka Silk Mill and Related Sites. Its impact spread throughout the world, even affecting social aspects. Due to this, we believe this property has worldwide significance similar to those sites.

**4) Results**

Results of the comparison with the properties inscribed in the World Heritage List are summarized as follows:

- No industrial heritage site with a principal theme of the practical production of silk has been designated as a World Heritage site.
- Those already designated as textile industry heritage focus mainly on the cotton industry and typify an “industrial settlement” and “company town.”
- Many industrial heritage sites are registered as breakthroughs in the development of their respective industries, and this property has the same historical significance as those sites.

## (iv) Comparison with other similar properties

### (iv)-1 Similar properties across the world

Firstly, based on a survey report entitled "International Context for Textile Sites"[20] by the textile section of the TICCIH, we compiled a table of listed sites in the report classified by fiber.[21] TICCIH conducts thematic studies regarding industrial heritage under the agreement between ICOMOS and TICCIH. The textile section of the TICCIH started compiling a list of worldwide textile heritage for consideration as possible candidates for World Heritage Sites since their 2000 meeting. The draft summary can be seen in aforementioned report.

20 See Watson,2010

21 See Appendix 5-b JCHC2011-1

Looking at the list, one can observe that there is relatively small proportion of silk related industrial heritage among the list of all textile-related heritages properties (12 cases). It account for only 8% among a total of 144 cases, and very few site are recognized compare to cotton (25%) and wool (18%). Furthermore, most of them are related to fabric production or silk twisting. Only Tomioka Silk Mill is clearly recognized as a silk reeling mill. In conclusion, no heritage sites comparable to Tomioka Silk Mill in terms of size and history was found within the list of existing silk-related sites shown the report by the textile section of TICCIH.

Secondly, Koinetwork g.e.i.e. industrial heritage consultancy was commissioned to conduct a historical survey[22] on important technological innovation in the silk industry, as well as on the status of significant remains. While tracing the development of the silk industry and each stage of development in the industrialization process in Europe and China, this survey compared important technological interchange and innovation with the nominated property while confirming the status of these facilities.

22 See Appendix 5-d Koinetwork g.e.i.e. 2010

Next, we will describe the stages of development in modern sericulture and silk reeling industries directly related to the nominated property, based on these researches. Each of the categories of machine reeling mills, sericulture farmhouses, and cold storage for silkworm eggs will be dealt with separately. For an explanation on what significant technological innovation means in this field, refer to the Appendix 4-a "Significant Technological Innovation in Sericulture and Silk Reeling."[23]

23 See Appendix 4-a "Significant Technological Innovation in Sericulture and Silk Reeling"

#### 1) Machine reeling mill

According to Koinetwork g.e.i.e.,[24] "from the mid-18th to mid-19th century, important technological innovation in silk reeling was achieved by inventors such as Jacques Vaucanson who improve lathe for drawing silk out of the cocoons. At the beginning of the 19th century, Ferdinand Gensoul had finalized the process for a collective distribution of steam to many basins. Then, machine reeling mills using steam power appeared and continued to improve while spreading as far as Italy."

24 See Appendix 5-d

We surveyed the actual remaining condition of silk mills related to these movements, and found that there are no cultural properties which represent significant technological innovation and interchange in machine reeling development remaining in sufficient state of preservation in either France or Italy.[25]

25 See Appendix 5-e

Examples of historic mills in a relatively good state of preservation, though not a place of technological innovation, include Laroque (1838)[Photo 3-12], Maison Rouge (circa 1850) [Photo 3-13], and Caussignac (beginning of 19th century)[Photo 3-14].[26] Looking at these properties from an architectural standpoint, all these mills have multiple floors, mostly made from stone and some partly with bricks.

26 Each of them is in the Region Languedoc-Roussillon, department of Gard. For further detail, see Appendix 5-e

The following stage was the transfer of silk reeling technology to Asia and, as stated in 2.b.(i)-1, Japan was the only country with dramatical success in raw silk production among Asian countries to which European machine reeling technology was transferred. A silk mill predating Tomioka Silk Mill was established in China with foreign capital from Jardine, Matheson & Co. of the U.K. in 1861, but it terminated business after a short time and no remains of this mill can be found.

After that, several modern factories on European model have been created in China. This included the Shanghai Silk Filature, which Paul Brunat, who supervised the construction of Tomioka Silk Mill, was involved with. However, factories did not develop smoothly in China, and any remains of machine reeling mill comparable to Tomioka Silk Mill could not be found.[27]

27 There are documents stating that 12 mills were established in China up until around the end of the 19th century. See Appendix 5-g. We commissioned JCHC several surveys including field surveys mainly at Shanghai and Suzhou, to determine whether any remains of these machine reeling mills existed, but no such mills were discovered as protected cultural properties . See Appendix 5-f.

In addition, Koinetwork's study of literary sources did not unearth a single property from countries outside Western Europe and China that matched the nominated property in terms of period or scale. This study therefore argued the following regarding the historical importance of Tomioka Silk Mill:

The great success of Tomioka Silk Mill lies in:

1) that the context of the take-off and success in Tomioka has been the one-of-a-kind in the world around 1870 and has been the key to a dramatic change of balance in the international geography and on the international market of raw silk and the whole range of its derived productions; and

2) that such events have been the result of the existence, in the Japan of the first years of the Meiji era, of a convergence of several conditions which was not achieved in any other country, including the rest of Eastern Asia:

Based on previous analysis, it could be argued that Tomioka Silk Mill is the most complete machine reeling heritage site that typifies industrial and technological interchange in the 19th to 20th century and is preserved in a high state of authenticity. This was a period when modern technology was being transferred from Western Europe to Asia leading to the region's rapid progress.

**COLUMN**

**<<Throwing mill>>**

According to Koinetwork g.e.i.e., technological innovation in silk throwing (twisting) was a notable achievement in the initial stages of European silk industry development. In the silk production process, silk twisting follows the silkworm rearing and silk reeling processes that were carried out by this nominated property.[28] Silk twisting refers to raw silk reprocessing (twisting) work according to the type of textile. Innovation in silk twisting started mainly in Italy from around the 14th century, and it started out by improving the operation of torcitoio (tumbling mill for twisting) from manpower to hydropower.[29] This soon developed to installing large waterwheel-powered silk twisting machines in multi-floor factories, and it became a new model for silk mills and work organization by the 17th to 18th century. Several of such heritage sites can be found in the Piemonte region of Italy (Caraglio [Photo 3-15] and Racconigi are representative examples). This silk twisting technology was a closely guarded secret at first, but it was soon transferred to other countries such as the U.K. and U.S., where silk twisting and textile weaving with imported raw silk was carried out. The aforementioned Derwent Valley Mills is a typical example of introducing such silk twisting machine.

When looking back at history, the number of such silk throwing mills in Italy and France with silk reeling machines that shared waterwheel power is by no means small. Examples include the La Galiciére silk twisting mill [Photo 3-16] and Le Mazel (1846) in France.[30] Thus, while silk twisting and reeling machines are both expected to be found at a typical silk mill, this method of working was never seen in Japan and China. The range of activities carried out by the Japanese sericulture and silk reeling industries only went as far as raw silk production. It was customary for textile manufacturers, who bought the raw silk, to perform silk twisting as a part of the weaving process. This analysis therefore treated silk twisting mill as completely different in nature to silk mills like the nominated property.

28 See Silk production process in Japan at the beginning of this dossier.

29 In China and Japan, different type of mechanism waterwheel-powered silk twisting machines.

30 See Appendix 5-e

Photo 3-12 Filature in Laroque, Herault, Languedoc-Roussillon, France

Photo 3-13 Filature “Maison Rouge,” Saint Jean du Gard, Gard, Languedoc-Roussillon, France

Photo 3-14 Filature in Caussignac, Gard, Languedoc-Roussillon, France

Photo 3-15 Il Filatoio di Caraglio (silk throwing mill) (1676-1678), Piedmont, Italy

Photo 3-16 Moulinage de la soie (silk throwing mill) “Galicière,” Chatte, Isère, Rhône-Alpes, France
Courtesy of Ass. Les Amis de la Galicière

Photo 3-17 Filature (both reeling and throwing) in Le Mazel, Gard, Languedoc-Roussillon, France

**2) Sericulture farmhouses**

Sericulture farmhouses were barely raised in the previously mentioned TICCIH and Koinetwork g.e.i.e, surveys with only a mention of the above stated Shirakawa-go and Gokayama farmhouses in the TICCIH survey report.

Therefore, a comparative analysis of Japanese and Western silkworm raising rooms was undertaken using the historic observation reports of both Japanese and Western experts conducted from the 19th to the 20th century.

Firstly, technological innovations in silkworm-rearing rooms in 19th century Europe related mainly to temperature adjustment (adding innovations to silkworm rearing rooms to maintain appropriate temperature) and the circulation of fresh air by ventilation.

In Figure 3-1 you can see how the necessity of temperature control and ventilation in silkworm-rearing room was appealed for. Italian and French sericulture rooms of the time focused on airflow as seen in Figures 3-2 with some kind of ventilation innovation added to a stone building.

However, according to an Italian economist, Giovanni Federico, European sericulture was considered to be a seasonal farming activity, so most used a part of the farmhouse to raise silkworms during the season and only a small fraction built a dedicated silkworm rearing room.

On the other hand, renovation of sericulture structures in Japan was actively pursued in the same period. Ventilation systems used at Tajima Yahei Sericulture Farm[31] and the temperature adjustment structure of Takayama-sha Sericulture School are prime examples.[32] The main building of the Tajima farm was built in 1863, preceding the Tajima family representatives' visit to Italy in 1879 and the introduction of European Sericulture farmhouse architecture by the Japanese delegation. This fact proves that this structure was a completely novel conception.

31 See p.055 2.a. (iv) S2 Tajima Yahei Sericulture Farm

32 p.064 2.a.(iv) S3 Takayama-sha Sericulture School

When comparing European and Japanese sericulture farmhouses, both of them attach importance to ventilation in function, and in modern times, information on respective techniques was exchanged via documents. However, the emergence of similar features was not induced by direct interaction. Moreover, while the typical Japanese modern silkworm raising room is one specially designed and incorporated into a residence. In Europe, we can not find out any example of such combined house as far as our study. As an existing example of exclusive silkworm rearing room we should mention is one established as an annex to the silk twisting mill, La Galiciére [Photo 3-18]. The actual architecture of European and Japanese sericulture farmhouses completely differ in terms of structure, design, and materials.

It was also found that while a large amount of research on silkworm-rearing rooms was carried out with vigorous spirit to improve the structure in Japan, there were only a small number of cases of such research in Europe.

### 3) Cold Storage

Cold Storage facilities enabled multiple rearing cycle of silkworm by storing silkworm eggs to control their hatching timing. In some areas of Southern part of China and India, there is the multivoltine used mostly in tropical Asia which do not hibernate and can go through the process of hatching – larva - eclosion -laying eggs repeatedly in any time of the year. However, because of the quality of raw silk obtained from this multivoltine was not satisfactory, most of the raw silk produced was consumed locally and did not enter the global market. On the other hand, to achieve multiple rearing cycle was difficult when using univoltine or bivoltine silkworms which can produce high quality cocoons.[33] The use of cold storage as a storage place for silkworm eggs is rarely seen anywhere outside of Japan and we have yet to obtain information on foreign cold storage for silkworm eggs protected as heritage sites.

33 more detail See Appendix 4-a

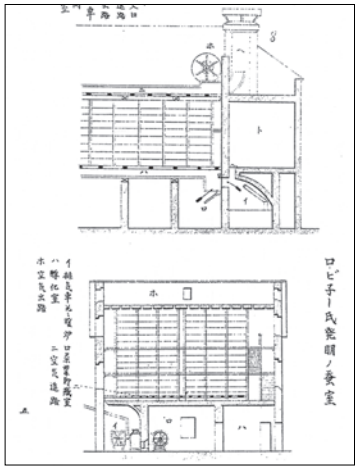


Figure 3-1 Section of silkworm rearing room developed by Darcay and Robinee, from *Ifutsu Sangyo Jijyo* [Report on Sericulture Industry of Italy and Japan] by Y. Miyoshi, 1892

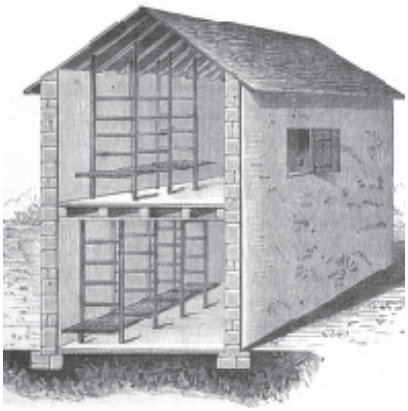


Figure 3-2 Silkworm rearing building in France, from *Manuel du Magnanier* [Sericulture Manual]" by L. Roman, 187

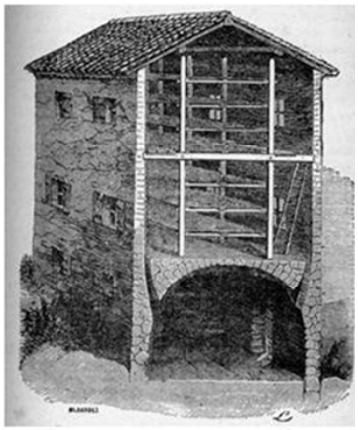


Figure 3-3 *Magnanerie* [Silkworm rearing building], *Des Cevennes Par Louis Pasteur*, from Vignon L., *La Soie*, 1890.

Photo 3-18 Interior of silkworm rearing building, *Moulinage de la soie* (silk throwing mill) *Galicière*, Chatte, Isère, Rhône-Alpes, France
Courtesy of Ass. Les Amis de la Galicière

Literary resources were searched for information on the use of cold storage outside of Japan, and only two cases were found. The use of cold storage for cooling silkworm eggs are indicated in Giovanni Bolle's *Anleitung zur Kultur des Maulbeerbaumes und zur rationellen Aufzucht der Seidenraupe* [Method of Rational Sericulture and Mulberry Cultivation].[34] His writing notes that a natural cave was used for the purpose.[35]

Another reference can be found in a book by Leo Duran.[36] It described that some Italian establishments utilized extensive cold storage enabling artificial hatching of silkworm eggs. However, in a separate section of the same book, raising silkworms multiple times in one year was an exception in Italy and it was normally hatched once a year. On the other hand, the author states that the Japanese controlled rearing cycles so that silkworms could be raised during two-thirds of a year.[37]

In addition, according to a research on the history of the European silk industry,[38] it was Japan that increased the number of rearing cycles in the 1910s to three times a year - spring, summer, and autumn - and there was no mention of the use of a cold storage in European countries.

Considering these description, it seems unlikely that cold storage historic site for silkworm egg storage comparable to Arafune Cold Storage will be found anywhere outside of Japan in the future.

**(iv)-2 Comparison with similar properties within Japan**

As stated in Chapter 2 and 3, sericulture and silk reeling industry in Japan has experienced extraordinary development different from other countries. Subsequently, comparison with similar properties in Japan takes significant part in this comparative study.

The survey used the following materials to identify the scale, remaining condition and historical value of cultural properties: the "National Cultural Property Database" created by the Agency for Cultural Affairs; each prefecture's "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization" and "Comprehensive Survey Report on Modern Japanese-style Buildings"; "Comprehensive Report Collection of Japanese Folk-houses"; the Department of Agriculture, Bureau of Agriculture and Commerce's "Sericulture Legislative Report" [1917]; Nagano Prefecture's Silkworm Disease Preventative Office's "Nagano Prefecture Cold Storage Research" [1910]; and the "National Cold Storage Research" (editor and publisher unknown) [1909].

**1) Machine-reeling mills**

As a result, from the review of above surveys, we know that no other mill comparable to Tomioka Silk Mill (S1) from a perspective of interchange and technological innovation in regard to silk-reeling technological development in the 19th to 20th century exists. Tomioka Silk Mill is outstanding either in scale, historical value or remaining condition.

34 Translation by Noshomu-sho (Ministry of Agriculture and Commerce) Sangyo Shiken-jo (Sericultural Laboratory) , *Method of Rational Sericulture and Mulberry Cultivation* (1918) (original text was published in 1913). Noshomu-sho Sangyo Shiken-jo, 1913, p61

35 The following is written in this publication: a cave in the Alps was used to store silkworm eggs in a state of hibernation till autumn and summer-autumn rearing was being attempted, as it was in Japan at that time. The amount of production increased by multiplication the rearing cycle to three times a year. Before this wintering method was introduced, spring was the main rearing period while summer rearing was nominal. However, enabling storage allowed summer-autumn rearing to be carried out in the period after spring, when there is a labor shortage due to farm work, and the amount of produced cocoons was one-third of that produced by Japan.

36 See Duran, L.,1921,p21

37 See Duran,L.,1921,p28-29

38 See Federico, 1997 p13

Aside from Tomioka Silk Mill, there are 16 cultural properties related to silk reeling currently designated or registered by law (2 designated and 14 registered). They include one reeling mill remain that rather new structures built since the 1910s and 9 warehouses for cocoons or thread. Other properties are partial remains of factory complexes such as offices or owner's house, which are not considered as production facilities.[39]

39 See Appendix 5-i

However, in view of the possibility that there may be any surviving undesignated silk-reeling mills, we determined "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization" and "Comprehensive Survey Report on Modern Japanese-style Buildings." Although approximately 90 machine reeling related properties are surveyed, only 30 partial remains of factory complexes including 10 production facilities can be found. Thus, There remains no complete factory complex like Tomioka Silk Mill.

Furthermore, we examined the present state of former silk-reeling mills considered to be a similar property from a historical perspective. First, Western-style machine-reeling mills built prior to Tomioka Silk Mill were the Maebashi Silk Mill built by the

Photo 3-19 Second reeling plant, Muroyama Silk-reeling Mill, Mie, Japan 1903

Photo 3-20 Office building, Former Yamajo Miyasaka Silk-reeling Mill, Nagano, Japan 1927

Maebashi clan in Maebashi, Gunma Prefecture in 1870 and the Onogumi Silk Mill built by the Ono group in Tsukiji, Tokyo in 1871. These were small-scale facilities that drove Italian-style reeling machines by traditional Japanese-type water-power. Both were closed a few years after opening and no traces can be found.

Next, from a literary review we identified mills modeled on Tomioka Silk Mill in the early Meiji period after 1872. According to the "Chronicle on Tomioka Silk Mill"[40] and the "Photographic Collection of Tomioka Silk Mill",[41] 32 machine-reeling mills[42] were modeled on Tomioka Silk Mill by 1880. We therefore surveyed the present state of the original architecture of these silk mills, but no remains of any of these 32 mills exist. A remain of second reeling mill of Muroyama silk-reeling mill built in 1903, which has no direct relation to Tomioka, only conveys a vestige[Photo 3-19].

40 Editorial Committee of Tomioka Seishijoshi ed., 1977. *Tomioka Seishijoshi* [Chronicle on Tomioka Silk Mill].

41 Katakurakogyokabushikigaisha, 2007. *Shashinshu Tomiokaseishijo* [Photographic Collection of Tomioka Silk Mill].

42 See Appendix 4-b

Just to make sure of an analysis, in the case of Nagano which had the highest the number of small, and medium machine-reeling mills from the end of Meiji to Taisho period,[43] we interviewed the officials of municipal educational boards in Nagano Prefecture in charge "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization," and noted condition of remains of silk mills built by the Taisho period, including small-scale, simplified versions of Tomioka Silk Mill that used boiler facilities and power-driven reeling equipment while substituting a water wheel for a steam engine. As a result, no mill architecture built up to 1900 still exists in its previous state. Although, some relatively new mill facilities built after the 1910s, and some subsidiary facilities such as water conduits as traces, managers' residence, and office buildings still exist partially [Photo 3-20].

43 Taisho period (1912-1926)

Based on the above, we can conclude that we were unable to find any considerable remains of the following: 1) machine-reeling mills built prior to Tomioka Silk Mill; 2) early Meiji period silk mills modeled on Tomioka Silk Mill; and 3) simplified silk mills created under the influence of Tomioka Silk Mill.

**2) Sericulture farmhouses**

In comparative study for Tajima Yahei Sericulture Farm (S2) and Takayama-sha Sericulture School (S3), it is important to focus on whether the property exhibits technological innovation of architecture for silkworm raising or not, in order to identify the nominated property's position as the prototype of "modern sericulture farmhouse." And also, the significance as educational facilities to disseminate standard sericulture method should be compared. Thus, firstly, we outline the architectural value of the "modern sericulture farmhouse" and its dissemination.

The architecture of "modern silk-raising farmhouses" that can be seen across the sericulture area in central Honshu, centered in Gunma Prefecture, is characterized by the use of the upper floor for silkworm rearing, comparatively large-scale two-story structure, and tiled roof with a raised roof called *koshiyane*. The main building of Tajima Yahei Sericulture Farm is the prototype of such modern silk-raising farmhouses. It is a two-story house with silkworm-raising room, which has an innovative architectural style incorporating a ventilation system. It was introduced in *Yosan*

*Shinron* [New Theory of Sericulture] by Yahei Tajima in 1872 and spread nationwide.[44]

44 See p.106 photo 2-46

In the inaugural year of the Meiji period in 1868, sericulture delegations and researchers visited Tajima Yahei Sericulture Farm from all over Japan including Kumamoto, Shizuoka, Hyogo, Kyoto etc., and the number rose to 179 people from a total of 25 prefectures in the period of 1873 to 1874.

This included researchers from Yamagata Prefecture who after returning home built structures for silkworm rearing modeled on Tajima Yahei Sericulture Farm and these buildings are components of the Matsugaoka Land Reclamation Site, now a nationally designated Historic Site.

Takayama-sha Sericulture School incorporated a ventilation system by using a raised roof developed by Yahei Tajima. It also has a variety of innovations including a floor structure and a furnace, and its revolutionary silkworm room enables the temperature to be carefully controlled.

The silkworm room that can still be found at the Takayama-sha Sericulture School was built in 1891 and its structure became popular throughout Japan via the

Photo 3-21 Tomizawa House, a sericulture farmhouse with thatched roof, built in the 18th century.

Photo 3-22 Silkworm-rearing building, the Matsugaoka Land Reclamation Site

Photo 3-23 Silkworm-rearing farmhouses in Akaiwa district (Influenced by Takayama-sha)

Photo 3-24 *Kyoshin-sha* sericulture school

20,000 or more students taught at Takayama-sha Sericulture School and teachers dispatched to all corners of the country. *Kyoshin-sha* is worthy of special mention as a silkworm-raising room modeled on the Takayama-sha Sericulture School. It was built by Kuzo Kimura, the younger brother of Chogoro Takayama, in Honjo City, Saitama Prefecture in 1894. However, this building was a dedicated silkworm-raising room built inside a silkworm rearing educational institution and not in combination with residential facilities.

Tajima Yahei Sericulture Farm and Takayama-sha Sericulture School pass on the history of the Japanese silk industry, as important witnesses testifying to new developments in sericultural methods, improving silkworm-raising room structures to embody the method, and giving rise to technological innovations on a nationwide scale. As Japan grew to be the largest silk exporter in the world, occupying 80% of the global silk exportation market, modern sericulture farmhouses (two-story tiled houses with a partially raised roof for ventilation) were built all over Japan from the 1860s to 1960s.

Based on such historical background, to find similar property in Japan, firstly, from the list of national cultural properties.[45] Aside from Tajima Yahei Sericulture Farm (S2) and Takayama-sha Sericulture School (S3), 14 designated and 34 registered sericulture farmhouse, including some groups of farmhouses, are identified. These were built over a wide period from the 18th century to the first half of 20th century and their styles were diverse. These included the late Edo period thatched roof sericulture farmhouses [photo 3-21] and, farmhouses which were built under the influence of Tajima Yahei sericulture Farm and Takayama-sha Sericulture School structures [photo 3-23]. The list also contains aforementioned Matsugaoka Land Reclamation Site [photo 3-22] and no front-runner of sericulture farmhouse prior to Tajima Farm nor sericulture educational facility prior to Takayama-sha.

45 See Appendix 5-i

Secondly, from “Comprehensive Survey Report on Heritage Structures related to Japanese Modernization” and “Comprehensive Survey Report on Modern Japanese-style Buildings,” 144 properties came up including Kyoshin-sha described before as one modeled on the Takayama-sha. Neither older nor similar example did not exist in the list.

