

“Sites of Japan’s Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining” (No.1484)  
**Status of Damages Caused by Heavy Rain at the Terayama Charcoal Kiln  
 (Component Part 2-2) and Future Measures**

The Terayama Charcoal Kiln (Kagoshima City, Kagoshima Prefecture), Component Part 2-2 of the “Sites of Japan’s Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining” was damaged in a landslip caused by heavy rains between June 27 and July 1, 2019. The following report will be submitted to the UNESCO World Heritage Centre on the status of the damages and measures to be taken in future.

Further, we will continue to provide additional information regarding the progress of the restoration measures as necessary.

**1. Overview of the Component Part**

(1) Name and Location

Name: “Sites of Japan’s Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining” (No.1484)  
 Location: Kagoshima City, Kagoshima Prefecture

(2) Location and Scale of the Terayama Charcoal Kiln (Component Part 2-2)

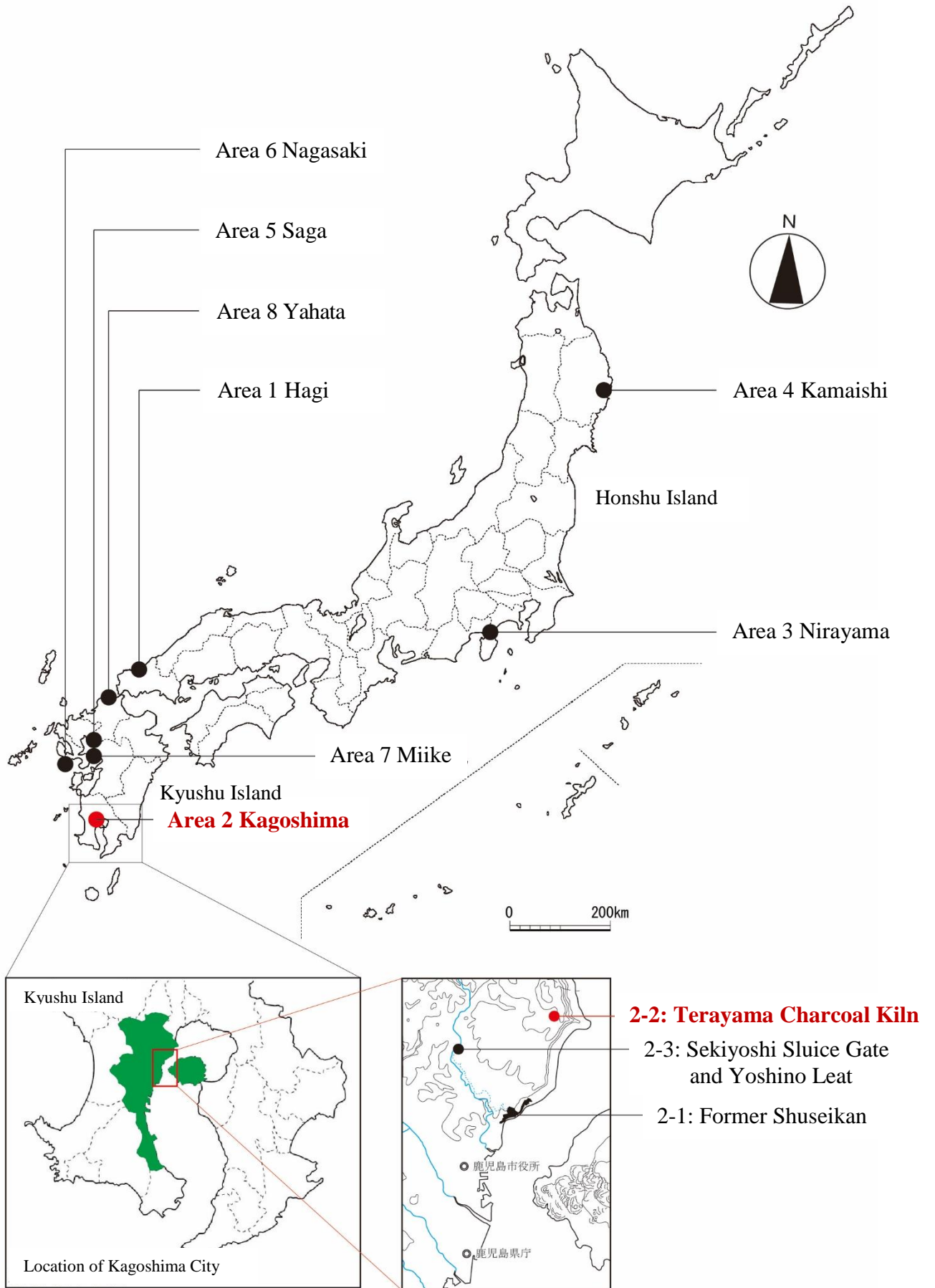
Component Part Name	Location	Latitude Coordinates	Longitude Coordinates	Component Part Area (ha)	Buffer Zone Area (ha)
Terayama Charcoal Kiln	Yoshino-cho, Kagoshima City	31° 39' 42.3" ~ 45.5" <del>N</del>	130° 36' 0.6" ~ 4.2" <del>E</del>	0.64	2.01