Further, in order to understand the progress of the sericulture farmhouse in Japan, we studied the scale and style of the farmhouses in Gunma, Nagano, Yamanashi, Hyogo, Fukushima, and Yamagata Prefectures, which were the top cocoon producing areas in the 1890s, from the “Comprehensive Report Collection of Japanese Folk-houses.” As a result, any precedent example equipped with the characteristic of modern sericulture farmhouse to Tajima Farm was not founded, neither sericulture training facility comparable to Takayama-sha.

The results of the above analysis clearly show that the technological innovation and historical significance of Tajima Yahei Sericulture Farm and Takayama-sha Sericulture School stand out compared to other cultural property.

### 3) Cold Storage

In aforementioned list of national cultural properties,[46] "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization" and "Comprehensive Survey Report on Modern Japanese-style Buildings," only "Arafune Cold Storage and Azumaya Cold Storage in Gunma Prefecture" are designated as a cold storage for silkworm eggs.[47] While several examples were found in Nagano Prefecture's "Comprehensive Survey Report on Heritage Structures related to Japanese Modernization," any of them are small in scale.

46 See Appendix 5-i

47 Azumaya Cold Storage located in Nakanojo-town, Gunma Prefecture is designated in conjunction with Arafune Cold Storage at the same time in 2010.

Furthermore, we examined the present state of cold storage for silkworm eggs considered to be a similar property from a historical perspective. All cold storage for silkworm eggs in Japan were regulated and registered by government during a certain period in the Taisho period. Therefore, based on the Department of Agriculture, Bureau of Agriculture and Commerce's "Sericulture Legislative Report (Sangyo Torishimari Seiseki) " [1917]; Nagano Prefecture's Silkworm Disease Preventative Office's "Nagano Prefecture Cold Storage Research" [1910]; and "National Cold Storage Research" (editor and publisher unknown) [1909], we identified the locations, years of construction, styles, and scales of cold storage facilities built from the late Meiji period to the Taisho period. Then Gunma Prefecture conducted a nationwide survey on their present state in 2008.

As a result, we found that the storage capacity of Arafune Cold Storage was outstanding in scale compared to others in Gunma Prefecture as well as in other prefectures.[48]

48 See Appendix 5-h

Further analysis of documents on Arafune Cold Storage and their trading records showed that silkworm egg storage was commissioned from almost all over Japan. These facts demonstrate its enormous influence in contributing to the multiplication of silkworm rearing cycles across the whole of Japan through silkworm egg storage.

Photo 3-25
Azumaya Cold Storage, Gunma, Japan

### 4) Justification for selection of components

The impact Tomioka Silk Mill has made on mass production of raw silk, through the introduction of Western machine reeling technology in the 19th century and inno-

vations that followed, is globally outstanding. And since scientific innovations that led to a rapid growth in the cocoon production were fundamental to mass production of raw silk, we must nominate a series of facilities, as an ensemble, that depict significant innovation in entire production system centered on Tomioka Silk Mill.

In composing a comprehensive technological ensemble, it is necessary to specify silkworm-rearing facilities that possess a functional connection in the raw silk production process. Also, we decided to strictly select only components indispensable for constituting the outstanding universal value of the nominated site rather than including everything related to the theme.

As a result, we carefully selected components of the nominated property in accordance with the following criteria based on this comparative analysis.

**[Principles for selection of components]**

- Tomioka Silk Mill is taken as the central component
- Sites that have strong relationships with Tomioka Silk Mill
- Sites that depict the emergence of innovation in sericulture

Firstly, Figure 2-1 in page 016 and Appendix 2-b outline the interrelation between Tomioka Silk Mill and three other sites.

Tajima Yahei Sericulture Farm, Takayama-sha Sericulture School and Arafune Cold Storage are located in Gunma Prefecture together with Tomioka Silk Mill, so they are geographically close, and also had a strong relationship as leaders in their respective fields from the late 19th century in each stage of sericulture and silk-reeling development. In order to facilitate and spread widely the development of excellent quality silkworms from the beginning of the 20th century, they formed a close association through the experimental rearing of foreign and hybrid breeds (Tajima Sericulture Farm and Takayama-sha Sericulture School), cocoon bulk purchase agreements (Takayama-sha Sericulture School), and silkworm egg storage agreements (Arafune Cold Storage). This connection with Tomioka Silk Mill cannot be seen with other silkworm-raising facilities located nearby.

In addition, as sites that depict wide emergence of innovation in sericulture, studies in 1) to 3) of this section clarify that Tajima Yahei Sericulture Farm, Takayama-sha Sericulture School and Arafune Cold Storage stand out compared to other cultural property in terms of historical significance of their innovation. Specifically, Tajima Yahei Sericulture Farm and Takayama-sha Sericulture School stand out in the development of silkworm-raising room structure and sericulture methods, and the Arafune Cold Storage in the storage of silkworm eggs.

Based on the above analytical results, Tomioka Silk Mill, Tajima Yahei Sericulture Farm, Takayama-sha Sericulture School, and Arafune Cold Storage, which make up the “Tomioka Silk Mill and Related Sites”, could be taken as a single “technological ensemble” that cooperated in working towards the mass-production of high-quality raw silk. What’s more, they also came to lead the world in the innovation of

sericulture and silk-reeling techniques.

It should also be noted that these four sites were not completely independent. Many other sites or cultural assets developed under their influence as well as those belonging to the pre-modern period or related fields such as textiles, transportation, and commerce. Some of those remain in a good state of preservation condition. Deeming it necessary to protect these properties as local heritage, Gunma Prefecture cooperated with the related towns and cities in registering them as "Gunma Silk Heritage Sites" and launched the "Gunma Silk Heritage Network" Project to conserve them.[49]

49 See p.209 ch5 (i)-5

## (v) Results of analysis

As shown above, we first considered already inscribed World Heritage Sites then other similar sites and then compared the nominated property with relevant properties in Japan and abroad from a variety of aspects.

The results of these respective analyses and comparisons have been summed up at the end of each section, but we would like to provide a final summation below.

**1) Appropriateness of nomination for the World Heritage List.**

As a result of comparison with properties already inscribed on the World Heritage List, there is no representative that has "practical production of silk" as its central theme. From a Global Strategy viewpoint, we believe that the nominated property is worth being included in the World Heritage List.

**2) Outstanding example among similar properties**

There were very few silk-related industrial heritage sites even in the comparison with the textile-related heritage sites not recorded in the World Heritage List and tentative list. The nominated property represents a significant turning point in the history of silk industry development, and when it comes to "exchange and technological innovation in machine-reeling and silkworm storage and rearing in the latter half of 19th century into the 20th century," the nominated property has no equal.

**3) Rationale for selecting components**

The nominated property is an ensemble that consist of four components - Tomioka Silk Mill, Tajima Yahei Sericulture Farm, Takayama-sha Sericulture School, and Arafune Cold Storage - that contributed to the realization of mass production of high-quality raw silk through the collaboration among these establishments.

This property could be considered a "technological ensemble" that served the leading stage for crucial technological innovations that accelerated the mass-production of high-quality raw silk. When selecting components of the nominated property, we focused on both the technological innovation and historical significance of each component as well as the importance of their relationship with the central component, Tomioka Silk Mill. We believe that as far as both points are concerned, the four sites have a far greater value than other similar facilities.

## 3.3. Proposed Statement of Outstanding Universal Value

**a. Brief synthesis**

Tomioka Silk Mill and Related Sites comprise a technological ensemble depicting the significant technological interchange and development that enabled realization of the mass production of high-quality raw silk from the latter half of 19th century into the 20th century, during the period when the world market was unified through international trade. This ensemble brought about developments in global silk industry as well as popularization of silk consumption and contributed greatly to modernization of the Japanese economy.

Mass production of high-quality raw silk was achieved through innovations not only in reeling technology but also in silkworm rearing methods for increased production of high-quality cocoons. Tomioka Silk Mill played a central role in this technological innovation as a pioneer in the movement. Established in 1872 by the national government in the heart of Japan's sericulture region, in the middle of the main island, the mill is a prototypical example of the move to introduce advanced Western technology and factory systems during Japan's early days of modernization. It exemplifies interchange in the fields of architecture and reeling technology. Tomioka Silk Mill was the setting in which a wide range of reeling technology was developed consecutively for about one hundred years, beginning with introduction of mechanical reeling technology from the West, and culminating in implementation of the automatic reeling machine in the 20th century. Here stand a complete set of structures that convey the progress of these important technological innovations.

The following three sites, strongly related to Tomioka Silk Mill, played essential roles in advancing silkworm rearing technology. They convey the process of innovations in silkworm rearing methods and their dissemination. Tajima Yahei Sericulture Farm was the starting point for improvements in silkworm rearing farmhouse structures focusing on ventilation. It was followed by Takayama-sha Sericulture School, an educational institute where standardized rearing methods were established by perfecting Tajima's method through use of a thermal-powered system for temperature and humidity control. Arafune Cold Storage provided cool storage for silkworm eggs to allow multiple rearing seasons, which enabled mass production of cocoons. These facilities joined forces in work headed by Tomioka Silk Mill to improve and standardize silkworm species, and were responsible for the novel developments employing scientific experiments for superior breeds of silkworms. The materialization of a stable provision system for fine-quality cocoons in large quantities was achieved through the collaboration of Tomioka Silk Mill, a large-scale factory established employing modern Western technology and the silkworm farmers that further developed domestic sericulture methods. Thus, a model for mass production of high-quality raw silk was established. This success was spread throughout the country and provided a standard for silk reeling factories and silk rearing establishments all over Japan.

As a result, Japan's raw silk export developed exponentially to dominate a share

of 80 percent in the global market in the 1930s. It was not only exportation of raw silk but also worldwide transfer of efficient technology for silkworm rearing and silk reeling, developed under the leadership of these four sites, that provided the foundations for contemporary raw silk production. Such contributions made by this group of sites enhanced the broad dispersal of silk products to new consumers.

**b. Justification for criteria**

**Application of Criterion (ii)**

Tomioka Silk Mill and Related Sites exhibit an important interchange of scientific knowledge between Japan and various countries, on developments in silk production technology. This group of sites well exemplifies mutual exchange of industrial technology on a global scale that resulted in mass production of high-quality raw silk by the early 20th century, and brought about a uniquely modern consumer culture in which silk may be consumed by the general public. Western technology and full-scale factory systems were first introduced in Japan at the government established Tomioka Silk Mill. The mill spearheaded development in silk reeling technology and dissemination throughout Japan, and promoted advancement in silkworm cultivation in conjunction with three related sites. This was followed by the worldwide transfer of modern sericulture technology together with the effective silk production machinery perfected in Japan, which continue to support raw silk production to this day.

**Application of Criterion (iv)**

Tomioka Silk Mill and Related Sites form an exemplary technological ensemble that represents the significant stage in human history when mass production of raw silk was realized, from the late 19th century into the 20th century. This group of four sites consists of a large-scale factory and three small-scale breeding facilities responsible for developments in silkworm rearing and reeling technology that enabled mass production of raw silk. They vividly depict the progression from mechanical reeling machines introduced from the West, to the later Japanese invention of the automatic reeling machine, as well as the process of repeatedly attempted innovations in silkworm breeding technology and its dissemination. Such technological innovations played a pivotal role in the development of the modern global silk-industry during this time when the world market was unified through international trade.

**c. Statement of integrity**

All components of the nominated property are indispensable for giving an account of international exchange and major technological innovations that contributed to the development of the world's silkworm rearing and silk-reeling industries. By treating the four components as a group of interrelated sites responsible for the mass production of high-quality raw silk, it is possible to exhibit the entire picture of the series of production systems for silkworm breeding and silk reeling. The nominated property is appropriately delineated to include all buildings and structures necessary to convey the significance of each component. Each of these properties is preserved accordingly.

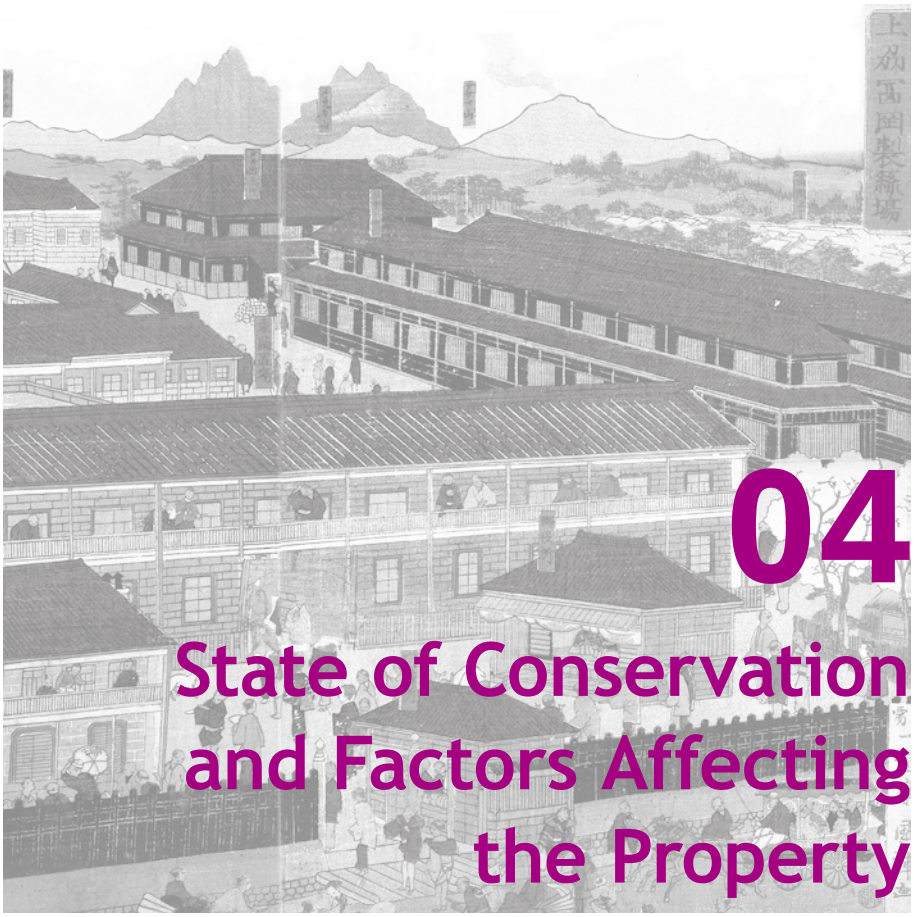
**d. Statement of authenticity**

The principal structures extant at each property typically retain their original construction. Site boundaries as well as the layout of main buildings within the premises remain unchanged. Minor interventions undertaken on some buildings as functional enhancements to meet technological innovations of each period do not mar any of the major characteristics of each property. Repairs have been made with sufficient consideration for maintaining authenticity of original form and design, material and quality, use, and function. Authenticity of major characteristics including technology and tradition is ensured.

**e. Requirements for protection and management**

Each component is fully protected under the Law for the Protection of Cultural Properties, having been designated as Historic Sites and/or Important Cultural Properties. In the buffer zones, all possible measures are being taken for protection of surrounding environments under such laws as the City Planning Act and the Landscape Act as well as ordinances enforced by their respective municipal governments. Comprehensive preservation and management plans to cover all components have been formulated and are being appropriately enacted. A cooperative committee comprised of all relevant prefectural and municipal governments was established to ensure effective measures are being taken among the parties concerned.

Possible major threats to these properties are natural disasters. Careful preventive measures against damage by such causes are being taken and long-term measures have been drawn up based on detailed surveys by professionals. In order to continuously protect these sites into the future, both development of surrounding areas and public access to components are being appropriately regulated. Protection is reinforced by the efforts of local volunteer groups involved in preservation and promotion of these resources.



# 04

# State of Conservation and Factors Affecting the Property

# 4. State of Conservation and Factors Affecting the Property

## 4.a. Present State of Conservation

### (i) Overall property

Prior to designation, all four components of Tomioka Silk Mill and Related Sites had been preserved and managed properly by the owners. Thus, land, buildings, structures, and underground structural remains are kept in good condition. At present, these four components are nationally designated as Historic Sites under the Law for the Protection of Cultural Properties and historical values of the land, buildings, subsidiary and underground structures are preserved at the highest level of protection. Furthermore, the buildings of Tomioka Silk Mill that were built during government operation are designated also as national Important Cultural Properties under the same law.

The conservation state of each component is excellent as the local municipalities, assigned as custodial bodies by the Japanese government, set each preservation and management plan, and maintain and manage the components properly.
Concerning the elements that constitute historic value of the property such as buildings, subsidiary structures, underground structural remains or relevant plants, scientific investigations have been and continue to be implemented one by one, and maintenance and/or conservation are underway based on the investigation outcome.

### (ii) Present state of conservation

The state of conservation of each component is described as follows:

#### S1 Tomioka Silk Mill

Within the property, there presently remain buildings and underground structures constructed in various periods. Those buildings, not only the ones designated as national Important Cultural Properties constructed during the government operation period, are preserved in good condition. Partial degradation or minor damage such as that on the roofs has been properly repaired according to a preservation and management plan.

Concerning locations of the dismantled buildings, it is possible to identify them according to reliable documentation including historic site plans and historic photos. Underground structural remains have been and continue to be surveyed, with proper excavation procedures as necessary, to establish appropriate measures for preservation and management of these traces.

**S2 Tajima Yahei Sericulture Farm**

Within the site, the main building used for both residence and sericulture, storehouse for mulberry leaves and silkworm eggs as well as stone remnant of lost building lots are preserved in good condition.

Although the entrance of the main building was altered in 1952, the *koshiyane* or the raised roof used with ventilation function developed by Yahei remains completely intact including the fittings used for ventilation control. The openings of the raised roof have been closed from the outside with tin plate to improve interior living conditions.

A microscope room which exhibits the history of international exchange and the partition structure of the silkworm room upstairs setup at the time when researches on F1 hybrids were implemented, the fittings, all railings and divider functions, except for some removable panels and screens, are preserved in good condition.

The site is appropriately taken care of by the property owner in charge of daily management. In order to properly continue preservation of the premises with respect for the owners' daily living, Isesaki City acting as a custodial body for preservation and management.

**S3 Takayama-sha Sericulture School**

Within the site, in addition to the main building with silkworm rearing rooms, the *nagayamon*-gate, bathhouse/kitchen, outside toilet, stone masonry that convey the footprints of the practical school buildings, and stone walls of the mulberry storage basement are preserved.

Of the main building with silkworm raising rooms, all structures, which constitute the main features for the *seion-iku* silkworm rearing method, such as a series of three raised roofs for ventilation, large openings of the upper-floor silkworm room, latticed ceiling called *komagaeshi*, as well as places for installing a brazier and ventilation openings are completely preserved in good condition. After they stopped raising silkworms, some parts on the ground floor were renovated to accommodate present living conditions. However, most of the alterations were done by simply placing new materials over the original features, such as the floor, walls, and ceiling. Therefore, the interventions made are all reversible so that the original condition can be brought back.

Regarding other buildings, the roofs and walls of the bathhouse/kitchen are damaged. As a temporary protective measure before performing full restoration, protective coverings are provided to prevent further deterioration. Daily management is properly conducted by Fujioka City based on the preservation and management plan and the property is well conserved.

Fujioka City is implementing a detailed investigation regarding the original state when it was built. A full preservation is underway accordingly.

**S4 Arafune Cold Storage**

Within the site, stone foundation walls of the three cold storage buildings, remains of a passageway linking these buildings, and remains of an administrative building are preserved.

Although the stone masonry wall has partially collapsed by natural cause, its main attributes such as the base structure and the mechanism of circulating cold air are kept in good condition. On the exterior of the foundation walls, sealed pointing to confine cold air still remain. The mechanism of emanating cold air is perfectly maintained at around two or three degrees Celsius and cold air comes out even in summer.

Regarding the stone foundation wall which partially collapsed recently in cold storage No. 1, the preparation to reinstate stones back to the former state is underway according to detailed land surveys made before its collapse and detailed investigation of the fallen stone material. Stone pieces are individually numbered and recorded their locations prior to dismantling, so that they can be placed back exactly.

Daily management of the site is properly carried out by Shimonita Town based on the preservation and management plan. The necessity of an upper structure for the purpose of protecting existing stone masonry from wind or rain will be carefully considered.

## 4.b. Factors Affecting the Property

### (i) Development pressures

**(i)-1 Condition for overall properties**

Regarding the property, based on the Law for the Protection of Cultural Properties, alterations which affect the property are prohibited in principle unless they are necessary for preservation or restoration. Therefore, developments which might have adversery effects on the outstanding universal value are not permitted.

In the buffer zone, there is no large-scale development currently planned. Actions such as constructing buildings or structures, alteration of shape and size of land, cutting bamboo or trees are regulated in terms of the scale, shape, or structure under the City Planning Act, the Act on Establishment of Agricultural Promotion Areas, Forest Act, Landscape Act and the ordinance of the related cities and a town. Thus, any development with negative impacts to reduce the outstanding universal value of the property will not be permitted.

**(i)-2 Condition of each component**

**S1 Tomioka Silk Mill**

Tomioka Silk Mill site is in the town center formed on the riverside terrace of Kabura-gawa River. Within the buffer zone including the Mill itself, in line with the City Planning Master Plan implemented under the City Planning Act and also the "Tomioka City Machizukuri - development and revitalization - Plan" set out in 2006, sound city development is controlled.

**Development activity**

Within the buffer zone, matters such as use, shape of the buildings, building coverage ratio, and floor-area ratio of buildings are controlled. The Tomioka City Landscape Plan and the Tomioka City Landscape Ordinance implemented in 2009 define, construction works should be regulated in height, within 12m for immediate surrounding zone of the mill, and 14m for other zones, based on the height of buildings at the mill. Also, construction of a building or subsidiary structure which is over 1000 square meters in area should be notified. Therefore, any negative impact that may threaten the value of property is controlled.

**Policy reform for development projects in the town center**

In the central area (6.2 hectares) within the buffer zone, the city began an urban renewal project in 2002, scheduled to be in effect until 2016, which may have greatly altered the landscape. However, the city changed the development policy in March 2006, toward "sustainable development placing Tomioka Silk Mill as the core," which has been stated in the "Tomioka City Machizukuri - development and revitalization - Plan." Therefore the city is pursuing the town center development project in concordance with the balance between development activities and preservation of the property.

Photo 4-1 Photo of the periphery of Tomioka Silk Mill

**Road works**

There are no plans for new roads or large-scale expansion of road widths within the buffer zone. Additionally, the “Tomioka City Landscape Plan” established in 2009 identified nine roads in the buffer zone as the “Important Landscape Public Facilities” because it has a large impact on the creation of a pleasant landscape. While making such improvements, considerations have been established on structure, shape design, materials and color in order to preserve and improve the historic and cultural value possessed.

### S2 Tajima Yahei Sericulture Farm

Sakai-shimamura district in Isesaki City, where Tajima Yahei Sericulture Farm is located, adjacent to Honjo City and Fukaya City, both in Saitama Prefecture. Because the property is in close proximity to the prefectural boundary, the buffer zone was extended to include an area in Honjo City.

The area both in Isesaki City and Honjo City is specified as an Urbanization Control Area based on City Planning Act, and is designated as an "Agricultural Promotion Area" based on Act on Establishment of Agricultural Promotion Area where a protection policy for urbanization control and agricultural use is presumed.

**Development activity**

Development of a building or subsidiary structure over 15 meters in height or development activities over 1,000 square meters in area should be notified under the Landscape Plan and Landscape Ordinance of Isesaki City implemented in 2008. Further, the city schedules to strengthen the height restrictions to 10 meters and under for construction works of a buildings or structures in the buffer zone starting in April 2013.

Development activities in area of the Saitama side are controlled by requiring notification for construction of a building or structure over 10 meters in height or development activities over 200 square meters in area under the Landscape Plan and Landscape Ordinance of Saitama Prefecture.

**River improvement**

Tone-gawa River that runs north of the buffer zone is managed by the Minister of land, Infrastructure, Transportation and Tourism (MLIT). MLIT implemented a basic policy for river improvement in 2006, and is deliberately carrying out river safety improvement projects. There are no projects that may alter the landscape in the surrounding area of the property where a vast bank has been built.

**Others**

A coordinating committee for Tomioka Silk Mill and Related Sites has been established among the local governments. Through this committee Gunma Prefecture and Isesaki City cooperated with Saitama Prefecture, Honjo City to share information on development activities and to take cooperative actions.

### S3 Takayama-sha Sericulture School

The site is located on the riverside terrace in a small valley in rural area of Fujioka City. It is outside the city planning area and designated as an "Agricultural Promotion Area." Land use is controlled for the purpose of protecting farmlands.

**Development activity**

Fuijioka City is planning to implement a landscape plan and landscape ordinance in April 2013. Notification will be mandatory to development activities more than

a fixed size in height or in area. In the buffer zone, construction of a buildings or subsidiary structures will be controlled with a height restriction of 10 meters and under. With those regulations, any development activities that can give negative impact on the property will be prevented.

**River improvement**

The ten meter-wide Sanna-gawa River runs near the property, and bank protection work is being carried out as necessary. Regarding future river improvement projects, sufficient consultations and/or adjustments are to be made between the river administrator and related governmental organizations to ensure that they do not affect the preservation of the site.

On the riverbank next to the visitor parking, cutting of bamboo or trees, which is necessary to preserve the river, and embankment slope construction work for bank preservation, which takes into consideration the natural environment and landscape conservation, have been conducted.

### S4 Arafune Cold Storage

Arafune Cold Storage is surrounded by steep mountains on all sides. The property and surrounding area is mostly forest, and small scale farmlands and houses are located sparsely.

**Development activity**

Within the buffer zone around the site designated as a “Protection forest against erosion” and “Protection forest against draught” under the Forest Act, development activity is not permitted except for tree felling for the purpose of forest protection, such as periodic thinning. To the areas other than the Protection Forest, notification is required for development activities more than a fixed size in height or in area. Construction of a buildings or subsidiary structures will be controlled with a height restriction of 10 meters and under by Landscape Plan and Landscape ordinance of Shimonita Town. Therefore, any negative impact that will threaten the value of the property is controlled.

**Road works**

The Shimonita-Asashina Line managed by Gunma Prefecture leads to the Yashiki District where the property exists. The average road width is four meters. From the property to the Kozu Pasture,[1] the road width is about 2.5 meters and mainly used as a makeshift road for forest work. This road is designated as an important landscape public facility and future development will take into consideration effects on the surrounding landscape so as to be in harmony with roadside landscape.

1 The 350 ha ranch located about 2 km west of Arafune Cold Storage. Approximately 70,000 tourists a year visit the ranch

## (ii) Environmental pressures

### (ii)-1 Overall condition for all properties

Presently no environmental factors such as air pollution and climate change that can significantly reduce the value of the property and the buffer zone has been recognized.

However, in the future, air pollution including acid rain or climate change might cause decay or deterioration of buildings and other structures. Animals, uncontrolled plant growth or felling trees may cause damage to the buildings. Therefore, regular observations are carried out and appropriate preparations are done in order to respond properly according to the impact. The detailed condition of those preparations is described in chapter 6 of this document.

### (ii)-2 S4 Arafune Cold Storage

In Arafune Cold Storage, which makes use of the natural environment, the state of rocks stratum relating to the cold air flow system, the temperature of the cold air blowing out from the storage, the ambient temperature, as well as plant impact on the stone masonry have been regularly observed.

So far, no negative environmental impact has been confirmed. Investigations are continuously going on and proper measurements are taken when it is necessary to preserve the mechanism of the cold air flow.

## (iii) Natural disasters and risk preparedness

### (iii)-1 Overall condition for entire property

Although no huge natural disasters giving direct damage to the properties has been confirmed in the past, natural disasters such as water damage due to typhoon, heavy rain and flood, sediment disaster, fire hazard, earthquake, and volcanic hazard are considered as a possible threat in the area where the nominated property is located. Therefore, the following measures are implemented.

**Flood**

According to the preservation and management plan of the each property, proper drainage systems have been installed at the sites to reduce and prevent flood.
Gunma Prefecture measures precipitation at 41 stations and river water level at 59 stations, to obtain and share the right information quickly regarding the possible cause of flood. Those data and data from radar hyetometer of MLIT and information regarding to the rivers by the Foundation of River and Basin Integrated Communications are available through the internet as “Gunma Prefecture Water Level and Precipitation Information.[2]”

2 URL: http://www.uryou-gunma.jp/html/index.htm

**Sediment disaster**

For each property and slope adjacent to them, there is preparation for sediment disaster prevention by providing vegetation management and monitoring system as stated in the preservation and management plan.

Gunma Prefecture, along with Meteorological Observatory, has developed a system to identify and announce emergency warnings to the local municipalities that are in danger of sediment disaster by heavy rain. This information is available on the internet all the time as "Gunma Prefecture Sediment Disaster Alert and Danger Level Information[3]" to be used by local governments to consider issuing emergency evacuation instruction and other orders, or by residents to consider autonomous self-evacuation.

3 http://www.dosya-keikai-gunma.jp/

**Earthquake**

There has been little damage due to earthquakes originating in Gunma Prefecture. Even in the Great East Japan Earthquake of 2011, there was no damage that affected the cultural value of each property.

A fault zone extending over the border of Saitama and Gunma Prefecture border has been found as a possible cause of an earthquake that might impact the property, according to a report of the Headquarters of Earthquake Research Promotion in March 2005. However, this states that the possibility of an earthquake of M8 level occurring within 30 years is very low, at approximately 0 - 0.008%.

In addition, under the Disaster Countermeasures Basic Act, Gunma Prefecture Disaster Prevention Council announced the "Gunma Regional Disaster Prevention Plan." According to the plan, the prefecture, cities, towns, specified local governments and local public organizations shall all fully function and cooperate to work on disaster prevention, implementation of emergency countermeasures, and recovery plans. This way, the governments and organizations can establish the scheme to protect life, body, and property of the residents.

Following the Great East Japan Earthquake in 2011, the Japanese government reviewed the nation's disaster prevention plans. Following this, Gunma Prefecture and concerned cities and towns will also review their plans for each respective area, reinforce cooperation with related organizations, and promote countermeasures on disaster prevention and recovery plans.

**Volcanic hazard**

Neither property has been damaged by volcanic actions in the past.
The closest active volcano from the property is Mt. Asama-yama (altitude 2,568 meters) in western Gunma, located on the border of Gunma and Nagano Prefectures. There are records of volcanic ash having fallen in the vicinities of these properties in the great eruption of 1783.

The Mt. Asama-yama hazard map council, consisting of six towns and villages around Mt. Asama-yama, announced the hazard area map of Mt. Asama-yama volcano disaster in 2003.

According to the map, if a disaster as big as the eruption in 1783 were to occur, it is estimated that Arafune Cold Storage will be in the zone where 20 centimeters

or more of volcanic ash fall is expected, and Tomioka Silk Mill will be in the zone of that of 10 centimeters or more. Gunma Prefecture and the Meteorological Agency have installed such equipment as the seismometer and telescopic camera to observe volcanic activity. In addition, with cooperation of the relevant organizations, measurements of emission level of sulfur dioxide and crater temperature are done periodically. In this way an observation system has been fully developed.

**(iii)-2 Disaster countermeasures for each component**

According to the condition of each property, disaster countermeasures suited for the property have been implemented.

**S1 Tomioka Silk Mill**

**Flood, Sediment disaster**

Tomioka Silk Mill is located on top of a cliff by Kabura-gawa River which is designated a first-class river. In 1995, an adequate measure for landslide prevention of the cliff was undertaken as a preservation project of cultural properties. In January 2012, a lower section of the mortared slope outside the designated Historic Site, in an area not visible from the property, partially collapsed. Actions have already been taken to prevent further collapse. As a long-term measure, concerned authorities are discussing possible effects on the cultural value of the property. According to study results, appropriate preventive measures are to be taken.

**Earthquake**

Tomioka Silk Mill has never been greatly affected by earthquakes in the past. In order to study long-term measures for earthquake protection, in 2010, Tomioka City made a full-scale structure model of the wall of West Cocoon Warehouse and performed seismic experiments at the assumed level.

As a result, the present situation of the building turned out to meet the strength to resist such a scale of earthquake predicted in the “Gunma Prefecture Regional Disaster Prevention Plan.” The city is will reflect this result to improve earthquake countermeasures to protect its value as a cultural heritage property and security improvement for the visitors for mid and long terms, which have been studied and implemented. To begin with, in the fiscal year 2011, earthquake reinforcement work was done on the east cocoon warehouse as the first of seismic protection measures.

**Fire hazard**

The buildings of Tomioka Silk Mill, national cultural properties, are designated as structures requiring particular fire protection measures under the Fire Services Act. The silk mill buildings are wood frame structures prone to fire. Therefore, “the Tomioka Silk Mill Fire Protection Plan” was made in fiscal year 2006 and adequate countermeasures under the Fire Service Act are being implemented. They include:

- Appointment of Fire Warden

- Appointment of firefighting team on site
- Placement of automatic fire alarms
- Fire drills

In addition, the municipality fire service organization and community fire fighting team are organized. Thus, a fire protection and prevention scheme has been fully developed.

**Others**

The city created the “Regional Disaster Prevention Plan” in 2006 and decided on methods for protecting its cultural properties and the first actions to take after a disaster. The plan was reviewed in 2011-2012.


Measures for seismic protection at the east cocoon warehouse, an opening with two to three centimeters wide had appeared between the upper ends of brick masonry walls and the bottom of longitudinal beams due to contraction of joint mortar. For seismic reinforcement, the openings were filled with shrinkage-compensating mortar and thin brick walls on both sides of the central corridor were reinforced to prevent them from leaning.

Photo 4-2
Providing seismic protection

**S2 Tajima Yahei Sericulture Farm**

**Flood**

Tajima Yahei Sericulture Farm has been safe from flooding after completion of the present Tone-gawa River embankment in 1913.

The MLIT estimates flooding of Tone-gawa River at a probability level of “Once in 200 years” and delineates the flood area under the Flood Control Act. In the estimate, Sakai-shimamura district is in the area where 0.5-1.0 meter of flood is expected. Important buildings of Tajima Yahei Sericulture Farm are built on earth-mound foundations for protection from floods. Thus the impact will be alleviated even in case of great flood.

**Earthquake**

The site has never been damaged by earthquakes in the past. In order to utilize and protect its value as a cultural heritage property, an analysis is planned firstly to clarify the seismic resistance of each of the buildings for necessary countermeasures to be taken.

**Fire hazard**

Because the wood-frame buildings are living spaces of the property owner, sufficient attention is necessary for fire prevention. Therefore, the entire Historic Site is designated "Fire Prevention Management Area" and this is divided into two areas, "Fire Usage Limited Area" in the places used by the owner for daily living and the "Fire Usage Restricted Area" for all other areas. Isesaki City has equipped the site with fire extinguishers for early fire extinguishing and plans to install an automatic fire alarm system in the future. Fire drills with participants from Isesaki City, the fire station, property owner, and local residents are carried out in order to reinforce the fire prevention system and to raise fire-prevention awareness.

**S3 Takayama-sha Sericulture School**

**Flood**

The property on a high terrace had no record of flood damage even when Sannagawa River that flows southeast of the property flooded in the past. In the area near the property where visitor's parking is located, the "River Management Plan" will be made according to the principle to preserve the surrounding environment of Takayama-sha Sericulture School. Necessary countermeasures will be implemented.

**Sediment disaster**

The bamboo slope in the back of the property is specified as "Surrounding Preservation area." In the preservation and management plan, execution of a stability analysis of the site ground is planned and required measures are to be taken for sufficient protection of the property according to survey results.

**Earthquake**

Takayama-sha Sericulture School has no previous record of serious earthquake damage. In order to protect its value as a cultural heritage site and for its utilization, seismic examinations to clarify structural strengths according to the preservation and management plan are planned and appropriate measures will be taken based on the test results.

**Fire hazard**

The buildings are of wood frame and require sufficient protection against fires. Therefore, the use of fire in the Historic Site designated as a "Fire Prevention Management Area" is prohibited in principle and the main building and the *nagayamon* gate have been equipped with an automatic fire alarm system and fire extinguishers. Installation of such facilities as flair sensors around the site is planned.

A “Fire Fighting Plan” which deals with necessary things for fire prevention was made and stationed staff work on daily fire prevention management according to the plan appointing fire warden.

Fire drills are carried out at least once a year, with the cooperation of the local residents, community firefighting team, and nearby fire station. Permanent staff members are trained through the fire drill that includes guiding visitors in evacuation.

**Others**

Although damage by animals (bat and woodpecker) and insects (carpenter bee) to the property is small, bird netting and catchers (calling trap) have been installed in order to prevent further damage.

### S4 Arafune Cold Storage

**Sediment disaster and flood**

In 2010, the southern side of the stone wall of No.1 cold storage collapsed partially. Thorough close examinations were made and proper restoration work to return stones to their original positions is planned in order not to threaten the value of the property.

Sediment runoff due to rainwater is expected in the area around the administrative building. Therefore, piling up of sandbags is implemented as prevention measure.

**Earthquake**

Fixed-point observation of the stone wall is being undertaken, and the city will consider measures adequately consulting with professionals and relevant authorities in case of emergency.

**Others**

New young trees are immediately removed in order to protect the stone masonry of the cold storage from loosening or collapsing due to their roots. Vegetation management is strictly carried out for the purpose of keeping fallen trees from destroying the remains.

## (iv) Responsible visitation at World Heritage Sites

**(iv)-1 Overall condition**

Gunma Prefecture is located on the border between the Kanto plain around Tokyo and mountains with a height of around 2,000 meters, offering both traffic convenience and vast nature. It is about 100 kilometers from the Tokyo area to the Gunma Prefectural Hall in Maebashi. Directly connected to Tokyo by the bullet train as well as the Kan-etsu and Joshin-etsu Highways, Gunma is in a day-trip excursion area from the Tokyo metropolitan area. Therefore, the number of visitors to each of the properties is on the increase and due to growing interests related to World Heritage Site inscription, it can be highly expected that the number will further in-

crease in the future.

Gunma Prefecture and related municipal governments, in order to provide tourist information, have created internet web sites and pamphlets with information on and access to the sites; road signs and guide boards have been installed. Additionally, on-site staff and security guards are stationed for visitor safety and resources protection. Guide boards are to be placed on and around the sites and tourist guides will be trained to assist deeper understanding of the sites' values to visitors.

The related cities and town administrating the properties, will continue to investigate, examine and estimate the numbers, and prepare for the promotion and utilization plan reflecting on the result. Based on the survey result, methods for opening to the public, opening hours, areas and routes open for visitors along with appropriate measures for protection of the sites' values and visitor security are to be determined. Installation of crime-prevention alarm systems, arranging patrols and surveillance systems are customary made in accordance with the nature of the property.

**(iv)-2 Condition of each component**
**S1 Tomioka Silk Mill**

More than 250 thousand of people visit the mill yearly. As it is about a ten-minute ride by car from the Tomioka interchange on the Joshin-etsu Highway, most of the visitors come by car. Several parking lots are situated intentionally in a set distance from the property, to control the volume of traffic flowing into the surrounding area of Tomioka Silk Mill. Regarding public transportation, the mill is located in 15 minutes distance from Joshu-Tomioka Station of Joshin Dentetsu Railway which links to Takasaki Station. Signs leading from the station to the mill are provided by the city.

Public toilets and rest facilities of harmonizing design with the surrounding environment are developed in order to mitigate tourism pressures that may cause direct impact to the property.

Taking into consideration the safety of visitors and protection of the property, the area open to the public is limited and accessible only by guided tours; security guards are staffed around the site. The highest record of daily number of visitors is 3,000 up to now, due to growing interests in World Heritage Site inscription. Therefore, Tomioka City is currently seeking the best ways for control of visitor numbers, methods for tours by volunteer guides, and placement of security guards. Furthermore, in order to open the site to the public while protecting the property, the buildings will be restored one by one following the "Tomioka Silk Mill Promotion and Utilization Plan." Expansion of areas for public access and provision of visitor facilities are under consideration.

### S2 Tajima Yahei Sericulture Farm

Almost all visitors arrive by automobile and Isesaki City has provided a parking lot about 200 meters away from the site.

Since this is a private residence where the owner still resides, the property can only be viewed from the outside, as has been set in the preservation and management plan established with the participation of the property owner. Guide tours hosted by volunteers are available via reservation in advance.

About 40 people can be accepted at the site at once and there were 712 visitors in 2011.

In the area surrounding the property, there is a good number of historic modern silkworm farmhouses that were influenced by Tajima's architectural style still left and model tour routes have been set and offered. Because the number of visitors is on the rise due to growing interests in World Heritage inscription, Isesaki City provides an information booth and is planning further enhancement of the site including the areas surrounding the Tajima farm. Locations of visitor facilities that do match the environment will be set through discussion.

### S3 Takayama-sha Sericulture School

Almost all visitors arrive by automobile and Fujioka City has provided a small visitor parking lot.

Around 40 visitors can be accepted at once, and as a general rule, the premises and the lower floor of the main building are open to the public. The upper floor can be accessed only by reservation, to be guided by an on-site staff or volunteer guide.
The visitor number is increasing owing to growing interests in World Heritage inscription, and 1,783 people visited in 2011.

Fujioka City has established a preservation and management plan for the site and is now in the process of preparing a promotion and utilization policy of the property. Methods for arranging public access to the site and vicinities are being studied by a promotion and utilization committee composed of the municipality's concerned divisions. Accordingly, the committee is carefully examining the physical capacity of acceptable visitors inside the building and in the site. Visitor facilities including appropriate size and distance of parking are to be provided.

### S4 Arafune Cold Storage

Almost all visitors come to the site by automobile and Shimonita Town has provided a small visitor parking lot which is to be expanded in the fiscal year of 2012.

Although the total visitor numbers in 2011 was approximately 1,000, the number has risen to 1,100, only in the months of July to September.

20 people can be accepted at once. Because the site is located on a slope and is made of high stone masonry structures, it is difficult for a great number of visitors to enter. Additionally, for fear of the load of visitors walking on stone walls having negative effects on preservation, Shimonita Town limits visitors from observing the site from the tops of stone walls or cliffs. Since July 2012, on-site staff of the town municipality provides visitors guide to assure their safety.

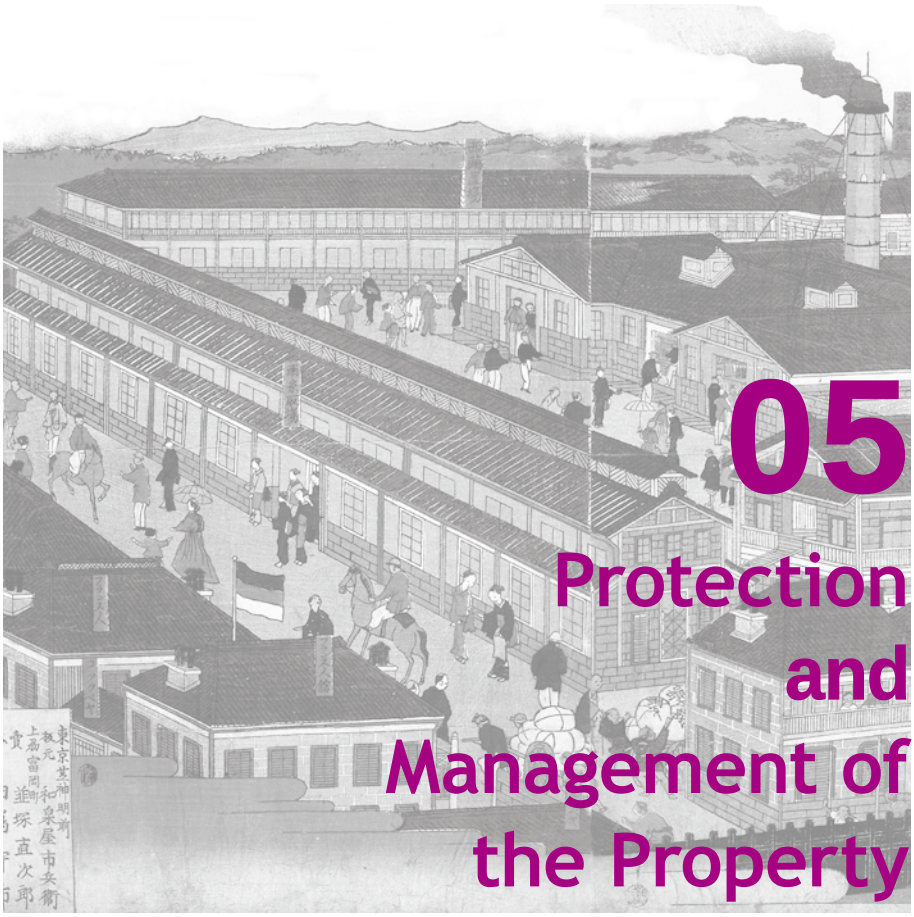
Presently, alternative methods for opening the site to the public including reserved tours and guided tours, according to the preservation and management plan of the property, are under consideration. The road leading to the site is narrow with many curves, the possibilities for access from Kozu Pasture two kilometers to the west of Arafune Cold Storage and arrangements for regional tours is being studied.

In addition, visitation in the winter season is limited at times in respect of safety due to snow and frost.

### (v) Number of inhabitants within the property and the buffer zone

Table4-1 Number of inhabitants within the property and buffer zone of each nominated component (as of Spring of 2012)

| No | Component Name | Population within the component | Population within the buffer zone | Total |
|---|---|---|---|---|
| S1 | Tomioka Silk Mill | 2 | 4,453 | 4,455 |
| S2 | Tajima Yahei Sericulture Farm | 3 | 616 | 619 |
| S3 | Takayama-sha Sericulture School | 0 | 53 | 53 |
| S4 | Arafune Cold Storage | 0 | 11 | 11 |
| | Total | 5 | 5,133 | 5,138 |



# 05

# Protection and Management of the Property

# 5. Protection and Management of the Property

## 5.a. Ownership

Location and ownership of four components are as follows:

Table 5-1 Property ownership

| No | Component name | Location | Owner |
|---|---|---|---|
| S1 | Tomioka Silk Mill | Tomioka City, Gunma Prefecture | Local government (Tomioka City) |
| S2 | Tajima Yahei Sericulture Farm | Isesaki City, Gunma Prefecture | Individual |
| S3 | Takayama-sha Sericulture School | Fujioka City, Gunma Prefecture | Local government (Fujioka City) |
| S4 | Arafune Cold Storage | Shimonita Town, Gunma Prefecture | Local government (Shimonita Town) |

## 5.b. Protective Designation

### (i) Designation status of the nominated property

Under the Law for the Protection of Cultural Properties established in 1950, all sites are designated as “Historic Site,” full preservation measures have been taken to the components. Furthermore, the main buildings of Tomioka Silk Mill have been designated as “Important Cultural Properties” under the law.
Cultural Property designation statuses for four components are as follows:

**S1 Tomioka Silk Mill**

July 14, 2005 The site was designated as a Historic Site under the name of “The former Tomioka Silk Mill”(Official Notice No.101 of Ministry of Education, Culture, Sports, Science and Technology)

November 1, 2005 Tomioka City was designated as the custodial body of the site (Official Notice No.26 of Agency for Cultural Affairs )

July 5, 2006 Seven buildings, two subsidiary structures and two added elements were designated as a National Important Cultural Property (Official Notice No.93 of Ministry of Education, Culture, Sports, Science and Technology )

**S2 Tajima Yahei Sericulture Farm**

September 19, 2012 The site was designated as a Historic Site under the name of “Tajima Yahei Sericulture Farm”(Official Notice No.145 of Ministry of Education, Culture, Sports, Science and Technology)

2013 Isesaki City shall be designated as the custodial body of the site

**S3 Takayama-sha Sericulture School**

July 23, 2009 The site was designated as a National Historic Site under the name of “The site of Takayama-sha” (Official Notice No.113 of Ministry of Education, Culture, Sports, Science and Technology)

September 16, 2009 Fujioka City was designated as the custodial body of the site. (Official Notice No.24 of Agency for Cultural Affairs )

September 19, 2012 An extension was added to the nationally designated Historic Site under the name of “The site of Takayama-sha”(Official Notice No.151 of Ministry of Education, Culture, Sports, Science and Technology)

**S4 Arafune Cold Storage**

February 22, 2010 The site was designated as a National Historic Site under the name of “Ruins of Arafune Cold Storage and Azumaya Cold Storage” (Official Notice No.12 of Ministry of Education, Culture, Sports, Science and Technology)

August 25, 2010 Shimonita Town was designated as the custodial body of the Arafune Cold Storage (Official Notice No.40 of Agency for Cultural Affairs )

## (ii) Policy to define a buffer zone

The policy to delineate the buffer zone is to identify an area where we need to prevent landscape factors from having negative impact that could become a threat to the value of the property. The buffer zone is delineated considering on the range of view to and from the property, and the range shall be defined in consideration of effects on the landscape.