Photo before the disaster of Terayama Charcoal Kiln(photographed Feb. 18, 2019)

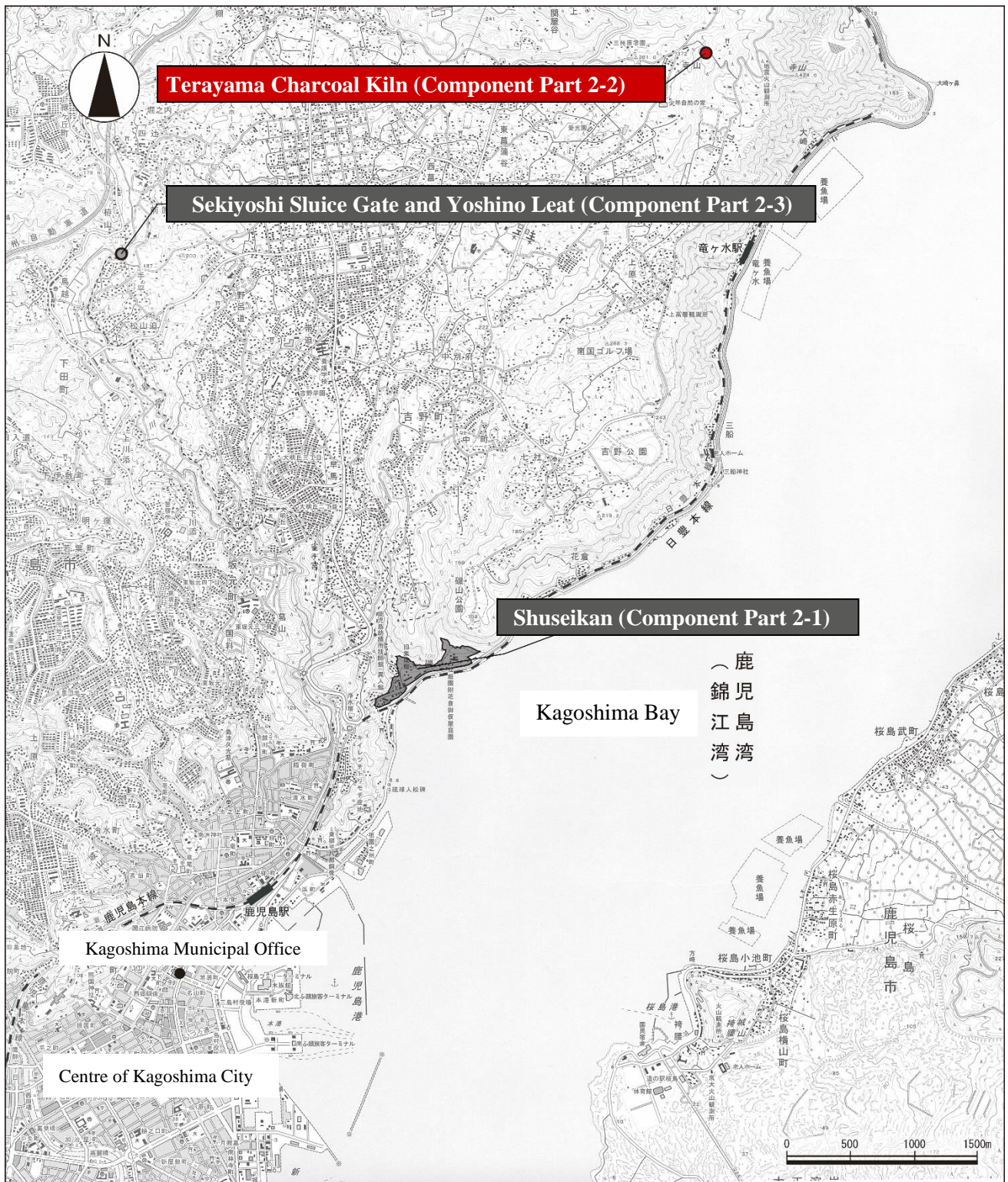
**Appendix 9**

(3) Map of the Kagoshima Area and Component Parts of the “Sites of Japan’s Meiji Industrial Revolution”