The boundaries of a buffer zone are comprised of geographic characters such as ridge lines, landscape features, as well as administrative boundaries, land registration, roads, and the other recognizable boundaries. The following section describes the detail of the buffer zone for each component. The matters of delineation are further illustrated in Appendix 1-b as well as Appendix 7, Comprehensive Preservation and Management Plan (hear after the Management Plan.)

**S1 Tomioka Silk Mill**

The buffer zone is delineated to include the range necessary for protecting views from the property as well as views of the property. The townscape surrounding the mill is to be conserved and enhanced together with the nominated property.

The buffer zone to the north, west, and east sides of the property include the inner-city to protect an integral townscape. To the south, the residential area that spreads on the other side of Kabura-gawa River, essential for protection of the fine view from Tomioka Silk Mill is included.

The boundaries of the buffer zone are delineated according to roads, railways, or land use subdivisions.

**S2 Tajima Yahei Sericulture Farm**

The buffer zone includes the area in which the neighboring silkworm farm village and characteristic rural landscape are to be preserved as a whole.

The north, west, and east sides of the buffer zone includes the area forming a community composed of silkworm raising farmhouses. To the south, the rural landscape continuing into Honjo City, Saitama Prefecture have been included to protect a wider area around the Tajima farm.

The boundaries of the buffer zone are delineated by roads, river, municipal boundaries, or other administrative boundaries.

**S3 Takayama-sha Sericulture School**

The buffer zone includes elements constituting the surrounding environment, such as neighboring hills (bamboo forest), the Sanna-gawa River, wooded mountains, and Kozen-in temple that is closely associated with the Takayama family. The two viewpoints from Takayama-sha and Kozen-in temple were taken into full account in determining the boundaries.

Because Takayama-sha is located at the bottom of a valley, the buffer zone includes to the north and south the ridgelines that form a single rural landscape; to the east landscape visible from Kozen-in; and to the west the range visible from Takayama-sha including Kozen-in temple grounds. The actual boundaries of the buffer zone follows the ridgeline on the north, west, and south sides, while on the east side, the community boundary where there is a change in land use was considered.

**S4 Arafune Cold Storage**

The buffer zone will be delineated based on the range of view from site of the administrative building and includes the mountain ridgeline visible from the site.

On the north, west, and south sides, the buffer zone includes geographical features such as the valley, rock slopes, and surrounding forests, which are visible from the property. The east side includes the nearby rural community in addition to the distant forests, both visible from the property.

The boundary of the buffer zone is basically formed by ridgelines; where forestry planning areas have been designated to include the ridgeline, the boundary of such areas were considered.

## 5.c. Means of Implementing Protective Measures

### (i) Common means for the property

The properties are designated either as Historic Site or Nationally Designated Important Cultural Property. Therefore not only the buildings and subsidiary structures, but also sites including underground remaining ruins and the geographic features that have close relationship with the value of the property are strictly protected and preserved.

In the Law for the Protection of Cultural Properties, management of the cultural property is primarily implemented by owners, and local and national government give instruction, advice and support.

The owners of Tomioka Silk Mill, Takayama-sha Sericulture School, and Arafune Cold Storage are respective cities and a town, while Tajima Yahei Sericulture Farm is privately owned, which management is implemented by the owner together with Isesaki City, acting as a custodial body, defined by the Law for the Protection of Cultural Properties.

In case when one wishes to make an intervention to a designated property that could alter the current condition, prior approval by the commissioner for the Cultural Affairs is needed. The commissioner for Cultural Affairs consults such alteration requests to the appropriate subdivision working group of the Cultural Property Council appointed by the Agency for Cultural Affairs. Thus, permission is issued after academic and strict examination.

### (ii) Common means for buffer zone

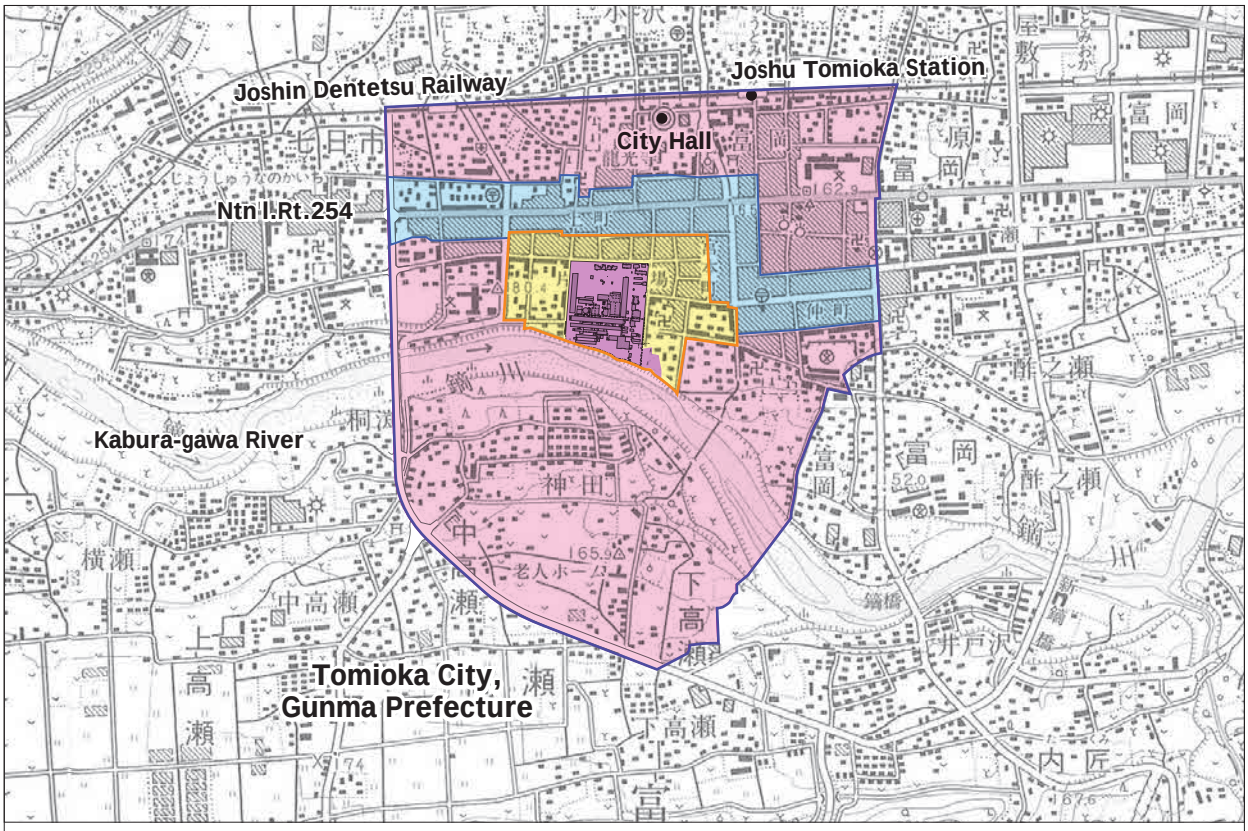
Within the buffer zone, the activities such as constructing buildings or structures, alteration of shape, size and character of land, cutting bamboo or trees are controlled by Law for the Protection of Cultural Properties, City Planning Act, Forest Act, Act on Establishment of Agricultural Promotion Areas, Landscape Act and other ordinances adopted by the concerned municipalities. Those activities are regulated and need either a permission or notification according to scale, style shape or structure (as for constructing buildings or structures, including its height and color of exterior wall). Relevant authorities give an instruction and advice in advance to avoid causing influence to the value of the property.

The Landscape Act is the one law out of those mentioned above that is used mainly as a law to regulate and to provide guidance the buffer zones of the four component properties. With the Landscape Act, any acts that need to be notified must be notified up to 30 days prior to getting started on the said act. Moreover, a system for consultations prior to the notifications is provided in landscape ordinances adopted by relevant cities and town. Project owners are supported to consult with local authorities for implementation of a project in line with landscape plan following the guidance.

The Comprehensive Preservation and Management Plan deals with the control of activities and its criteria in detail. For more detail, see Appendix 7.

Table 5-2 Outline of law, act, and ordinance for protection of the nominated property and respective buffer zone

| | | Component | | Buffer zone | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Law/regulation | | Law for the Protection of Cultural Properties | | Landscape Act and municipal ordinances | City Planning Act (Confirmation by Building Standard Act) | | Outdoor Advertisement Act Outdoor Advertisement Ordinance (Gunma Prefecture, Saitama Prefecture, and other municipalities) | Forest Act | Act on Establishment of Agricultural Promotion Areas |
| Scheme | | Nationally Designated Cultural Property | | Landscape planning area | Area division (Urbanization control Area ) | Land use zoning | Outdoor advertisement prohibited area | Protection Forest | Agricultural Promotion Area |
| | | Important Cultural Property | Historic Site | | | | | | |
| Component | S1 Tomioka Silk Mill | ○ | ○ | ○ | | ○ | ○ | | |
| | S2 Tajima Yahei Sericulture Farm | | ○ | ○ | ○ | | ○ | | ○ |
| | S3 Takayama-sha Sericulture School | | ○ | ○ | | | ○ | | |
| | S4 Arafune Cold Storage | | ○ | ○ | | | ○ | ○ | |
| Summary (purpose) | | Alternations of the existing state are regulated for the purpose of protecting cultural properties. | | Restrictions on certain activities for conservation and creation of sound landscape. | Restrictions on certain activities for urbanization control | Restrictions on certain activities for appropriate and rational land use | Restrictions on certain activities for the conservation of landscape and prevention of harm in public | Regulations on certain activities for not only conservation and creation of sound natural environments, but also maintenance and improvement of the various functions of forests | Restrictions on non-agricultural activities are set to promote sound development of agriculture |
| Restriction on architectural actions etc. | | Any person who intends to newly construct or remodel a building, to erect or remove a structure, to change the land configuration or to cut trees or bamboo shall obtain prior permission before he/she starts the action. | | Any person who intends to newly construct enlarge, remodel, or remove a building or a structure, to repair, redesign, or change the color of the exterior appearance shall submit prior notification before he/she starts the action. | Building activity shall prohibited in urbanization control area . | Restrictions and guidance on building-coverage ratio, floor-area ratio, building height etc | Restrictions and guidance on prohibited advertisement and its area. | Any person who intends to cut standing trees or to change the land configuration shall obtain prior permission before he/she stars the action. | Any person who intends to develop the Agricultural Land for other purposes shall obtain a prior permission before he / she starts the action. |
| Procedure required | | Permission | Permission | Notification | Permission/Confirmation | Confirmation | Permission | Permission/Notification | Permission |
| Penalty | | Imprisonment with/ without labor or fine | | Imprisonment with labor or fine | Imprisonment with labor or fine | Imprisonment with labor or fine | Fine | Fine | Imprisonment with labor or fine |




Component

Bufferzone

SCALE 1:20,000
0 200 400 1,000m

Landscape Planning Area Specified by Tomioka City Landscape Ordinance

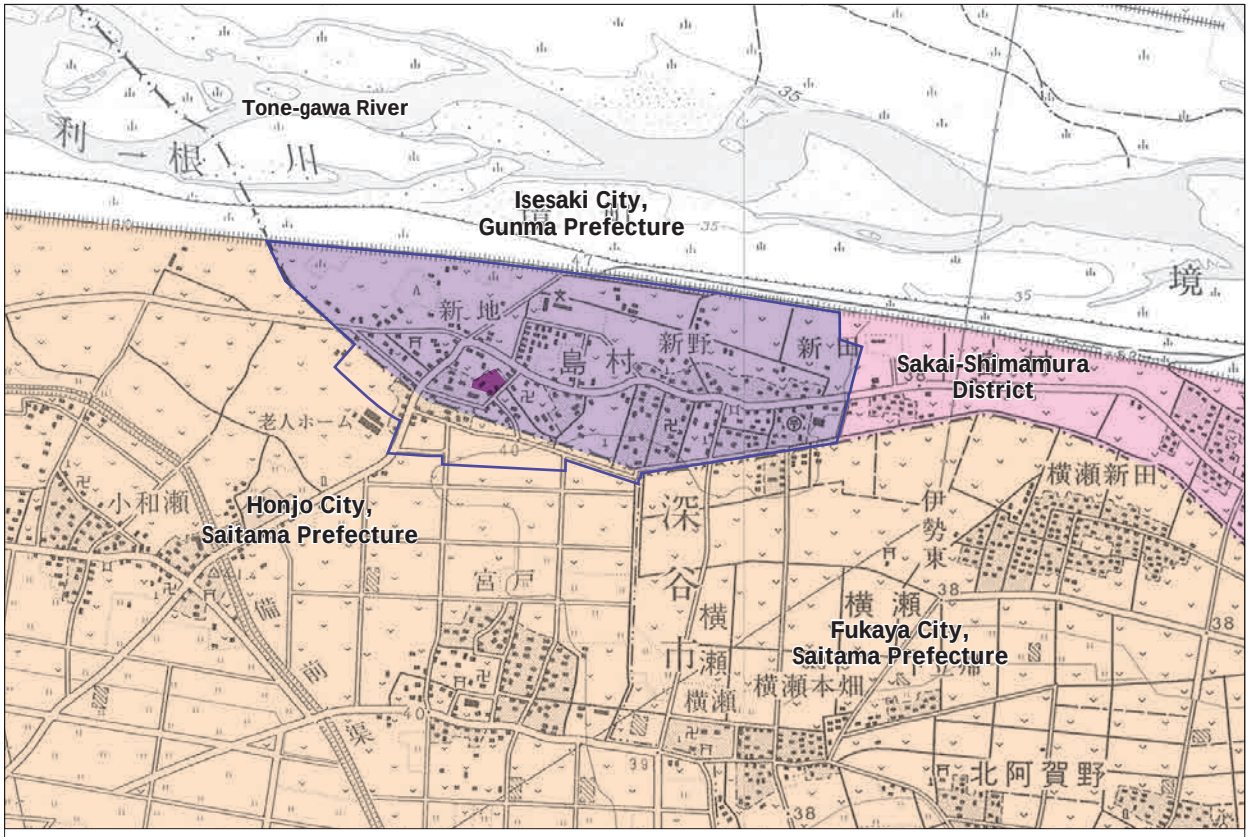
Historical and Cultural Landscape Preservation Zone
1. 12m height restriction
2. color regulation
3. design control of ridge lines and eaves

Townscape along Historic Main Street Promotion Zone
1. 14m height restriction
2. color regulation
3. communal design concept guidance

Historical and Cultural Landscape Harmonization Zone
1. 14m height restriction
2. color regulation

* Entire Tomioka City except for the Specified Landscape Planning Area, indicated above is generally regulated by the Ordinance:
1. 20m height restriction
2. color regulation
3. encouraging harmonization with mountain ridge and skyline.

Figure 5-1 Map Indicating the Zones of Legal Protection and Regulations of S1 Tomioka Silk Mill




Component

Bufferzone

SCALE 1:20,000
0 200 400 1,000m

Isesaki City Landscape Ordinance

Sakai-shimamura Specified Landscape Planning Area (scheduled in April 2013)
1.10m height regulation
2.color regulation

Restricted Core Area Concerning Landscape with History and Culture
1.harmonization of area landscape
2.color guideline for harmonizing core elements

* Entire Isesaki City except for the two areas above, is generally regulated by the Isesaki City Landscape Ordinance:
encouraging harmonization with surroundings such as shape, color or other design features of a building or structure and outdoor advertisement.

Saitama Prefecture Landscape Ordinance: Specific Issue Response Area**

Areas along Expressways outside the Metropolitan Intercity Expressway Network
1.color regulation

* *The area is defined to conserve rural landscape facing to development pressure by the nearest highway.

Figure 5-2 Map Indicating the Zones of Legal Protection and Regulations of S2 Tajima Yahei Sericulture Farm (Landscape Act)

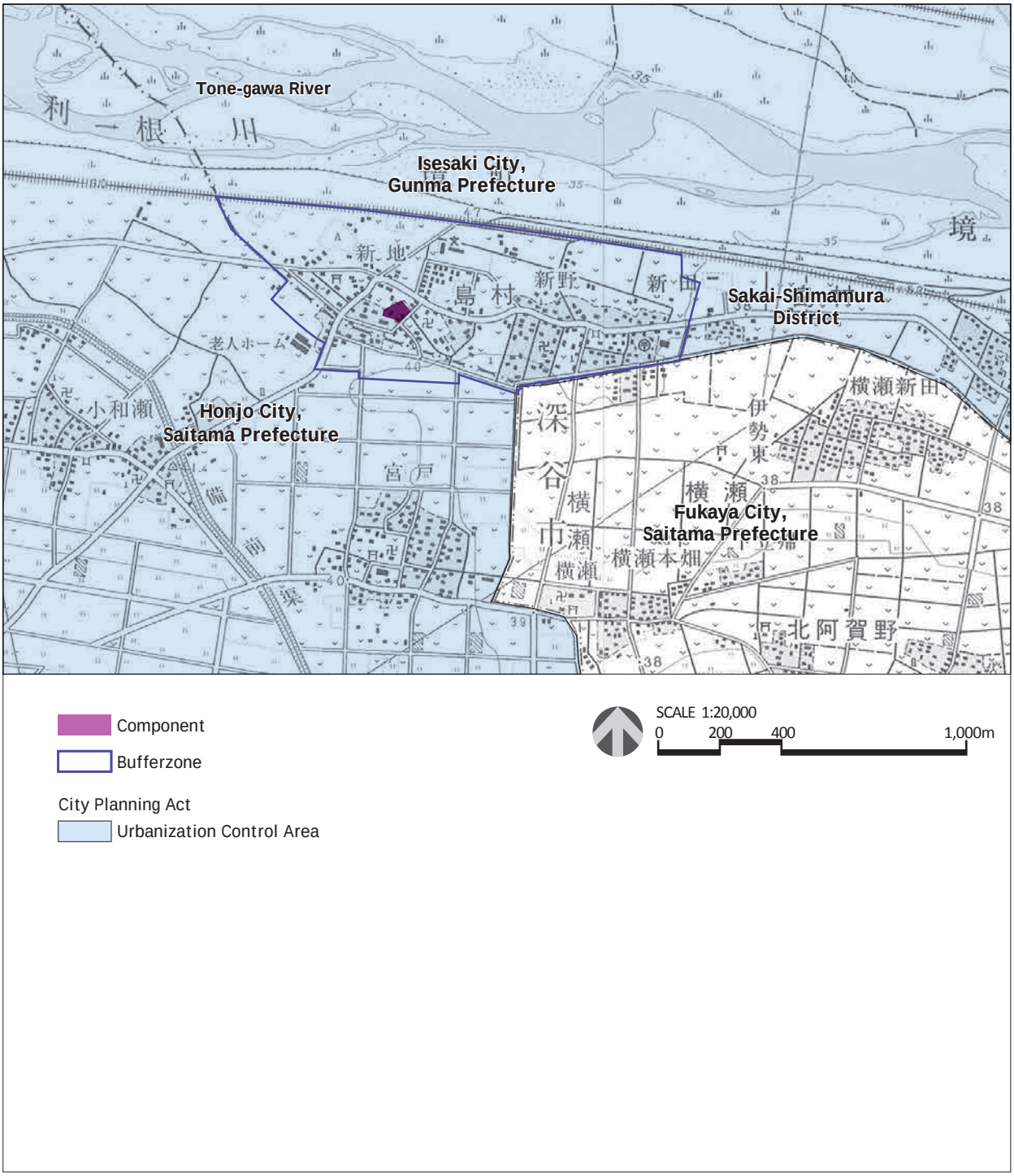



Figure 5-3 Map Indicating the Zones of Legal Protection and Regulations of S2 Tajima Yahei Sericulture Farm (City Planning Act)

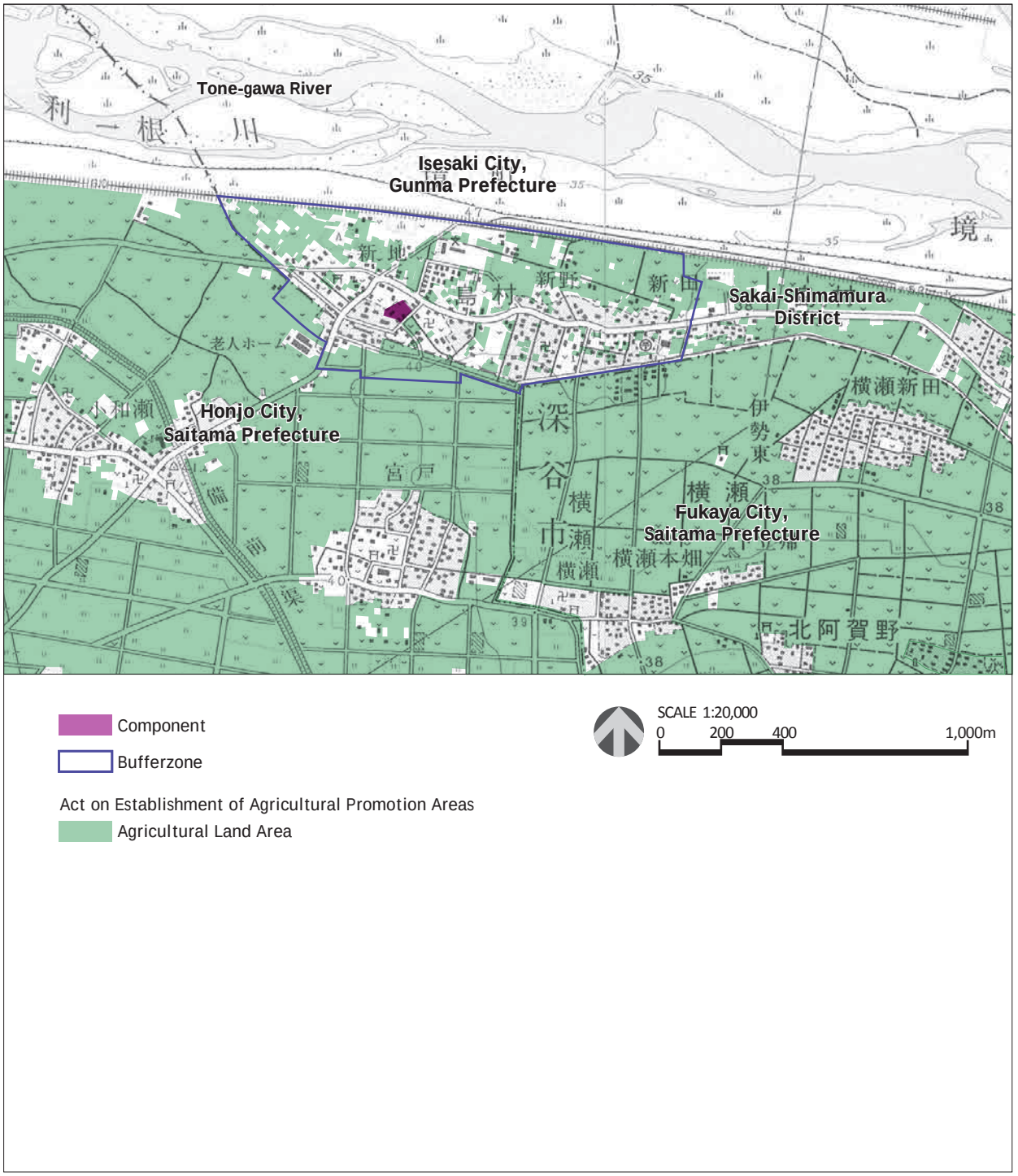



Figure 5-4 Map Indicating the Zones of Legal Protection and Regulations of S2 Tajima Yahei Sericulture Farm
( Act on Establishment of Agricultural Promotion Areas)

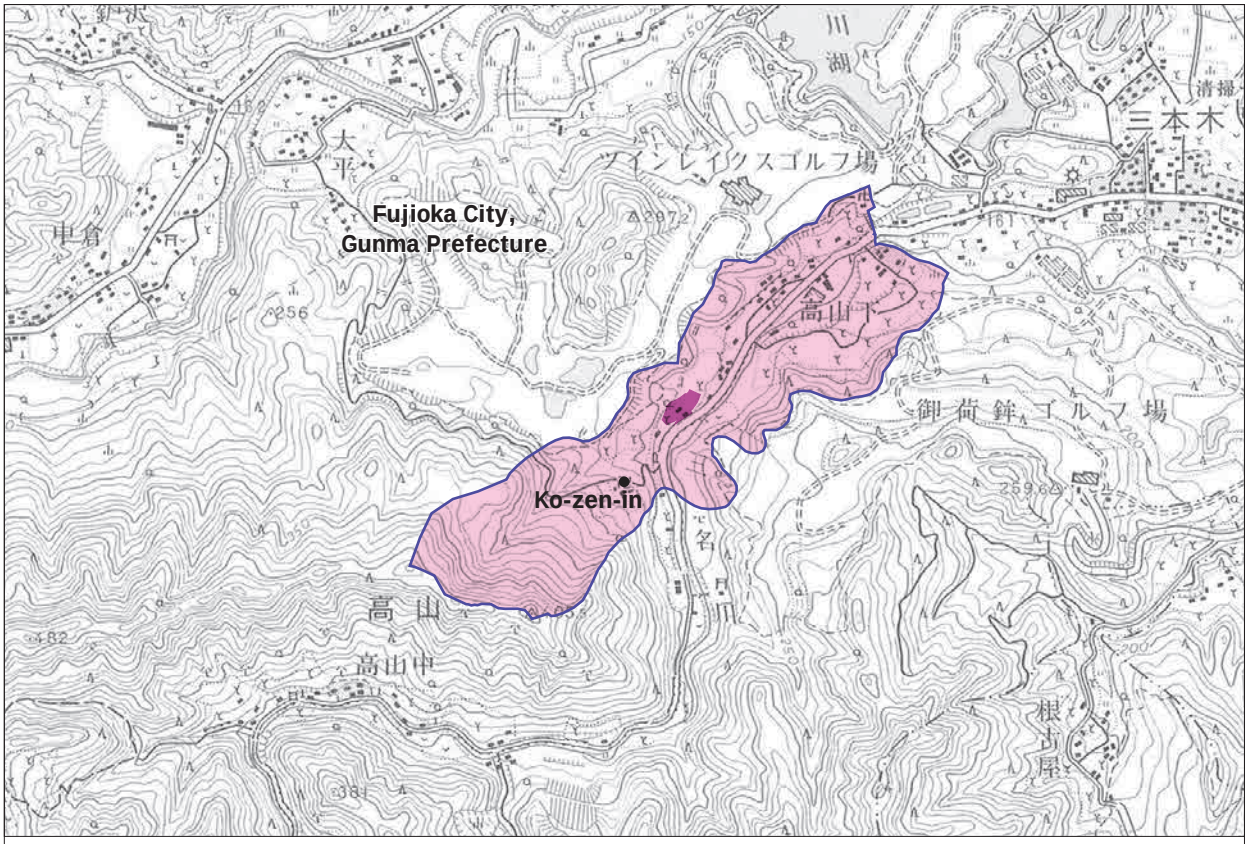
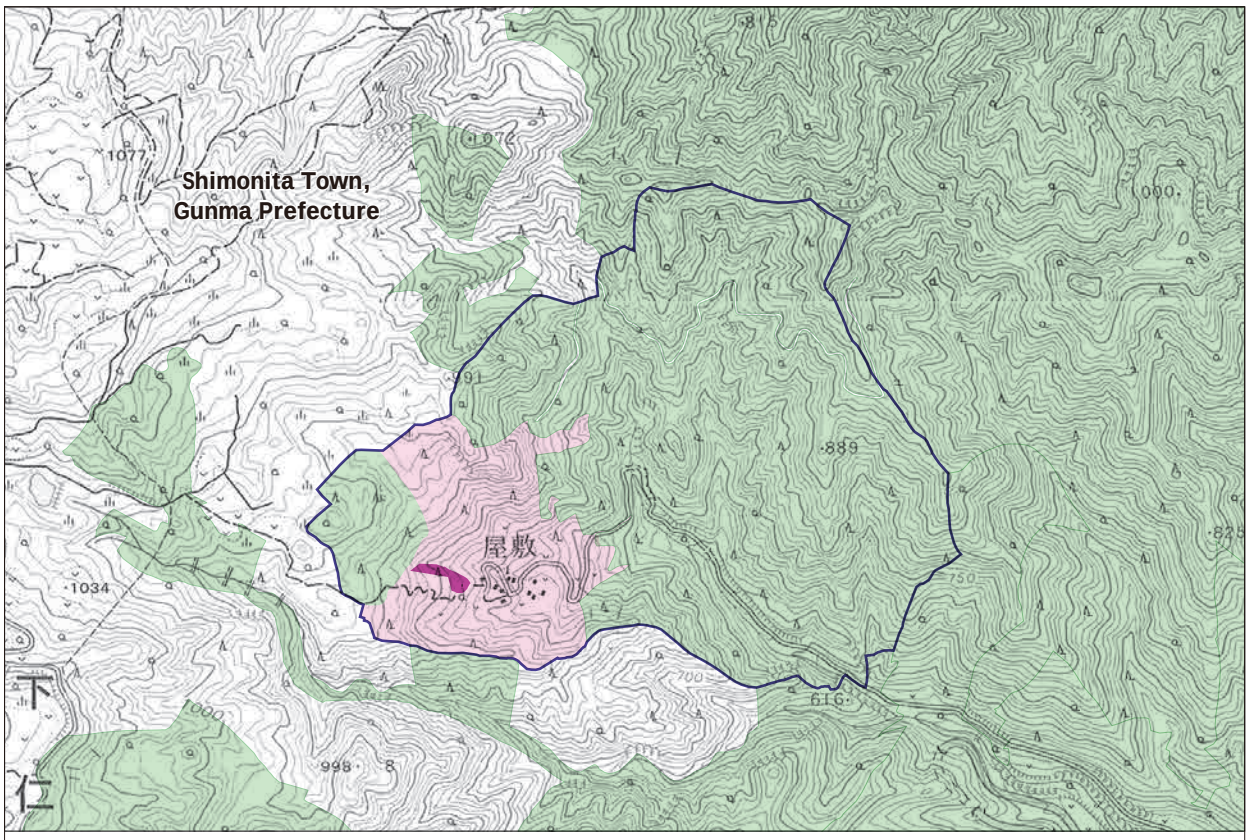



Figure 5-5 Map Indicating the Zones of Legal Protection and Regulations of S3 Takayama-sha Sericulture School




Component

Bufferzone

SCALE 1:20,000
0 200 400 1,000m

Shimonita Town Landscape Ordinance

Specified Landscape Planning Area around Arafune Cold Storage

1. 10m height regulation
2. color regulation
3. consideration of building materials

* Entire Shimonita Town except for the Specified Landscape Planning Area, indicated above is generally regulated by the Shimonita Town Landscape Ordinance :

1. height consideration to harmonize with the surroundings
2. color regulation
3. encouraging harmonization with mountain ridge and skyline.

Forest Act

Protection Forest

1. regulation of cutting trees
2. regulation of mining and land reclamation
3. regulation of collecting fallen leaves

Figure 5-6 Map Indicating the Zones of Legal Protection and Regulations of S4 Arafune Cold Storage

**COLUMN**

**<<"Preservation and management plan" and "enhancement and promotion plan" of cultural properties in Japan>>**

In Japan, when a site becomes designated as a national cultural property, it is required to establish a plan for appropriately preserving and managing the property. Daily maintenance and protection measures are to follow this plan. Particularly regarding actions to alter the present state, restrictions are clearly stated. Additionally, the basic concept for enhancement and promotion are set by this plan.

In the next step, it is suggested to create plans for enhancement and promotion of the property, so that the value of the cultural property would be protected and at the same time be well understood. Such projects as large-scale restoration or arrangement of visitor facilities are first considered according to this plan. They can be executed only after having gone through detailed reviews and receiving permission from the Agency for Cultural Affairs.

Abstracts of the "preservation and management plan" for each of the four components are attached in Appendix 7 (Comprehensive preservation and management plan).

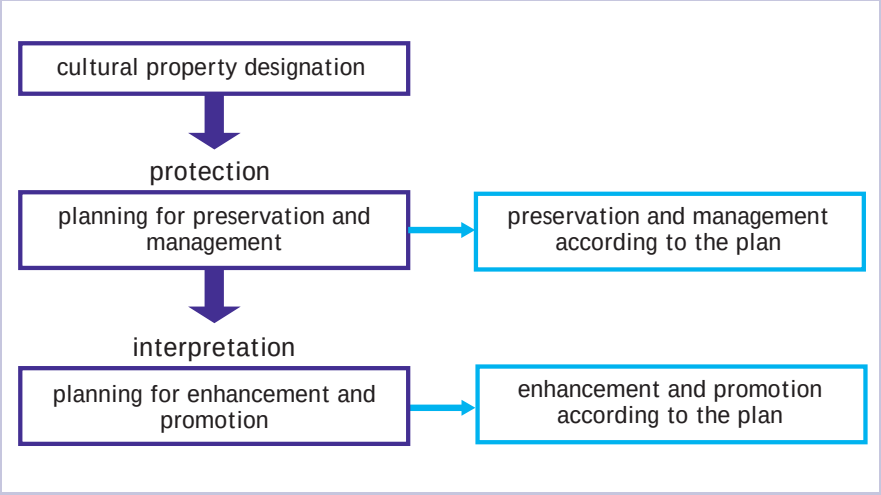



Figure 5-7 Flow chart for protection and utilization of cultural properties

## 5.d. Existing Plans Related to Municipality and Region in which the Proposed Property is Located

### (i) Regional plans (Prefecture)

1. *Gunmaken Sogokeikaku* [Gunma Prefecture Comprehensive Plan] (Fiscal 2011 – fiscal 2015)

i) Scope

Gunma Prefecture

ii) Main objectives

It describes goals/direction of the measures which the prefecture will implement in the next five years.

iii) Issues regarding the nominated property

"Finding local resources and increasing their value to promote and utilize effectively" is one of the actions constituting the priority project, and preservation and utilization of local heritage related to the silk industry are described in this item.

Moreover, creating a network between the components of "Tomioka Silk Mill and Related Sites" and other heritage in various locations in the prefecture is planned as a part of "Building a local bond through culture." In this way, area development by prevention and utilization will be promoted.

2. *Gunmaken Kankyô Kihon Keikaku* [Gunma Prefecture Basic Environment Plan] , (Fiscal 2011 – fiscal 2015)

i) Scope

Gunma Prefecture

ii) Main objectives

The plan contains policies which aim to promote preservation of the great natural and cultural environment in Gunma Prefecture and creating a comfortable life environment.

iii) Issues regarding the nominated property

"Creating a beautiful region offering affluent and peaceful life" is a future vision, and preserving the prefecture's numerous cultural properties with historical values, historical town landscape and natural environment are in its scope of issue.

3. *Habatake Gunma Kendo Seibi Puran* [Gunma Prefecture Infrastructure Master Plan] (Fiscal 2008 – fiscal 2017)

i) Scope

Gunma Prefecture

ii) Main objectives

The basic plan regarding infrastructure development in Gunma Prefecture

iii) Issues regarding the nominated property

In order to promote the local resources which the people of Gunma can pride themselves with in the world, it describes burying electric lines and cables along roads near Tomioka Silk Mill underground, improving pedestrian space, and other measures to make the property more attractive including road maintenance which leads to each component of the property.

3-1. *Habatake Gunma Kendo Seibi Kanra and Tomioka Chiki Plan* [Gunma Prefecture Infrastructure Master Plan, Kanra and Tomioka Regional Plan ] (Fiscal 2008 – fiscal 2017)

i) Scope

Tomioka City and Shimonita Town, et al.

ii) Main objectives

The plan is based on above mentioned "Gunma Prefecture Infrastructure Master Plan." Projects, aimed to solve individual problems in the Kanra and the Tomioka area are described.

iii) Issues regarding the nominated property

As one of the priority projects, development of a lively area around Tomioka Silk Mill is described. Enhancing the functions as a tourist base, coordination with nearby tourism facilities, improvement of how local information is offered to visitors and others are planned.

4. *Toshikeikakukuiki no Seibi Kaihatsu Hozen no Hoshin* [Prefectural Master Plan for Each City Planning Area in Gunma]

1) *Tomioka Toshikeikaku Toshikeikakukuiki no Seibi Kaihatsu Hozen no Hoshin* [Policy for Improvement, Development and Conservation in the City Planning Area, Tomioka City Planning] (Fiscal 2009 – fiscal 2015)

i) Scope

City Planning Area in Tomioka City

ii) Main objectives

It aims at defining basic policies such as development the urban area, improvement of public facilities and preservation of natural environments.

iii) Issues regarding the nominated property

Creating good life environment by preserving historical/cultural resources such as Tomioka Silk Mill, promoting tourism and developing a lively city is described as one of the goals.

2) *Isesaki Toshikeikaku Toshikeikakukuiki no Seibi Kaihatsu Hozen no Hoshin* [Policy for Improvement, Development and Conservation in the City Planning Area, Isesaki City Planning] (Fiscal 2009 – fiscal 2015)

i) Scope

City Planning Area in Isesaki City

ii) Main objectives

It aims at defining basic policies such as development the urban area, improvement of public facilities and preservation of natural environments.

iii) Issues regarding the nominated property

Sakai-shimamura area, where the Tajima Yahei Sericulture Farm is located, is designated as "urbanization control area" and development except buildings for agriculture, forestry and fishery is not permitted generally under the policy of controlling urbanization.

The areas such as Agricultural Land within Agricultural Promotion Area where land improvement projects are implemented are going to be positively preserved as good agricultural production area.

### (ii) Municipal plans (Cities and Towns)

**S1 Tomioka Silk Mill**

1. *Tomioka-shi Sogo Keikaku* [Tomioka City Comprehensive Plan] (Fiscal 2008 – fiscal 2015)

i) Scope

Tomioka City

ii) Main objectives

Goals and measures which the city aims at are described in a planned and comprehensive way.

iii) Issues regarding the nominated property

"Community development centering Tomioka Silk Mill" is proposed as one of the basic principles.

Major policies (related to Tomioka Silk Mill)

- City infrastructure to improve liveliness and convenience of the city.
  (Development of the area around Tomioka Silk Mill)
- Creating rich landscape by utilizing the local resources
  (Creation of distinctive Tomioka City like landscape)
- Appealing tourism promotion by utilizing the rich resources such as Tomioka Silk Mill
  (Improvement of tourism appeal/building tourism network)
- Creating a historical and cultural city with resources like Tomioka Silk Mill
  (Preserving and utilizing of history/cultural resources)

2. *Tomiokashi Toshikeikaku Masuta Puran* [Tomioka City City Planning Master Plan] (Fiscal 2009 – fiscal2028)

i) Scope

City Planning Area in Tomioka City

ii) Main objectives

While maintaining compatibility with Tomioka City Comprehensive Plan, it shows the policy of developing the city planning area in a long and comprehensive way.

iii) Issues regarding the nominated property

The range of environment and landscape around Tomioka Silk Mill, which need to be properly protected and preserved, and the way it should be are described.

Major policies

- Setting an unique place of exchange with Tomioka Silk Mill at its center.
- Preservation and utilization of historical and cultural resources such as Tomioka Silk Mill

3. *Tomiokashi Machizukuri Keikaku* ["Tomioka City Machizukuri - development and revitalization - Plan" ]
(medium term: Fiscal 2011 – fiscal 2015, long term: 2016 and after)

i) Scope

Downtown of Tomioka City

ii) Main objectives

It describes measures for projects to carry out sustainable development of the community by utilizing local resources in the downtown of Tomioka City.

iii) Issues regarding the nominated property

Taking into consideration future inscription of Tomioka Silk Mill as a World Heritage Site, the basic policy for the community development, which is suitable as a buffer zone, is described.

Plan outline

- Promotion of a road plan which comprises excursion routes and controls the traffic amount toward the city center where Tomioka Silk Mill is located.
- Promotion the development of natural and historical landscapes.
- Preservation and utilization of historical buildings
- Promotion of measures for disaster prevention and infrastructure development suitable for the local culture and the community.

**S2 Tajima Yahei Sericulture Farm**

1. *Isesakishi Sogo Keikaku* [Isesaki City Comprehensive Plan](Fiscal 2007 – fiscal 2014)

i) Scope

Isesaki City

ii) Main objectives

It shows the most fundamental plan for new phase of community development of Isesaki City.

iii) Issues regarding the nominated property

Concerning protection of cultural properties and forming good landscapes, the following strategies are described.

Major basic policies

- Developing creative personnel and local history
 (lifelong learning promotion, protection and utilization of cultural properties)
- Creating infrastructure for citizens' comfortable life
 (Proper land use and formation of sound landscape)
- Developing prosperous industries and a lively community
 (Succession and creation of culture, promotion of attractive tourism)

2. *Isesakishi Toshikeikaku Masuta Puran* [Isesaki City City Planning Master Plan](Fiscal 2008 – fiscal 2027)

i) Scope

Isesaki City

ii) Main objectives

Based on the Isesaki City Comprehensive Plan, visions and policies regarding the development of city on which citizens, business operators and the ad-

ministration should work are described.

iii) Issues regarding the nominated property

The southern area of Isesaki City, where the Tajima Yahei Sericulture Farm is, provides the policy for the development of a community where prosperous industry and history/culture harmonize.

By re-recognizing the values of the area having a rare historical village with big sericulture farm houses and landscape, the city aims to be selected as the "Important Preservation District for Groups of Historic Buildings" and carry out preservation and utilization.

**S3 Takayama-sha Sericulture School**

1. *Fujiokashi Sogo Keikaku* [Fujioka City Comprehensive Plan (the forth)] (Fiscal 2008 – fiscal 2017)

i) Scope

Fujioka City

ii) Main objectives

It shows the fundamental concept of the community development in Fujioka City, and the priority polices and the direction of measures and projects are described.

iii) Issues regarding the nominated property

Regarding the Takayama-sha Sericulture School, policies of preserving historical landscape and the protection and utilization of cultural properties and historic site are described.

Structure of related major policies

- Improvement of life environment based on the characteristic of the district
  Developing a community in harmony with surroundings
  (formation of landscape/preservation of historical landscape)
- Capacity building for local communities
  Developing a community with a sense of culture
  (protection and utilization of cultural property and historical remains)

**S4 Arafune Cold Storage**

1. *Shimonitamachi Sogo Keikaku* [Shimonita Town Comprehensive Plan (the forth)] (Fiscal 2007 – fiscal 2016)

i) Scope

Shimonita Town

ii) Main objectives

The basic concept for comprehensive and systematic administration of Shimonita town is described.

iii) Issues regarding the nominated property

Measures related to the Arafune Cold Storage are described, intended to create a better landscape and promote local culture.

Major basic policies

- Developing a community surrounded by beautiful nature where people can live a safe and comfortable life
(promotion of environment preservation and nicer landscape)
- Developing a community where people can learn from local culture and grow kind heart and rich imagination
(promotion of local culture)

## 5.e. Property Management Plan or Other Management System

Gunma Prefecture, Tomioka City, Isesaki City, and Shimonita Town under full co-ordination developed Comprehensive Preservation and Management Plan for the nominated property comprised of four components that is shown in the Appendix 7-a of this nomination dossier.

Moreover, daily management for these components, all of which are designated as Historic Site and/or Important Cultural Property, are in compliance with each preservation and management plan drawn up by relevant municipalities. [Appendix 7-b]

A coordinating committee of these plans has been established centered on the governing bodies of the prefecture, cities, and town and appropriate collaborative efforts are being made in site protection and management of the property as a whole.

### (i) Basic principles of the Management Plan

**1) Basic approach**

Tomioka Silk Mill and Related Sites comprise a singular technological ensemble designed for raw silk production - that developed in close cooperation depicting international interchange and technological innovation of sericulture and silk-reeling.

In order to sustain the outstanding universal value of Tomioka Silk Mill and Related Sites adequately, it is necessary to prepare a comprehensive and practical management that honors a harmony with local communities and surrounding environment, while ensuring compatibilitiy with various plans, regulations, and administrative policies.

The most appropriate measures are to be examined. Moreover, it is important that the management of the property as a single unit must be an overall management direction.

The preservation and management of each component based on the respective preservation and management plan based on the Law for the Protection of Cultural Properties. In addition, it is presupposed that the conservation conducts for the nominated property meets codes of conducts accepted as a World Heritage.

Legal protection for property surroundings is ensured not by a single law but by employing numbers of existing laws and ordinances simultaneously.

In light of the above, following basic principles are implemented, and concrete principles and measures are established accordingly.

**2) Basic principles**

To protect the outstanding universal value of Tomioka Silk Mill and Related Sites, a sustainable preservation and management program for each of the components

is indispensable. Gunma Prefecture and respective municipalities in which the components are located are to be in charge of appropriate preservation and management of the properties under the guidance of the Agency for Cultural Affairs in cooperation with local residents.

Preservation and management will follow the following six basic principles:

1. Appropriate preservation and management for sustaining the outstanding universal value of the nominated property
Practical management measures are to be implemented in order to ensure and pass on the outstanding universal value of Tomioka Silk Mill and Related Sites.

2. Comprehensive preservation including surroundings
For the purpose of effective protection of outstanding universal value of the nominated property, comprehensive preservation including its surroundings is essential. Buffer zones of adequate size are to be set out for this purpose, and their appropriate preservation are to be carried out.

3. Advancement of presentation and promotion
To promote an integral understanding of the outstanding universal value that the nominated property has, suitable enhancement of the nominated property is offered through volunteer guide tours or recommended visitors' routes.

4. Establishment and operation of effective management system
Effective management system through collaboration and cooperation is to be implemented by all relevant organizations including relevant governmental authorities, centering on the Coordinating Committee for Tomioka Silk Mill and Related Sites.

5. Implementation of monitoring
Management organizations of the property are to monitor factors that may possibly diminish the outstanding universal value by setting indicators for continuous observation.

6. Collaborating with "Gunma Silk Heritage Network"
"Gunma Silk Heritage Network" has been created to protect and promote a large number of tangible and intangible cultural properties still existing in Gunma Prefecture. To raise awareness and understanding of such cultural properties, the network was established to invigorate their cultural value through education, communication, and public affairs. The site to be nominated for World Heritage inscription should play a representative role among these properties.

### (ii) System for preservation and management

"Coordinating Committee for Tomioka Silk Mill and Related Sites" was established by Gunma Prefecture, Tomioka City, Isesaki City, Fujioka City and Shimonita Town. Under the cooperation of the Agency for Cultural Affairs, the Committee fully responds to matters such as preservation and management of the components and surrounding environment, adjustment and discussion regarding preservation measures, appropriate instructions/advice toward developers based on their authority and proper implementation of Comprehensive Preservation and Management Plan.

Concerned authorities pertaining to the committee and their detailed roles, and the organizational frameworks of the municipalities for each component are described in Comprehensive Preservation and Management Plan attached to see Appendix 7.

As described in 5.i. of this document, many private organizations and resident organizations have carried out actions actively in regard to preservation and interpretation so far. Therefore, cooperation and collaboration with these organizations is also planned. This is an effective way of preserving and managing the components and the buffer zone.