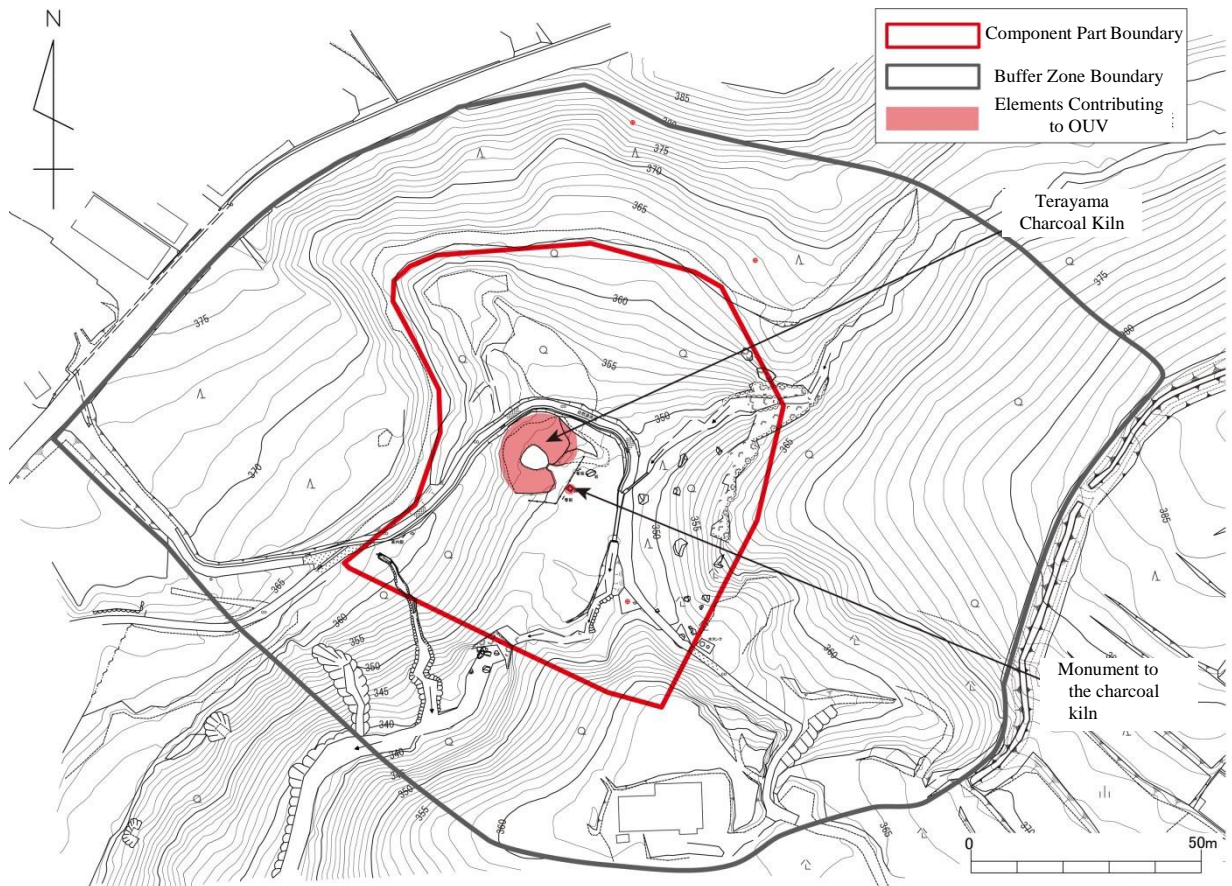
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(4) Map of Component Parts in Kagoshima Area



## Appendix 9

### (5) Terayama Charcoal Kiln (Component Part 2-2) and Buffer Zone Boundaries



### (6) Laws and Regulations Applicable to the Component Part and Buffer Zone

Component Part Name	Section	Laws, etc. Concerning Protection				
		Law for the Protection of Cultural Properties (Historic Site)	National Parks Act (Class II Special Zone)	City Planning Act (Terayama Scenic District)	Landscape Act and Kagoshima City Landscape Ordinance (Natural Green Zone)	The Act on Regulation of Housing Land Development (Regulated Area For Housing Land Development)
Terayama Charcoal Kiln	Boundary of Component Part	○	○ *partial	○	○	○
	Boundary of Buffer Zone	—	○	○	○	○

## (7) Ownership / Administration of the Component Part and Buffer Zone

Site	Owners / Administrator
Component Part	National University Corporation(Kagoshima University)
	Kagoshima City government
	Private Individuals
Buffer Zone	National University Corporation(Kagoshima University)
	Kagoshima Prefectural government
	Kagoshima City government
	Private Individuals

## (8) “Sites of Japan’s Meiji Industrial Revolution” and the Terayama Charcoal Kiln (Component Part 2-2)

## a) Criteria for which the Property was Inscribed

## ➤ Criterion (ii)

The Sites of Japan’s Meiji Industrial Revolution illustrate the process by which feudal Japan sought technology transfer from Western Europe and America from the middle of the 19th century and how this technology was adopted and progressively adapted to satisfy specific domestic needs and social traditions, thus enabling Japan to become a world-ranking industrial nation by the early 20th century. The sites collectively represents an exceptional interchange of industrial ideas, know-how and equipment, that resulted, within a short space of time, in an unprecedented emergence of autonomous industrial development in the field of heavy industry which had profound impact on East Asia.

## ➤ Criterion(iv)

The technological ensemble of key industrial sites of iron and steel, shipbuilding and coal mining, is testimony to Japan’s unique achievement in world history as the first non-Western country to successfully industrialize. Viewed as an Asian cultural response to Western industrial values, the ensemble is an outstanding technological ensemble of industrial sites that reflected the rapid and distinctive industrialization of Japan based on local innovation and adaptation of Western technology.

## b) The Contribution of the Terayama Charcoal Kiln to the Outstanding Universal Value

The 23 component parts making up the Sites of Japan’s Meiji Industrial Revolution included three sites in the Kagoshima Area: the Former Shuseikan, the Terayama Charcoal Kiln, and the Sekiyoshi Sluice Gate. All of these are component parts associated with the Shuseikan Enterprise, a project by which the feudal lord Shimazu Nariakira, looking at Japan as a whole, sought to build up the country as a powerful and wealthy nation through the policies of “Fukoku Kyōhei” (enriching the country and strengthening the military) and “Shokusan Kōgyō” (encouraging new industry).

Of the three developmental phases reflected in the Outstanding Universal Value of the Sites of Japan’s Meiji Industrial Revolution, the three component parts located in the city of Kagoshima are heritage sites from the early stages of industrialization that belong to the initial “phase of trial and error experimentation” with regard to the field of iron and steel manufacture, and to both the initial “phase of trial and error experimentation” and the secondary “phase of direct importation of western technology” with regard to the field of shipbuilding.

Of the three, the Terayama Charcoal Kiln was a large kiln built for the mass production of powerful-

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firing hard charcoal to supply the fuel needed for the Shuseikan Project. In addition to representing the hard charcoal production system, the site also forms part of the whole Shuseikan industrial system which illustrates the phase of trial and error experimentation in the iron and steel manufacturing field that took place at the Sites of Japan's Meiji Industrial Revolution.

### 2. Causes and Overview of the Disaster

#### (1) Basic Information on the Heavy Rains (Source: Kagoshima Local Meteorological Observatory)

Between June 28 and July 4, a seasonal rain front hovered over Kyushu Island, a front that was stimulated when warm and extremely moist air flowed in from the south. In conjunction with this, driving rains fell in localized areas across Kagoshima Prefecture from June 27 to July 3. Total precipitation in the vicinity of the Terayama Charcoal Kiln (Component Part 2-2) appears to have reached between 700 and 800 mm.

### 3. Principal Damage Sites and Conditions

Damage due to heavy rains occurred on two occasions as described below. For the location and status of the damages, refer to Appendix 1 "Disaster Summary and Photographs."

#### (1) June 28

Following the heavy rains beginning on June 27, water seeped into the soil behind the masonry surrounding the charcoal kiln site. The masonry, unable to bear the resulting weight, collapsed over a section on the right side (facing) of the kiln site (approx. 2.5m high by 2m wide).