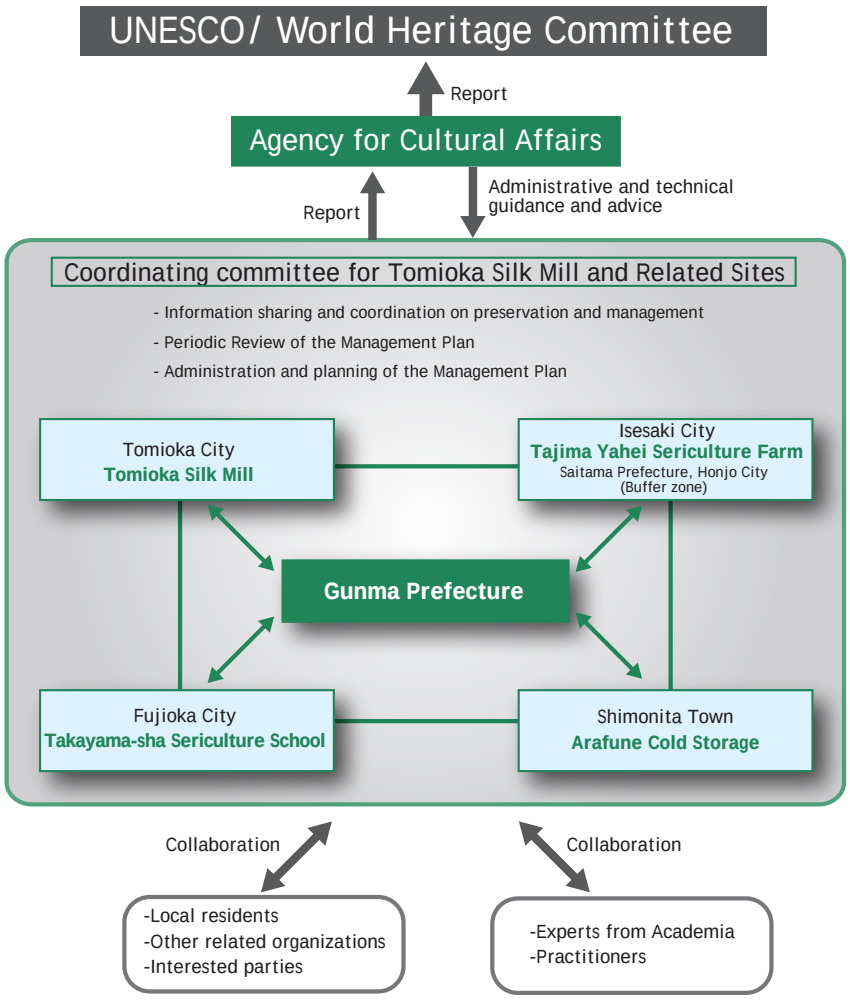



Figure 5-8
Management system of Tomioka Silk Mill and Related Sites

## 5.f. Sources and Levels of Finance

In the Law for the Protection of Cultural Properties, management of the cultural property is primarily implemented by owners and designated custodial bodies. The National Government provides 50% - 80% of the costs for the conservation of Nationally Designated Important Cultural Properties, or the exploration, rehabilitation and enhancement including archaeological excavation within a site of a Nationally Designated Historic Sites, upon necessity. For cases installing disaster prevention facilities, the National Government provides a subsidy of similar ratio to those described above.

For the nominated property, Gunma Prefecture provides 50% subsidy to the balance of the above costs after the subsidy by the National Government. When the municipalities are the owner of the components appropriate fund shall be allocated annually for that purpose. While the component with private ownership is received an additional subsidy from the municipalities.

It is a matter of consideration that apart from these subsidies, Gunma Prefecture and the custodial bodies of the components i.e. Isesaki City, Fujioka City, Tomioka City, Shimonita Town might efficient use of other public support schemes to preserve, manage and promote the properties and buffer zones.

In addition, it has been established that a half of the entrance fee goes to “Tomioka Silk Mill Fund.” The fund will be used to implement projects in regard to preservation and presentation.

Table 5-3 Conservation cost (unit 1,000 yen)

| Object / Year (fiscal) | Fiscal 2010 | Fiscal 2011 | Fiscal 2012 |
|---|---|---|---|
| Site protection | 99,327 | 79,398 | 87,505 |
| Building protection | 98,324 | 109,593 | 92,227 |
| Visitors’ facility and promotion | 142,125 | 53,714 | 85,964 |
| Management | 66,519 | 72,740 | 87,851 |
| Total | 406,295 | 315,445 | 353,547 |

## 5.g. Sources of Expertise and Training in Conservation and Management Techniques

The owners or the designated custodial bodies for the components, i.e. the municipalities, are assuming preservation and management appropriately.
Gunma Prefecture, and Gunma Prefecture Board of Education provide technical assistance to the municipalities, which implement activities for preservation, management and necessary research as custodial bodies. Moreover, Gunma Prefectural Archives, Gunma Prefectural Museum of History, Sericulture Promotion Foundation, and Gunma Archeological Research Foundation have experts and engineers of preservation and management of cultural property, and provide technical assistance in their respective fields to the custodial bodies. Gunma Prefecture Board of Education, Gunma Prefectural Archives, and Gunma Archeological Research Foundation offer periodical lectures and training opportunities for the staffs of municipalities.

Agency for Cultural Affairs and National Institutes for Cultural Heritage conducts trainings regularly to improve the expertise of the specialists in the local government bodies as well as to assist the implementation of the management enhancement projects for Nationally Designated Historic Sites. Gunma Prefecture and local government officers also attend this training opportunity to improve the state of preservation and enhancement.

To preserve a National Important Cultural Property and Historic Site, in case of rehabilitation or restoration, prior approval by the commissioner for the Cultural Affairs is needed. In such process, the Agency for Cultural Affairs provides technical assistance to the rehabilitation or restoration of Nationally Designated Important Properties and Nationally Designated Historic Sites. Thus, the management level is maintained at a high standard.

Cultural property protection instructors (a.k.a. cultural property patrols) established by Gunma Prefecture Board of Education not only provide regular inspection of physical conservation state, but also instruct and advise owners and stakeholders for the purpose of disseminating philosophical aspect of conservation.

Photo 5-1 Training for conservation and management techniques

## 5.h. Visitor Facilities and Infrastructure

### S1 Tomioka Silk Mill

Visitor facilities are the guidance display and a shop in the East Cocoon Warehouse as well as toilets and rest area on site.

In principle, all visitors are only allowed to enter in the buildings with proper guides. This is to avoid setting up unnecessary guidance facilities to protect authenticity of the property and to retain the state of conservation at the time of closing operation. It should also prevent unforeseen accidents of visitors. Guided tours of several times a day are offered to both groups and individuals by Tomioka City in cooperation with volunteer guides group. For foreign visitors electronic guidance device (iPod) in English, French, Chinese and Korean is offered with a fee.

In the buffer zone, rest areas, public restrooms, and parking lots have been prepared, with care for the surrounding environment. In addition, collaborating restaurants and shops located within walking distance from the property, guests are welcomed to the Mill.

### S2 Tajima Yahei Sericulture Farm

The site is presently not open to the public because it is the privately-owned property, but the outside of the building is possible to observe. A citizen association, "Association for Gunma Shimamura Silkworm Eggs" had hosted various workshops and study visit to improve the knowledge and knowhow of the members who provide guiding tours to visitors.

The City of Isesaki provides a information booth. Furthermore *Shimamura kaiko-no-furusato* [Shimamura hometown of silkworm] park and Sakai-shimamura community center have public restroom and public parking.

A guidance facility and sign boards are planned further in order to prepare for the increased number of visitors expected.

### S3 Takayama-sha Sericulture School

The city of Fujioka has employed full time guides who also work as daily maintenance of the property. A citizen association "Association for Takayama-sha" had trained guiding volunteers through its training course and had started guiding service in April 2011. Along the prefectural road outside the site boundary, one small parking lot, equipped with a guidance plate, and a box for storing leaflets have been constructed.

In addition, Fujioka Historical Museum in Fujioka City offers comprehensive information on history and culture of Takayama-sha Sericulture School as well as academic documentation on the subject.

New development of visitor facilities such as additional parking, visitor flows, and other improvements are being discussed for the expected numbers of increasing visitors.

**S4 Arafune Cold Storage**

The town of Shimonita dispatch staff to provide visitors a guide to assure their safety, and also has organized guiding volunteers who assist various events and visitor tours upon requests. As for the visitor facilities, a small parking lot equipped with a guidance plate, a bench have been constructed.

During the winter season when the site visit is not suitable, people are welcomed to Shimonita Furusato Center guidance facility located in Shimonita Town. The center offers comprehensive information on academic findings of Arafune Cold Storage including local history and culture.

New development of visitor facilities such as additional parking and visitor flows is under discussion.

## 5.i. Policies and Programs Related to the Presentation and Promotion of the Property

### (i) Overall property

"Tomioka Silk Mill and Related Sites" is a technological ensemble which was developed for the production of raw silk. Therefore, all properties were closely related, proving the evidences of the technical exchange and the technological innovation of sericulture and silk reeling. In order to pass on this outstanding universal value to the next generation, proper enhancement of the properties and their surrounding and active presentation/utilization are going to be promoted.

**(i)-1 Principles for enhancement and promotion**

Enhancement, presentation and promotion of the nominated property will be implemented in accordance with the following policies based on the basic principles of the Management Plan (Appendix 7.a.)

(1) Interpretation and promotion of the outstanding universal value of the property with consideration of interrelationship of components.
(2) Sustainable presentation and promotion of the property with participation of various stakeholders
(3) Preparation to accept domestic and foreign visitors
(4) Integrated presentation and promotion together with "Gunma Silk Heritage Network."

**(i)-2 Interpretation and promotion of the outstanding universal value of the property with consideration of interrelationship of components**

Four components of the property are closely tied together through the relationship of technology and production. Restoration, presentation and interpretation of each component must take this into consideration.

It is essential to demonstrate the value of Tomioka Silk Mill and Related Sites that must be understood inclusive of their structure, machinery and history. Therefore the guidance is very important to improve the understanding of the visitors.
Gunma Prefecture has supported the training, organization and management of the tour guides in collaboration with the related municipalities, citizen groups and local residents. Sufficient numbers of volunteers are ready to give guide tours at all components. Furthermore there is a local voluntary association called Tomioka Silk Mill World Heritage Ambassadors. The association conducts more than 200 activities in and out of the prefecture, with lectures and panel exhibitions.

The tour guide and volunteer also lecture the historical value of the nominated property in addition to the description of each component. Guidance facilities conveying the outstanding universal value of the nominated property are provided in the east cocoon warehouse of the Tomioka Silk Mill and existing local museums established by each municipality. The value of each site and overall outstanding universal value are exhibited in those facilities by using a common guidance panel.

Furthermore, museum facilities established by the prefecture have provided exhibitions on the history and techniques of the sericulture and silk-reeling industry as a whole, helping people to understand the outstanding universal value of the Tomioka Silk Mill and Related Sites.

Because a dramatic increase in visitors is forecast with the progress of promotion activities for world heritage inscription, Gunma Prefecture is currently considering future establishment of Gunma Prefecture World Heritage Management and Enhancement Organization (name provisional), which will coordinate guidance facilities and promote cooperation between volunteer guide groups.

**(i)-3 Sustainable management and promotion of the property with participation of various stakeholders**

Gunma Prefecture and related municipalities in cooperation with relevant organizations focus on improvement of stewardship including establishment of comprehensive guide system, facilities, and recommended route for visitors. Training for volunteer guides is also in scope of the project.

For each component of Tomioka Silk Mill and Related Sites, local community organizations have been organized and active. They are working for interpretation and public relation of the value of each site. A not-for-profit organization Friends of Tomioka Silk Mill holds a membership of 1400; Association for Takayama-sha holds 470, and Association for Gunma Shimamura Silkworm Eggs holds 60.

In addition Tomioka Silk Mill World Heritage Ambassadors with a membership of 250 is active over regional boundary. Thus the promotion activities are done by many organizations locally and regionally.

Silk Country Gunma association has been formed with those organizations above, and other organizations which are related to silk industrial heritage sites. Its objective is to preserve silk industrial heritage and has produced and distributed pamphlets and organized World Heritage campaigns by linking all the local organizations and private companies. Gunma Prefecture and relevant municipalities also

Photo 5-2 Participation of private and community organizations (school visit of zaguri hand reeling)

collaborate with these activities.

**(i)-4 Preparation to accept domestic and foreign visitors**

In order to accept visitors from all over Japan and overseas, Gunma Prefecture and the related cities and town will cooperate and take the necessary measures regarding public transportation, improvement of parking, signs and visitor facilities, and cooperation with the local residents concerning visitors.

1. Access to the property

Many visitors travel to each component of “Tomioka Silk Mill and Related Sites” by car. Gunma Prefecture and related municipalities are already in the process of providing road signs leading to the components individually and improving visitor facilities including parking with a careful consideration not to do harm on the value of the property.

At the closest train station to each component offer access information for visitors using public transportation.

2. Providing information on the nominated property

Gunma Prefecture and relevant municipalities have created official websites for “Tomioka Silk Mill and Related Sites.” Promotional posters and pamphlets have been created as well. They are being sent to public facilities outside Gunma Prefecture to actively promote the nominated sites.

3. On-site interpretation

Guides are available at each component to inform visitors of the characteristics of the property as well as the historic values and their significance as World Heritage Sites.

**(i)-5 Collaborating with Gunma Silk Heritage Network**

There are a number of tangible and intangible cultural properties related silk industry in addition to the components of the "Tomioka Silk Mill and Related Sites" within Gunma Prefecture. "Gunma Silk Heritage" registration project started in July, 2011.

Components of the nominated property are representatives of such properties. Therefore, by promoting conservation and utilization of those cultural properties together with the nominated sites, comprehensive understanding of their cultural value is facilitated.

Gunma Prefecture identify and register those local silk heritage annually,[4] and provide assistance through creating and disseminating guidebook/website/DVD as well as subsidy for preservation activities by municipalities. They are planning to form a network linking stakeholders of the Gunma Silk Heritage through establishment of excursion routes. Through this network, activities of this project such as preservation works and promotion of their values must be accelerated. Expansion of its network to neighboring prefectures is under consideration as possible future development.

4 As of December 2012, total of 78 items have been registered. See Appendix 5-j

Examples of "Gunma Silk Heritage" sites are shown in the photo 5-3 through 5-10.

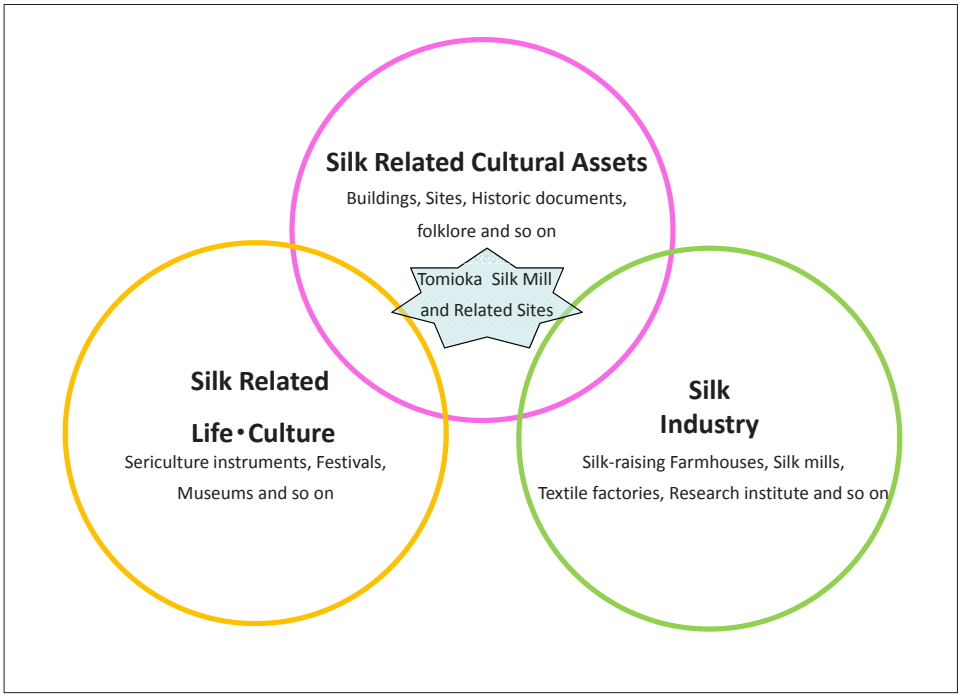



Figure 5-9 Concept of Gunma Silk Heritage Network

Photo 5-3 Great Mulberry of Usune

Photo 5-4 Old Usui-sha Head Building

Photo 5-5 Tomizawa House

Photo 5-6 Usui Pass Railroad Facility

Photo 5-7 Old Kanra-sha Obata-gumi Warehouse

Photo 5-8 Goto Textile

Photo 5-9 Tools of Sericulture

Photo 5-10 Monzenharukoma (folk music and dance)

### (ii) Individual component

The details of the policy outline concerning the presentation and promotion of the properties are described in Comprehensive Preservation and Management Plan in the Appendix 7.a. of this dossier. Below is the outline.

#### S1 Tomioka Silk Mill

The “Tomioka Silk Mill Enhancement and Promotion Committee” consisting of architectural and historical specialists will be established. Then, the “Tomioka Silk Mill Presentation and Utilization Plan” will be formulated, which is based on examination of assignments regarding the future vision and their implementation. This will allow operation in a systematical manner.

#### Other components

According to the preservation and management plan for the property, policies of presentation and utilization will be examined.
In addition, the projects regarding presentation and utilization are going to be examined.

## 5.j. Staffing Levels and Expertise (Professional, Technical, Maintenance)

### (i) Overall condition

The related municipalities owning the properties have nominated experts who are necessary for the property protection. This policy is going to be continued. Moreover, the Japanese government and Gunma Prefecture will strengthen the support system toward the related municipalities while enriching technical instructions regarding preservation and management by using an organization such as the Incorporated Administrative Agency responsible for cultural property protection and research institutions. In this way, frequent information exchange will be implemented.

Therefore, a staffing level is sufficient to preserve the properties for the future.

### (ii) Condition of the each component

#### S1 Tomioka Silk Mill

Tomioka City created a department for the preservation and management in Tomioka Silk Mill, and experts of cultural properties and facilities are working there. In addition, Tomioka Silk Mill Comprehensive Research Center is established and staff with high expert knowledge for cultural properties are engaged in the investigation and research of the property. Tomioka City Board of Education also hires experts of cultural property protection and they work on excavation works in the mill.

#### S2 Tajima Yahei Sericulture Farm

Experts of cultural property protection are stationed in the Isesaki City Board of Education and they are engaged in preservation and management and research of the Tajima Yahei Sericulture Farm. In Isesaki municipal museum, Akabori History and Folklore Museum, experts of cultural property protection collect and research documents related to sericulture and textile industries in the city.

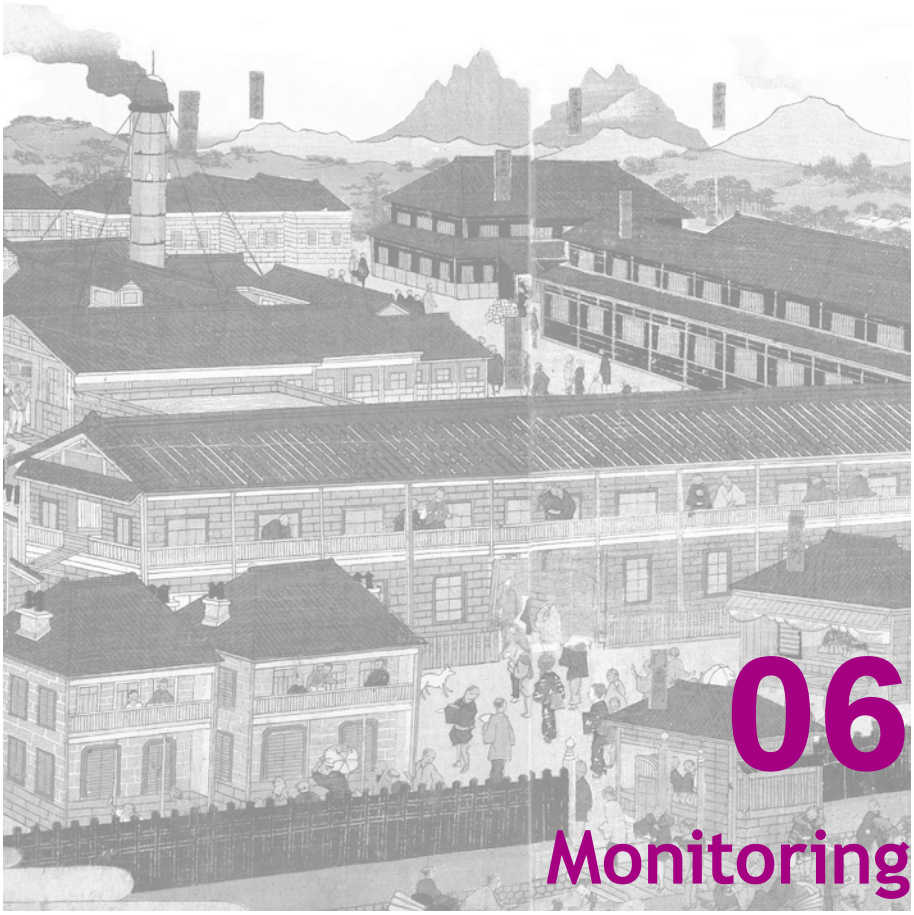
#### S3 Takayama-sha Sericulture School

Experts of cultural property protection in Fujioka City Board of Education are engaged in preservation, management and research of the Takayama-sha Sericulture School. Staff always stay on site and perform daily management tasks under the instruction of experts. In Fujioka History Museum, experts of cultural property protection are also working on collecting and researching documents related to the property.

#### S4 Arafune Cold Storage

Shimonita Town Board of Education delegates experts of cultural property protection to the Shimonita Town Furusato Center (Museum of History and Folk Customs). They are engaged in preservation, management and research of the Arafune Cold Storage. In addition, geological experts are working in the Geo-park[1] related department in the board and are engaged in preservation and management of the Cold Storage working together with the Furusato Center.

1 Shimonita Town was accredited as a Japan Geopark in September, 2011 and promotes activities in regard to preservation, education, and geotourism as a member of Japan Geopark network, which is an authorized member of Global Geoparks Network.



# 06
# Monitoring

# 6. Monitoring

## 6.a. Key Indicators for Measuring State of Conservation

Periodic and systematic monitoring are to be conducted to achieve the secured protection of the outstanding universal value in the nominated property and its buffer zones with respect to the state of conservation and factors affecting the property, as shown in Chapter 4. The key indicators suitable for the purpose have been established based on the main viewpoints set out below.

- Whether the value, the integrity and authenticity of the property, as stated in "Chapter 3: Justification of Inscription" have been sustained;
- Whether individual factors (development, environment, natural disaster, visitation, et. al.) described in "Chapter 4. section 4.b. Factors Affecting the Property" are either affecting or have affected upon the property and its buffer zone;
- Whether the approach to management of the property and its buffer zone is suitable and promotional activities for disseminating correct information on the property's outstanding universal value is appropriate, in regard with "Chapter 5 Protection and Management of Property.

A summary of monitoring indicators and their measuring methods are described in Table 6-1. For more details on the content can be found in Comprehensive Preservation and Management Plan attached as Appendix 7.


photo 6-1
Thermal data-logger installed at the site of Arafune Cold Storage

Table 6-1 Monitoring indicators for the nominated property

| Effect on properties and buffer zones | | Indicator | | Monitoring cycle | Location of Records |
|---|---|---|---|---|---|
| Environmental factors | Acid rain | The attainment of air quality standard for air pollution(sulfur dioxide) | monitor the atmosphere periodically, and measure a rate of sulfur dioxide in the air | every year | Gunma Prefecture |
| | Climate change | Soundness of woods | select the object trees and monitor changes over the years | every year | Municipalities |
| | | Temperature of cold airflow of the cellar | monitor the temperature of cold airflow of the cellar | continuous | Shimonita Town |
| | Influence by animals, plants, insects | Degree of damage to buildings | monitor the effect on buildings by a wild boar, a woodpecker, a bat, a mouse and a white ant | every year | Municipalities |
| | Changes over the years | Soundness of buildings and structures | monitor changes over the years such as leaks, roof moving and falling, decay of timbers, crack of mud wall, and stability of stone masonry | every year | Municipalities |
| Natural disaster | Wind and flood | Soundness of buildings and structures | measure damage of buildings and structures by wind and flood | as necessary | Municipalities |
| | Sediment disaster | Soundness of buildings and structures | measure damage of buildings and structures by sediment disaster | as necessary | Municipalities |
| | Earthquake | Soundness of buildings and structures | measure damage of buildings and structures by earthquake | as necessary | Municipalities |
| | Eruption | Monitoring of volcanic activity | monitor volcanic activity using seismograph, tilt meters, GPS using data of Japan Meteorological Agency | as necessary | Gunma Prefecture |
| | Effect on landscape by natural disaster | Degree of disasters in the buffer zone | measure disasters at rivers, forests, farmlands, and public facilities in the buffer zone | as necessary | Gunma Prefecture Municipalities |
| | Effect on buildings and landscape by fire | Degree of damages to cultural property | count numbers of reported damage caused by fire | every year | Municipalities |
| | | Number of fires | count number of fire in the buffer zone | every year | Municipalities |
| | | Number of fire prevention equipment inspections | inspect fire prevention equipment installed in the property | every year | Municipalities |



| | | | | | |
|---|---|---|---|---|---|
| Natural disaster | | Number of fire Number of fire and evacuation drills | carry out fire and evacuation drill in the property | every year | Municipalities |
| Effect by visitors and tourism | Effect on buildings and landscape by increase of visitors | Visitors to property | count visitors to property | every month | Municipalities |
| | | Number of cars using parking for visitors | count number of cars using parking | every month | Municipalities |
| | | Number of visitors using public transportation | count number of passengers getting on and off at nearest station of the site | every year | Municipalities |
| | | Pedestrians | do sampling survey on number of pedestrians at roads around property on a fixed day and at fixed points | every year | Municipalities |
| Effect by private development and public infrastructure development | Effect by public works | Number of public work orders | measure number of public work orders such as roads, rivers, sewerage, afforestation in the buffer zone | every year | Gunma Prefecture, municipalities |
| | Effect by private development | Number of private developments | measure number of development permission and building confirmation in the buffer zone | every year | Gunma Prefecture, municipalities |
| | | Number of notifications based on landscape ordinances | measure number of notification based on landscape ordinances | every year | Municipalities |
| | | Number of control of illegal outdoor advertisements | measure number of supervision and control of illegal outdoor advertisements based on outdoor advertisements ordinances | every year | Gunma Prefecture, Tomioka City, Isesaki City |
| Transmission of Outstanding Universal Value | Transmission of Value | Number of participants in lectures on component property | count number of participants in lectures and seminars on component property | every year | Gunma Prefecture, municipalities |
| | Citizen's activities | Frequency of citizen's activities on property | count frequency and number of participants in citizen's activities on property | every year | Gunma Prefecture, municipalities |
| | Provision of information | Number of information provided by pamphlets and websites | measure frequency of provision of information and the way it is provided through published pamphlets and municipalities' websites | every year | Gunma Prefecture, municipalities |

## 6.b. Administrative Arrangements for Monitoring Property

### (i) For the entire property

Monitoring, including regulatory reporting, will be conducted by local municipalities involved in the management of property in accordance with the instructions of the Cultural Affairs Agency via the Gunma Prefecture (World Heritage Registration Promotion Division or Board of Education). In carrying this out, information will be gathered and records created based on the "Operational Guidelines for the Implementation of the World Heritage." Accumulated results will be consolidated every six years as an assessment of the state of preservation and reported periodically to the World Heritage Committee via the World Heritage Center.

### (ii) Contact address of monitoring body for each component

Management bodies responsible for monitoring each component and their contact information

**S1 Tomioka Silk Mill**

Tomioka City has a management office ("Tomioka Silk Mill Division, Department of World Heritage Town Planning, Tomioka City") at the site and conducts the monitoring as part of its day-to-day management.

Tomioka Silk Mill Division, Department of World Heritage and Town Planning, Tomioka City

1-1 Tomioka, Tomioka city, Gunma Prefecture 370-2316 JAPAN

Phone: +81-274-64-0005

Fax: +81-274-64-3181

**S2 Tajima Yahei Sericulture Farm**

Isesaki City will act as a custodial body and collaborate with the owner in proactively and properly monitoring the property and managing records.

Cultural Property Protection Division, Isesaki City Board of Education

1-64-5 Nishikubo-cho, Isesaki City, Gunma Prefecture 379-2298 JAPAN

Phone: +81-270-63-3636

Fax: +81-270-63-3001

**S3 Takayama-sha Sericulture School**

Fujioka City will conduct monitoring not only on the designated historic site, but also on the surrounding area that would directly affect the site.

Cultural Property Protection Division, Fujioka City Board of Education
1291-1 Shiroishi, Fujioka City, Gunma Prefecture 375-0055 JAPAN
Phone: +81-274-23-5997
Fax: +81-274-23-5997

### S4 Arafune Cold Storage

Monitoring will be carried out by the Section of Cultural Property Protection in the Shimonita Town Board of Education. In case of emergency, the authority plans to build a reliable and sustainable site monitoring system in cooperation with the local residents.

Section of Cultural Property Protection, Shimonita Town Board of Education
In the Shimonita Town Furusato Center
71-1 Shimokosaka, Shimonita Town, Gunma Prefecture 370-2623 JAPAN
Phone: +81-274-82-5345
Fax: +81-274-82-5345

### Supervising organization

Office for World Cultural Heritage
Monuments and Sites Division
Cultural Properties Department
Agency for Cultural Affairs
3-2-2 Kasumigaseki, Chiyodaku, Tokyo, 100-8959 JAPAN
Phone: +81-3-6734-2877
Fax: +81-3-6734-3822

### Advisory organization

Gunma Prefecture World Heritage Registration Promotion Division
1-1-1 Ohte-machi, Maebashi City, Gunma Prefecture 371-8570 JAPAN
Phone: +81-27-226-2328
Fax: +81-27-224-2812

Cultural Property Protection Division
Gunma Prefecture Board of Education
1-1-1 Ohte-machi, Maebashi City, Gunma Prefecture 371-8570 JAPAN
Phone: +81-27-226-4684
Fax: +81-27-243-7785

## 6.c. Results of Previous Reporting Exercises

### S1 Tomioka Silk Mill


Editorial Committee of Tomioka Seishijoshi ed., 1977. *Tomioka Seishijoshi* [Chronicle on Tomioka Silk Mill]. Tomioka City Board of Education.

The Japanese Association for Conservation of Architectural Monuments ed., 2005. *Kyu Tomioka Seishijo Gaiyo Hokokusho* [Brief report on overall research of old Tomioka Silk Mill]. Tomioka City Board of Education.

The Japanese Association for Conservation of Architectural Monuments ed., 2006. *Kyu Tomioka Seishijo Kenzobutsugun Chosa Hokokusho* [Research of buildings in old Tomioka Silk Mill]. Tomioka City Board of Education.

Tomioka City Board of Education ed., 2007. *Shiseki Juyobunkazai (Kenzoubutsu) Kyu Tomioka Seishijo Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Important Cultural Property and Historic Site, Tomioka Silk Mill]. Tomioka City Board of Education.


### S2 Tajima Yahei Sericulture Farm


Isesaki City Board of Education ed., 2010. *Sakai-shimamura Yosan Nokagun Chosa Chukan Hokokusho (Archives of Isesaki City Cultural Properties 3*) [Interim report of research on Sakai-shimamura sericulture farms]. Isesaki City Board of Education.

Isesaki City Historic Building Research Committee ed., 2011. *Shimamura no Tatemono -Sakai-shimamura Yosan Nokagun Chosa Hokokusho-* [Report of research on Sakai-shimamura sericulture farms]. Isesaki City Board of Education.

Isesaki City Board of Education ed., 2012. *Tajima Yahei Kyutaku Chosa Hokokusho* [Report of research on Tajima Yahei Sericulture Farm]. Isesaki City Board of Education.

Isesaki City Board of Education ed., 2012. *Tajima Yahei Kyutaku Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Historic Site Tajima Yahei Sericulture Farm]. Isesaki City Board of Education.


### S3 Takayama-sha Sericulture School


Fujioka City Board of Education ed., 2009. *Takayama-sha Ato Gaiyo Chosa Hokokusho* [Brief report on overall research of Takayama-sha Sericulture School]. Fujioka City Board of Education.

Fujioka City Board of Education ed., 2012. *Shiseki Takayama-sha Ato Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Historic Site Takayama-sha Sericulture School]. Fujioka City Board of Education.

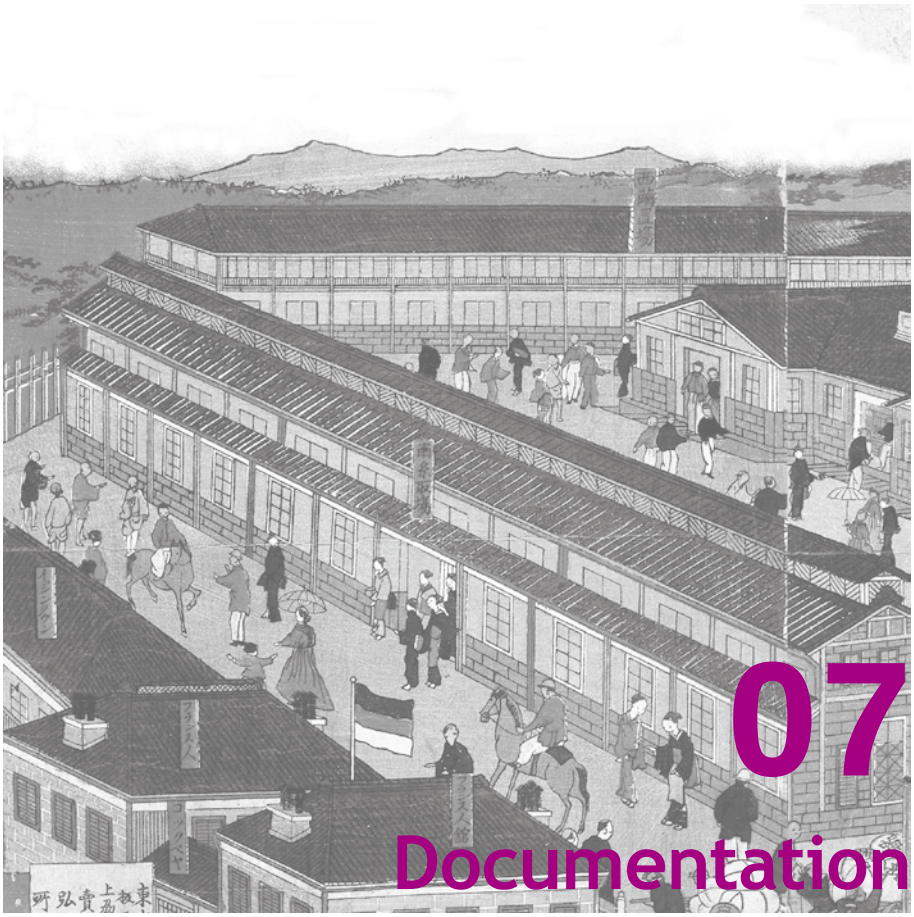
**S4 Arafune Cold Storage**

Shimonita Town Board of Education and Nakanojo Town Board of Education ed., 2009. *Gunma no Sanshu Chozo Fuketsugun Gaiyo Chosa Hokokusho Arafune Fuketsu Tochikubo Fuketsu* [Brief report on overall research of Silkworm Cold Storage in Gunma]. Shimonita Town Board of Education and Nakanojo Town Board of Education.

Shimonita Town Board of Education ed., 2012. *Kunishiteishiseki Arafune Azumaya Fuketsu Sanshu Chozosho Ato Arafune Fuketsu Sanshu Chozosho Ato Hozonkanri Keikakusho* [Preservation and management plan of Nationally Designated Historic Site Arafune Cold Storage]. Shimonita Town Board of Education.

Shimonita Town Board of Education ed., 2012. *Kunishiteishiseki Arafune Azumaya Fuketsu Sanshu Chozosho Ato Arafune Fuketsu Sanshu Chozosho Ato Chosa Hokokusho I* [Report of research on Nationally Designated Historic Site Arafune Cold Storage]. Shimonita Town Board of Education.

Shimonita Town Board of Education ed., 2012. *Arafune Fuketsu nikakawaru Kioku no Siryoka –Shimonita machi Dentoteki Chikisangyo oyobi Bunka Chosa Jigyo-* [Report of research on traditional local industry and culture in Shimonita Town]. Shimonita Town Board of Education.



# 07
# Documentation

# 7. Documentation

## 7.a. Photographs and Audiovisual Image Inventory and Authorization Form

**Table 7-1-1 Inventory and authorization of photographs, slides and images**

| ID No | Format | Caption | Date of photo (mo/yr) | Photogragher / Director of the Video | Copyright owner | Contact details of copyright owner | Non exclusive cession of rights |
|---|---|---|---|---|---|---|---|
| Photo E-1 | Slide/ Electric image | - | 11/2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture<br>1-1-1 Ote-machi, Maebashi City, Gunma Prefecture 371-8570, JAPAN<br>Phone: +81-27-226-2328<br>Fax: +81-27-224-2812 | Yes |
| Photo 2-1 | Slide/ Electric image | S1 Aerial view of Tomioka Silk Mill | 11/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-2 | Slide/ Electric image | S1 Exterior of east cocoon warehouse, Tomioka Silk Mill | 11/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-3 | Slide/ Electric image | S1 East facade of silk -reeling plant,Tomika Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-4 | Slide/ Electric image | S1 View from northwest, silk -reeling plant , Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-5 | Slide/ Electric image | S1 Interior of Silk-reeling plant, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-6 | Slide/ Electric image | S1 Interior of east cocoon warehouse, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-7 | Slide/ Electric image | S1 View from southwest, west cocoon warehouse, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-8 | Electric image | S1 View from northeast, Steam boiler plant, Tomioka Silk Mill | 10/2012 | Tomioka City | Tomioka City | Tomioka City<br>1460-1 Tomioka, Tomioka city, Gunma Prefcture 370-2392, JAPAN<br>Phone: +81-274-62-1511<br>Fax: +81-274-62-0357 | Yes |
| Photo 2-9 | Slide/ Electric image | S1 View from southwest, Director's house (Brunat house), Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-10 | Slide/ Electric image | S1 View from west, Dormitory for female instructors, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-11 | Slide/ Electric image | S1 View from northeast, Inspector's house, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |

Table 7-1-2 Inventory and authorization of photographs, slides and images

| ID No | Format | Caption | Date of photo (mo/yr) | Photogragher / Director of the Video | Copyright owner | Contact details of copyright owner | Non exclusive cession of rights |
|---|---|---|---|---|---|---|---|
| Photo 2-12 | Slide/ Electric image | S1 View from northwest, Iron water tank, Tomioka Silk Mill | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-13 | Electric image | S1 Brick drain, Tomioka Silk Mill | — | Tomioka City | Tomioka City | Tomioka City (Refer to Photo2-8) | Yes |
| Photo 2-14 | Electric image | S1 View from south, Dormitory for female workers (Haruna dormitory), Tomioka Silk Mill | 10/2012 | Tomioka City | Tomioka City | Tomioka City (Refer to Photo2-8) | Yes |
| Photo 2-15 | Electric image | S1 View from southwest, Re-reeling plant and packing room | 11/2006 | Tomioka City | Tomioka City | Tomioka City (Refer to Photo2-8) | Yes |
| Photo 2-16 | Electric image | S1 Archaeological survey,site of silkworm egg production laboratory, Tomioka Silk Mill | 3/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-17 | Slide/ Electric image | S1 View from east, Dormitory for female workers（Myogi dormitory and Asama dormitory）, Tomioka Silk Mill | 4/2010 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-18 | Electric image | S1 View from west, Clinic, Tomioka Silk Mill | 5/2012 | Tomioka City | Tomioka City | Tomioka City (Refer to Photo2-8) | Yes |
| Photo 2-19 | Slide/ Electric image | S2 Aerial view of Tajima Yahei Sericulture Farm | 11/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-20 | Slide/ Electric image | S2 View from east, Tajima Yahei Sericulture Farm | 5/2009 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-21 | Slide/ Electric image | S2 Interior of attic space under the raised roof,main building, Tajima Yahei Sericulture Farm | 9/2012 | Isesaki City | Isesaki City | Isesaki City<br>1-64-5 Nishikubo-cho, Isesaki City, Gunma Prefecture 379-2298, JAPAN<br>Phone: +81-270-63-3636<br>Fax: +81-270-63-3001 | Yes |
| Photo 2-22 | Slide/ Electric image | S2 View from northwest, Besso (left) and kuwaba (right), Tajima Yahei Sericulture Farm | 7/2011 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-23 | Slide/ Electric image | S2 View from north, Exterior of the microscope room (tiled-roofed projection in the center), Tajima Yahei Sericulture Farm | 8/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-24 | Slide/ Electric image | S3 Takayama-sha Sericulture School | 11/2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-25 | Slide/ Electric image | S3 View from east, Takayama-sha Sericulture School | 11/2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-26 | Slide/ Electric image | S3 Interior detail of silkworm shelves and brazier facilities,Takayama-sha Sericulture School | 11/ 2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |

**Table 7-1-3 Inventory and authorization of photographs, slides and images**

| ID No | Format | Caption | Date of photo (mo/yr) | Photogragher / Director of the Video | Copyright owner | Contact details of copyright owner | Non exclusive cession of rights |
|---|---|---|---|---|---|---|---|
| Photo 2-27 | Slide/ Electric image | S3 Interior detail of latticed ceiling, Takayama-sha Sericulture School | 8/2011 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-28 | Slide/ Electric image | S3 Aerial view of Takayama-sha Sericulture School | 11/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-29 | Slide/ Electric image | S4 View from northwest, Arafune Cold Storage | 11/2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-30 | Slide/ Electric image | S4 Reconstruction model of Arafune Cold Storage | 3/2010 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-31 | Slide/ Electric image | S4 Cold air flow at Arafune Cold Storage, No.1, June 21, 2011 | 6/2011 | Shimonita Town | Shimonita Town | Shimonita Town<br>71-1 Shimokosaka, Shimonita Town, Gunma Prefecture 370-2623, JAPAN<br>Phone: +81-274-82-5345<br>Fax: +81-274-82-5345 | Yes |
| Photo 2-32 | Electric image | Comparison of the cocoon size<br>Left: Native species Koishimaru<br>Right: F1 hybrid Shinkoishimaru | 5/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 2-41 | Electric image | Yamato-style cocoon dryer | - | Tomioka City | Tomioka City | Tomioka City (Refer to Photo2-8) | Yes |
| Photo 3-1 | Slide/ Electric image | S1 East Cocoon Warehouse with a keystone inscribed with the construction year, Tomioka Silk Mill | 4/2010 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-2 | Slide/ Electric image | S1 West Cocoon Warehouse (left) and Silk-reeling plant (right) | 10/2008 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-3 | Electric image | S4 Cold airflow, Arafune Cold Storage | 7/2007 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-4 | Electric image | S3 Archaeological survey, Foundation for sericulture building, Takayama-sha Sericulture School | 3/2011 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-21 | Electric image | Tomizawa House, sericulture farmhouse with thatched roof built in the 18th century. | 3/2010 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-23 | Electric image | Silkworm-reeling farmhouses in Akaiwa district (Influenced by Takayama-sha) | 6/2007 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 3-25 | Electric image | Azumaya Cold Storage, Gunma, Japan | 11/2008 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 4-1 | Slide/ Electric image | Photo of the periphery of Tomioka Silk Mill | 11/2012 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |

**Table 7-1-4 Inventory and authorization of photographs, slides and images**

| ID No | Format | Caption | Date of photo (mo/yr) | Photograpgher / Director of the Video | Copyright owner | Contact details of copyright owner | Non exclusive cession of rights |
|---|---|---|---|---|---|---|---|
| Photo 5-3 | Electric image | Great Mulberry of Usune | 10/2005 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 5-4 | Electric image | Former Usui-sha head Office | 8/2004 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 5-5 | Electric image | Tomizawa House | 3/2010 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 5-6 | Electric image | Usui Pass railroad facility | 11/2009 | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 5-7 | Electric image | Old Kanra-sha Obata-gumi Brick Warehouse | — | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Photo 9-1 | Slide/ Electric image | — | 11/2012 | Jo Shimizu | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-3 | Electric image | Map of central Japan indicating the location of components of the nominated property | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-4 | Electric image | S1 Tomioka Silk Mill, boundary of the component and buffer zone | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-5 | Electric image | S1 Tomioka Silk Mill, boundary of the component (close up) | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-6 | Electric image | S2 Tajima Yahei Sericulture Farm, boundary of the component and buffer zone | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-7 | Electric image | S2 Tajima Yahei Sericulture Farm, boundary of the component (close up) | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-8 | Electric image | S3 Takayama-sha Sericulture School, boundary of the component and buffer zone | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-9 | Electric image | S3 Takayama-sha Sericulture School, boundary of the component (close up) | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-10 | Electric image | S4 Arafune Cold Storage, boundary of the component and buffer zone | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 1-11 | Electric image | S4 Arafune Cold Storage, boundary of the component (close up) | - | - | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | Yes |
| Figure 2-31 | Electric image | S4 Arafune Cold Storage,Plan | - | - | Shimonita Town | Shimonita Town (Refer to Photo2-31) | Yes |
| Figure 2-32 | Electric image | S4 Arafune Cold Storage,Profile | - | - | Shimonita Town | Shimonita Town (Refer to Photo2-31) | Yes |
| - | Video | Tomioka Silk Mill and Related Sites | - | Gunma Prefecture | Gunma Prefecture | Gunma Prefecture (Refer to Photo E-1) | No |

## 7.b. Texts Relating to Protective Designation, Copies of Property Management Plans or Documented Management Systems and Extracts of Other Plans Relevant to the Property

Copies of official designation notices (Refer to Appendix 6-b)

English summaries of law which control the nominated property (Refer to Appendix 7-f)

Comprehensive Preservation and Management Plan [Main document] (Refer to Appendix 7-a)

English summaries of property management plans specific to each component (Refer to Appendix 7-b)

English summaries of relevant laws and standards (Refer to Appendix 7-d)

English summaries of existing plans related to municipality and region (Refer to Appendix 7-e)

## 7.c. Form and Date of Most Recent Records or Inventory of Property

S1 Tomioka Silk Mill

The Japanese Association for Conservation of Architectural Monuments ed., 2006. *Kyu Tomioka Seishijo Kenzobutsugun Chosa Hokokusho* [Research of buildings in old Tomioka Silk Mill]. Tomioka City Board of Education. (printing)

S2 Tajima Yahei Sericulture Farm

Isesaki City Board of Education ed., 2012. *Tajima Yahei Kyutaku Chosa Hokokusho* [Report of research on Tajima Yahei Sericulture Farm]. Isesaki City Board of Education. (printing)

S3 Takayama-sha Sericulture School

Fujioka City Board of Education ed., 2009. *Takayama-sha Ato Gaiyo Chosa Hokokusho* [Brief report on overall research of Takayama-sha Sericulture School]. Fujioka City Board of Education. (printing)

S4 Arafune Cold Storage

Shimonita Town Board of Education ed., 2012. *Kunishiteishiseki Arafune Azumaya Fuketsu Sanshu Chozosho Ato Arafune Fuketsu Sanshu Chozosho Ato Chosa Hokokusho* [Report of research on Nationally Designated Historic Site Arafune Cold Storage]. Shimonita Town Board of Education. (printing)

## 7.d. Address where Inventory, Records and Archives are held

Agency for Cultural Affairs
3-2-2 Kasumigaseki, Chiyodaku, Tokyo, 100-8959, JAPAN

Gunma Prefecture World Heritage Registration Promotion Division
1-1-1 Ote-machi, Maebashi City, Gunma Prefecture 371-8570, JAPAN

Cultural Property Protection Division
Gunma Prefecture Board of Education
1-1-1 Ote-machi, Maebashi City, Gunma Prefecture 371-8570, JAPAN

Gunma Prefectural Archives
3-27-26 Bunkyo-cho, Maebashi City, Gunma Prefecture 371-0801, JAPAN

Gunma Prefectual Museum of History
992-1 Watanuki-machi, Takasaki City, Gunma Prefecture 370-1293, JAPAN

Tomioka Silk Mill Division, Department of World Heritage and Town Planning, Tomioka City
1-1 Tomioka, Tomioka city, Gunma Prefecture 370-2316, JAPAN

Cultural Property Protection Division, Isesaki City Board of Education
1-64-5 Nishikubo-cho, Isesaki City, Gunma Prefecture 379-2298, JAPAN

Cultural Property Protection Division, Fujioka City Board of Education
1291-1 Shiroishi, Fujioka City, Gunma Prefecture 375-0055, JAPAN

Section of Cultural Property Protection, Shimonita Town Board of Education
In the Shimonita Town Furusato Center
71-1 Shimokosaka, Shimonita Town, Gunma Prefecture 370-2623, JAPAN

## 7.e. Bibliography

### (i) Reports on the property and components

#### S1 Tomioka Silk Mill


Editorial Committee of Tomioka Seishijoshi ed., 1977. *Tomioka Seishijoshi* [Chronicle on Tomioka Silk Mill]. Tomioka City Board of Education.

The Japanese Association for Conservation of Architectural Monuments ed., 2005. *Kyu Tomioka Seishijo Gaiyo Hokokusho* [Brief report on overall research of old Tomioka Silk Mill]. Tomioka City Board of Education.

The Japanese Association for Conservation of Architectural Monuments ed., 2006. *Kyu Tomioka Seishijo Kenzobutsugun Chosa Hokokusho* [Research of buildings in old Tomioka Silk Mill]. Tomioka City Board of Education.

Tomioka City Board of Education ed., 2007. *Shiseki Juyobunkazai (Kenzoubutsu) Kyu Tomioka Seishijo Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Important Cultural Property and Historic Site, Tomioka Silk Mill]. Tomioka City Board of Education.


#### S2 Tajima Yahei Sericulture Farm


Isesaki City Board of Education ed., 2010. *Sakai-shimamura Yosan Nokagun Chosa Chukan Hokokusho (Archives of Isesaki City Cultural Properties 3*) [Interim report of research on Sakai-shimamura sericulture farms]. Isesaki City Board of Education.

Isesaki City Historic Building Research Committee ed., 2011. *Shimamura no Tatemono -Sakai-shimamura Yosan Nokagun Chosa Hokokusho-* [Report of research on Sakai-shimamura sericulture farms]. Isesaki City Board of Education.

Isesaki City Board of Education ed., 2012. *Tajima Yahei Kyutaku Chosa Hokokusho* [Report of research on Tajima Yahei Sericulture Farm]. Isesaki City Board of Education.

Isesaki City Board of Education ed., 2012. *Tajima Yahei Kyutaku Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Historic Site Tajima Yahei Sericulture Farm]. Isesaki City Board of Education.

**S3 Takayama-sha Sericulture School**

Fujioka City Board of Education ed., 2009. *Takayama-sha Ato Gaiyo Chosa Hokokusho* [Brief report on overall research of Takayama-sha Sericulture School]. Fujioka City Board of Education.

Fujioka City Board of Education ed., 2012. *Shiseki Takayama-sha Ato Hozonkanri Keikaku* [Preservation and management plan of Nationally Designated Historic Site Takayama-sha Sericulture School]. Fujioka City Board of Education.

**S4 Arafune Cold Storage**

Shimonita Town Board of Education ed., 2012. *Kunishiteishiseki Arafune Azumaya Fuketsu Sanshu Chozosho Ato Arafune Fuketsu Sanshu Chozosho Ato Chosa Hokokusho* [Report of research on Nationally Designated Historic Site Arafune Cold Storage]. Shimonita Town Board of Education.

Shimonita Town Board of Education ed., 2012. *Kunishiteishiseki Arafune Azumaya Fuketsu Sanshu Chozosho Ato Arafune Fuketsu Sanshu Chozosho Ato Hozonkanri Keikakusho* [Preservation and management plan of Nationally Designated Historic Site Arafune Cold Storage]. Shimonita Town Board of Education.

## (ii) Referential Materials

Agency for Cultural Affairs, National Cultural Property Database, Cultural Heritage Online. [online] Available at: <http://www.bunka.go.jp/bsys/>

Bell, Lynda S, 1999. *One Industry, Two Chinas: Silk Filatures and Peasant-Family Production in Wuxi County, 1865-1937.* Stanford: Stanford University Press.

Breciani, Cesare, 1880. *Domestic Travel in Japan*.

China, Ministry of Industry, Bureau of Foreign Trade (comp.), 1933. *China Industrial Handbooks Kiangsu: First Series of the Reports by the National Industrial Investigation.* Shanhai: Ministry of Industry, Government of China.

Duran, Leo, 1921. *Raw Silk, A practical Hand-Book for the Buyer*. Silk Publishing Company.

Federico, Giovanni, 1997. *An economic history of the silk industry, 1830-1930*. Cambridge: Cambridge University Press.

Field, Jacqueline, Senechal, Marjorie, and Shaw, Madelyn, 2007. *American Silk, 1830 - 1930: Entrepreneurs And Artifacts.* Texas: Texas Tech Univ Press.

Gaimusho Tsushokyoku ed., 1930. *Koyoyosangyo no genjo.* Tokyo: Gaimusho Tsushokyoku

Gunmaken, 2007. *Kindai Yosannouka*.

Gunmaken Fujiokashi Kyoikuiinkai ed., 2009. *Takayama-sha ato Gaiyochosa Hokokusho*. Fujioka: Gunmaken Fujiokashi Kyoikuiinkai.

Gunmaken, Gunmaken Kyoikuiinkai, 2009. *Zenkoku no Sanshu Chozou Fuketsu ato no Genjyo-Zenkoku Fuketsu Anketochosakekka ni tsuite.* Maebashi: Gunmaken, Gunmaken Kyoikuiinkai.

Gunmaken Kyoikuiinkai Bunkazaihogoka ed., 1992. *Gunmaken Kindaikaisan sogochosa Hokokusho* [Comprehensive Research Report on Architectural Heritage of the Modern Period]. Maebashi: Gunmaken Kyoiku iinkai

Gunmaken Kyoikuiinkai Bunkazaihogoka ed., *Gunmaken Kindaiwafukenchiku Sogochosa Hokokusho* [Comprehensive research report on Modern Japanese-Style buildings]. Maebashi: Gunmaken Kyoikuiinkai.

Gunma Kenritsu Toshokan Shozo Hitsusha Shiryo, 1909. *Zenkoku Fuketsu Shirabe* [National cold storage research].

Gunze Kabushikikaisha, 1998. *Gunze Hyakunen-shi* [100 year anniversary of Gunze ]. Gunze.

Hyogoken Kyoikuiinkai Bunkazaihogoka ed., 1997. *Kinkichiho no Minka 2 Mie, Shiga, Hyogo, Nara, Wakayama, Osaka* (Nihon no Minka chosahokokusho shusei dai 12 kan) [Comprehensive report collection of Japanese Folk-Houses]. Tokyo: Toyo shorin.

Honda, Iwajiro, 1899. *Shinkoku Sangyo Chosa Fukumeisho*. Noshomusho.

Honda, Iwajiro, 1913. *Chosen Shina Sanshigyo Gaikan*. Noshomusho

Honda, Iwajiro ed., 1935. *Nihon Sanshigyoshi (dai 2-kan Seishishi) (dai 3-kan Yosanshi)*

Imanishi, Naojiro ed., 1894. *Chugaisangyojijyo shohen*. Yokohama: Imanishi Naojiro.

Imanishi, Naojiro ed., 1902. *Obeisanshigyo Shisatsu Fukumeisho*. Yokohama: Imanishi Naojiro.

Isesakishi Kyoikuiinkai Bunkazaihogoka ed., 2009. *Sakaishimamura Yosannoukagun chosachukanhokokusho*. Isesaki: Isesakishi Kyoikuiinkai.

Ishii, Kanji, 1997. *Nihon no Sangyokakumei: Nisshin, Nichirosenso kara kangaeru*. Tokyo: Asahishinbunsha.

Ishii, Kanji, 1972. *Nihon Sanshigyo-shi Bunseki: Nihon Sangyoukakumei Kenkyu Josetsu*. Tokyo: Tokyo University Press.

Ishii, Kanji, 1984. *Kindai Nihon to Igirisu Shihon: Jyadin Maseson Shokai wo Chushin-ni*. Tokyo University Press.

Ishii, Mayako, 1998. *Kindai Chugoku to Igirisu Shihon: 19 seiki kohan no Jyadin Maseson Shokai wo Chushin-ni* [Modern China and British capital: focusing on Jardine Matheson Company in the latter half of 19th century.] Tokyo: Tokyo University Press.

Japan Cultural Heritage Consultancy (JCHC), 2011. *Existing Condition of Historic Silk Reeling Mills in China.*

Johan, Bolle, Noshomushosangyoshikenjyo trans., 1918. *Goriteki yosanhou oyobi saisohou* [Rational sericul-

ture method and mulberry harvesting]. Tokyo: Meibundo

Kamigaki, Morikuni, 1887. *Yosanhiroku*. Tokyo: Yurindo.

Kamijo, Hiroyuki, 1986. Paul Brunat -Kikaiseishi gijutsu no dokusaiteki ishokusha-. *Kouza nihongijutsu no shakaishi bekkan 2 jinbutsuhenkindai.* Tokyo: Nihonhyoronsha.

Katakurakogyokabushikigaisha, 2007. *Shashinshu Tomiokaseishijyo* [Photographic collection of Tomioka Silk Mill]. Tokyo: Katakurakougyo.

Katakura-seishi-boseki Kabushikikaisha, 1941. *Katakura Seishi Boseki Kabushikikaisha 20-nenshi* [20 year anniversary of Katakura Seishi Boseki Kabushikikaisha]. Tokyo: Katakurakougyo.

Kiyokawa, Yukihiko, 2009. *Kindaiseishigijyutsu to Ajiagijyutsu dounyu no Hikakukeizaishi*. Nagoya: Nagoya Daigaku Shuppankai.

Koinetwork, 2010. *International Comparison-a Synthesis*. Paris: Koinetwork.

Koinetwork, 2010. *Silk Mills Sites in Italy and France: preservation, physical condition*. Paris: Koinetwork.

Ma, Debin ed., *Textiles in the Pacific, 1500-1900.* Hampshire: Ashgate Publishing Limited.

Matsubara, Takehiko, 2003. *Furansu Kindaikinukogyoshiron*. Kyoto: Shoyoshobou.

Matsunaga, Gosaku, 1897. *Shinkoku Sangyo Shisatsu Fukumeisho.* Noshomusho Shomukyoku.

Matsuura, Toshitaka, 2006. Zairaigijutsukairyo no sasaeta kindaika: Tomiokaseishijo no paradokkusu wo koete

Miyoshi, Yonekuma, 1892. *Ifutsusangyojijyo*. Ueda: Shinanosangyodokokai.

Nakamura, Zenuemon, 1849. *Kaikotoukeihiketsu*.

Naganoken Kyoikuiinkai Bunkazaihogoka ed., *Naganoken Kindaikaisan Sogochosa* [Nagano modern heritage survey report]. Naganoken Kyoikuiinkai.

Naganoken Sanbyoyoboujimusho, 1910. *Naganoken Fuketsu Shirabe* [Nagano Prefecture cold storage research].

Nihon Gakushiin Nihonkagakushi Kankoukai ed., 1960. *Meijimae Nihonsangyogijyutushi*. Tokyo: Nihongakujyutsushinkoukai.

Norinshodaijinkanbosomuka ed., 1958. *Noringyoseishi, Dai 3-kan.* Tokyo: Zaidanhojinnorinkyokai.

Noshomushonomukyoku, 1919. *Sangyotorishimariseiseki* [Sericulture legislative report] (Taisho 1, 3,5,6 nendo).

Ono, Akira, 1991. Wagakuni niokeru yoshikiseishigijutsu no tekiseika wo meguru shomondai -Shinshu shiki seishiho no jirei wo chusin ni. *Kyoto Gakuen Daigaku Keizaigakubu Ronshu.* 1 (3), pp.41-59. Kyoto: Kyoto Gakuen Daigaku Keizaigakubugakkai.

Ono, Akira, 2010. Amerikashijo de nihonsanseishi ga yakushinshita riyu nitsuite. *Kyoto Gakuen Daigaku Keizaigakubu Ronshu*. 19(2), pp.1-55. Kyoto: Kyoto Gakuen Daigaku Keizaigakubugakkai.

*Sangokushi Gisho Wajinden* [Annals of the three kingdoms]

Shimazaki, Akinori, 2000. *Seishigijyutsu no ayumi-"Seishi-Kindaika no Ishizue*. Takasaki: Nihonkinunosato.

Shimizu, Kinzaemon, 1847. *Yosankyokouroku Jyokan*, Gekan.

Soda, Saburo 1994. *Chugoku Kindai Seishigyoshi no Kenkyu* [Research on history of modern Chinese reeling industry]. Tokyo: Kyuko Shoin.

Tajima, Yahei, 1872. *Yosanshinron* [New treatise for sericulture]. Tokyo: Izumodera Manjiro.

Tomiokashi Kyoikuiinkai, 2010. *Tomioka Seishijo no oyatoigaikokujin ni kansuru chosahoukoku.* Tomiokashi: Tomiokashi Kyoikuiinkai.

Tomiokashi Kyoikuiinkai, 2011. *Nihonkoku no Yosan ni kansuru Igirisukoushikan shokikan Adamuzu niyoru houkokusho*. Tomiokashi Kyoikuiinkai.

UNESCO-ICOMOS Documentation Centre, 2009. *Industrial and Technical heritage in the World Heritage List*. UNESCO-ICOMOS Documentation Centre. [online] Available at: <http: //www.international.icomos.org/centre_documentation/bib/worldheritage-industrialsites.pdf> [Accessed 2 February 2011]

Vignon, L., 1890. *La Soie*. Paris : J.B.Bailliere et Fils.

Watson, Mark, 2010. *International context for textile sites*. Documentation Centre in TICCIH's website. [online] Available at: <http://www.mnactec.cat/ticcih/documentation.php> [Accessed 2 February 2011]

Xu, Xin Wu ed., 1990. 中国近代繅絲工業史 [Modern history of silk industory in China]. Shanhai: Shanhaijin-minshuppansha.

Yamagataken Kyoikuiinkai and Fukushimaken Kyoikuiinkai ed., 1998. *Hokkaido, Tohokuchiho no Minka 3 Yamagata, Fukushima* (Nihon no Minka chosahoukokushoshusei dai 3 kan). Tokyo: Toyoshorin.

Yamanashiken Kyoikuiinkai, Naganoken eds., 1998. *Chubuchiho no Minka 3 Yamanashi, Nagano* (Nihon no Minkachosa Houkokushosyusei dai 9 kan). Tokyo: Toyo Shorin.

Yoshida, Shikei, 1933. *Yosansuchi*. Gunmaken Shibukawamachi: Shibukawamachi Yosanjikkoukumiai.

Yuasa, Masahiko ed., 1989. *Sakaimachi no Minka to Yofukenzoubutsu*. Gunmaken Sakaimachi.

Zanier, Claudeio, 1998. Kinuboeki to shoki no nichiikoryu. Nichiibunkakenkyu 36, pp.51-69. Tokyo: Nichiikyo-kai.

Zanier, Claudeio, 1994. *Where the Roads Met: East and West in the Silk Production Processes.* Kyoto: Italian School of East Asian Studies.

## (iii) Information of sources cited in the dossier

### Figures cited in the nomination document

Figures 2-5, 2-6, 2-7, 2-8, 2-9, 2-10, 2-11, 2-12, 2-13, 2-14, 2-15, 2-16, 2-17, 2-18: Research of buildings in old Tomioka Silk Mill. Tomioka City Board of Education. 2006.

Figures 2-20, 2-21, 2-22: Report of research on Tajima Yahei Sericulture Farm. Isesaki City Board of Education. 2012.

Figures 2-24, 2-25, 2-26, 2-27: Preservation and management plan of Nationally Designated Historic Site Takayama-sha Sericulture School. Fujioka City Board of Education. 2012.

Figure 2-29: Briefing material of cold storage (created in September 21st, 2012). Division of cultural property protection, Shimonita Town Board of Education, 2012.

**Photographs used in the nomination document**

Photo 2-33: *Examples of automatic reeling machines exported by Japan Nembri Ind., Iseo, Brescia, Italy 1961*. The Japanese Society of Silk Science and Technology.

Photo 2-34: *Examples of automatic reeling machines exported by Japan Gilan Silk Ind.. Gilan, Iran 1978*. The Japanese Society of Silk Science and Technology.

Photo 2-35: *Woodblock print of the Tomioka Silk Mill, ca. 1873*. Nippon Silk Center.

Photo 2-36: *Paul Brunat standing, second from the right.* Tokyo National Museum, c. 1872.

Photo 2-37: *A scene during the time of original construction, east cocoon warehouse.* Tokyo National Museum, c. 1872.

Photo 2-38: *Interior of the silk-reeling plant at the time of establishment.* Tokyo National Museum, c. 1872.

Photo 2-39:*Silkworm egg production laboratory of Hara company, sericulture improvement division(demolished).* Katakura Industry Co., Ltd., 1908.

Photo 2-40: *Minorikawa style multi-end silk-reeling machines*. Katakura Industry Co., Ltd.

Photo 2-42: *Aerial view of Tomioka Silk Mill in the 1940s-50s.* Tomioka City.

Photo 2-43: *Interior of the katakura mill(Tomioka silk Mill) before closing.* Katakura Industry Co., Ltd., c. 1987.

Photo 2-44: *Portrait of Yahei Tajima.* Kenichi Tajima.

Photo 2-45: *Divination plan, Tajima Yahei Sericulture Farm 1863*. Kenichi Tajima.

Photo 2-46: *Woodblook print of Tajima Yahei Sericulture Farm "Yosan-shinron(New Theory of Sericulture)" by Yahei Tajima, 1872*. Gunma Prefectural Library.

Photo 2-47: *Tajima Yahei Sericulture Farm in the early 20th century.* Kenichi Tajima.

Photo 2-48: *Sericulture buildings at Matsugaoka Land Reclamation Site in Yamagata*. Yamagata Prefecture Matsugaoka Land Reclamation Site.

Photo 2-49: *Chogoro Takayama.* Fujioka City.

Photo 2-50: *Historic photo(date* unkown) of Takayama-sha Sericulture School when it was as a practical school for sericulture training. Gunma Prefectural Museum of History.

Photo 2-51: *Illustration of Takayama-sha Sericulture School*. Fujioka City.

Photo 2-52: *Seitaro Niwaya(1862-1936).* Shimonita Town.

Photo 2-53: *Arafune Cold Storage in the 1910's.* Shimonita Town.

Photo 2-54: *Historic photo, Silkworm eggs were kept in the Arafune Cold Storage, 1909*. Shimonita Town.

Photo 2-55*: Entry log book for Arafune Cold storage, 1912 photo*. Shimonita Town.

Photo 2-56: *Silkworm egg card,on which moths laid eggs.* Shimonita Town.

Photo 2-57: *Advertisement for Arafune Cold storage, 1922*. Shimonita Town.

Photo 3-5: *S4 Reinstatement of stone walls, Arafune Cold Storage.* Japan Cultural Heritage Consultancy, 2012.

Photo 3-6: *Cleaning activities by volunteers.* Friends of Tomioka Silk Mill, 2011.

Photo 3-7: *Derwent Valley Mills, United Kingdom.* Gunma Prefecture, 2007.

Photo 3-8: *Reconstruction model of Derby silk mill, Derwent Valley Mills, United Kingdom.* Gunma Prefecture, 2007.

Photo 3-9: *Historic villages of Shirakawa-go and Gokayama, Japan*. Gunma Prefecture, 2012.

Photo 3-10: *San Leucio Complex, 18th century Royal Palace of Caserta, Italy.* M. Louis Bergeron.

Photo 3-11: *New Lanark, United Kingdom.* Mark Watson, 1999.

Photo 3-12: *Filature in Laroque, Herault,Languedoc-Roussillon, France.* Koinetwork g.e.i.e.

Photo 3-13: *Filature "Maison Rouge," Saint Jean du Gard, Gard, Languedoc-Roussillon, France.* Koinetwork. g.e.i.e.

Photo 3-14: *Filature in Caussignac, Gard, Languedoc-Roussillon, France.* Koinetwork g.e.i.e.

Photo 3-15: *Il Filatoio di Caraglio (silk throwing mill) (1676-1678), Piedmont, Italy.* Koinetwork.g.e.i.e.

Photo 3-16: *Moulinage de la soie (silk throwing mill) "Galicière," Chatte, Isère, Rhône-Alpes,France.* Courtesy of Ass. Les Amis de la Galicière.

Photo 3-17: *Filature (both reeling and throwing) in Le Mazel, Gard, Languedoc-Roussillon, France.* M. Louis Bergeron.

Photo 3-18: *Interior of silkworm rearing building, Moulinage de la soie (silk throwing mill) Galliciere," Chatte, Isere, Rhone-Alpes, France.* Courtesy of Ass. Les Amis de la Galicière.

Photo 3-19: *Second reeling plant, Muroyama Silk-Reeling mill, Mie, Japan 1903.* Gunma Prefecture, 2012.

Photo 3-20: *Office building, Former Yamajo Miyasaka Silk-Reeling mill, Nagano, Japan 1927.* Gunma Prefecture, 2011.

Photo 3-22: *Silkworm-reeling building, the Matsugaoka Land Reclamation site.* Gunma Prefecture, 2009.

Photo 3-24: *Kyoshin-sha sericulture school.* Gunma Prefecture, 2005.

Photo 4-2: *Providing seismic protection, East Cocoon Warehouse, Tomioka Silk Mill.* Tomioka City, 2011.

Photo 5-1: *Training for conservation and management techniques.* Gunma Prefecture, 2012.

Photo 5-2: *Participation of private and community organizations (School visit of Zaguri hand-reeling).* Gunma Prefecture, 2012.

Photo 5-8: *Interior of Goto Textile Mill.* Gunma Prefecture, 2007.

Photo 5-9: *Tools of sericulture.* Maebashi City, 2007.

Photo 5-10: *Monzen-harukoma (folk music and dance).* Kawaba Village, 2010.

Photo 6-1: *Data logger installed at the site of Arafune Fu-ketsu Silkworm-egg Storage.* Shimonita Town.

# 08

# Contact Information of Responsible Authorities

# 8. Contact Information of Responsible Authorities

## 8.a. Preparer

Office for World Cultural Heritage
Monuments and Sites Division
Cultural Properties Department
Agency for Cultural Affairs
3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo, 100-8959, JAPAN
Tel: +81-3-6734-2877
Fax: +81-3-6734-3822
E-Mail: w-isan@bunka.go.jp

## 8.b. Official Local Institution/Agency

World Heritage Registration Promotion Division,
Gunma Prefectural Government
1-1-1 Ote-machi, Maebashi City, Gunma, 371-8570, JAPAN
Tel: +81-27-226-2328
Fax: +81-27-224-2812
E-mail:sekaiisan@pref.gunma.lg.jp

Cultural Property Protection Division
Gunma Prefecture Board of Education
1-1-1 Ote-machi, Maebashi City, Gunma Prefecture 371-8570, JAPAN
Phone: +81-27-226-4684
Fax: +81-27-243-7785
E-Mail: bunkaho@pref.gunma.lg.jp

## 8.c. Other Local Institutions

### S1 Tomioka Silk Mill

Tomioka Silk Mill Division, Department of World Heritage and Town Planning, Tomioka City
1-1 Tomioka, Tomioka city, Gunma Prefecture 370-2316, JAPAN
Phone: +81-274-64-0005
Fax: +81-274-64-3181
E-Mail: worldheritage@city.tomioka.lg.jp

**S2 Tajima Yahei Sericulture Farm**

Cultural Property Protection Division, Isesaki City Board of Education
1-64-5 Nishikubo-cho, Isesaki City, Gunma Prefecture 379-2298, JAPAN
Phone: +81-270-63-3636
Fax: +81-270-63-3001
E-Mail: bunkazai@city.isesaki.lg.jp

**S3 Takayama-sha Sericulture School**

Cultural Property Protection Division, Fujioka City Board of Education
1291-1 Shiroishi, Fujioka City, Gunma Prefecture 375-0055, JAPAN
Phone: +81-274-23-5997
Fax: +81-274-23-5997
E-Mail: bunkazai@city.fujioka.gunma.jp

**S4 Arafune Cold Storage**

Section of Cultural Property Protection, Shimonita Town Board of Education
In the Shimonita Town Furusato Center
71-1 Shimokosaka, Shimonita Town, Gunma Prefecture 370-2623, JAPAN
Phone: +81-274-82-5345
Fax: +81-274-82-5345
E-Mail: bunkazai@town.shimonita.lg.jp

## 8.d. Official Web Address

**Agency for Cultural Affairs**
http://www.bunka.go.jp

**World Heritage Registration Promotion Division, Gunma Prefecture**
http://worldheritage.pref.gunma.jp

**Tomioka Silk Mill, Tomioka City**
http://www.tomioka-silk.jp/hp/en/index.html

# 09

# Signature on behalf of the State Party

## 9. Signature on behalf of the State Party

KONDO, Seiichi
Commissioner,
Agency for Cultural Affairs
January, 2013
Signed on behalf of the government of Japan