#### (2) July 1

Heavy rains that continued intermittently from June 27 then caused landslips of approx. 100m long and 30m to 50m wide on a slope northeast of the charcoal kiln site. As a result, a large volume of earth, sand, and fallen trees was carried onto the grounds of the site, and a section of masonry on the left side (facing) of the charcoal kiln site collapsed (approx. 2.5m high by 3.5m wide). In addition, most of the charcoal kiln site was buried in soil by the landslide. The "Monument to the charcoal kiln" was not damaged, however. (See the right photograph of the top on p.7)



#### 4. Impact on Constituent Elements Contributing to the Outstanding Universal Value (OUV) of the World Heritage Site

##### (1) Damage Status for Constituent Elements Contributing to the OUV

Component Part Name	Constituent Elements Contributing to the OUV	Damage Status
Terayama Charcoal Kiln	Charcoal kiln	<p>June 28 Masonry collapsed over a section on the right side (facing) of the kiln site measuring approx. 2.5m high by 2m wide</p> <p>July 1 A large volume of earth, sand, and fallen trees was carried into the component part, and masonry collapsed over a section on the left side (facing) of the kiln site measuring approx. 2.5m high by 3.5m wide. *Details of the status of the interior of the charcoal kiln site have not yet been confirmed.</p>
	Monument to the charcoal kiln	No problems.

##### (2) Impact on the Constituent Elements of the Component Part Contributing to the Outstanding Universal Value of the World Heritage Property

While masonry around the charcoal kiln that contributed to the OUV collapsed on two occasions as the result of the recent heavy rain and landslide damage, the stone material that made up the masonry was not washed away from the site, and has all been left behind on the grounds of the component part.

In the past, detailed positional information of the individual stones has been regularly recorded through fixed-point observation and three-dimensional laser scanning to understand the displacement of the masonry at the charcoal kiln site. At the same time, information on the structure and construction methods used for the original charcoal kiln have also been collected via archaeological excavations.

Accordingly, even though the masonry, etc. surrounding the charcoal kiln site was severely affected by the recent damages, the stone materials from the collapsed masonry were not washed away from the

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component part, as described in 4. and 5. This means that it will be possible to restore the original masonry to a stable state by collecting the materials and rebuilding the remains of the charcoal kiln site.

Also, because this plan entails taking more measures to mitigate damages than ever before (e.g., by stabilizing the surrounding slopes and improving drainage), the restoration will keep the site in an even more stable condition, leading to the maintenance and strengthening of constituent elements that contribute to the OUV.

### 5. Future Measures

Future measures for the damaged areas will be divided into two stages: (1) measures to be implemented in the current fiscal year, and (2) full-scale restoration to be implemented from the next fiscal year forward. In addition, the division of roles for related organizations will be as shown in (3).

#### (1) Immediate Measures

The following items will be implemented as immediate measures anticipated for the current fiscal year, while design and full-scale restoration work will be started from next fiscal year. Even so, plans may change in future as the result of coordination among the parties concerned and further consideration, etc. of the surveys and construction methods.

##### a) Charcoal Kiln

- Because the large amount of rainwater that flowed out of the gorge north of the charcoal kiln site scoured the surface of the ground in the vestibule in front of the charcoal kiln site, the channel was changed by partially excavating the sediment and laying sandbags. As it is assumed that the path of future landslips due to heavy rains and typhoons will shift, the flow path will be managed appropriately.
- Because the collapsed section of the masonry on the left side (facing) of the charcoal kiln site remains exposed, a flow of rainwater directly into the area runs the risk that the remaining masonry will collapse with sediment outflow. As such, it will be protected with sandbags and tarpaulins.
- In addition to removing the earth, sand, trees, and other debris that have flowed onto the charcoal kiln site, damage to the site will be surveyed and recorded. When doing so, careful attention will be paid so that the remains of the charcoal kiln remains unaffected.
- The position of stone materials from the collapsed masonry will be recorded as they are being picked up by such means as photography or surveying, after which they will be stored in such a way as not to suffer any ill effects.

##### b) Collapsed Slope Northeast of the Charcoal Kiln

- In order to prevent the inflow of additional sediment from above the collapsed part as well as the erosion of the slope, large sandbags will be placed on the flat area near the northern end of the component part(see (7) Range in Appendix 1). These large sandbags will be colored in consideration of the landscape.
- We will remove the earth, sand, trees, and other debris that has flowed onto the component part, giving due consideration so as not to compromise the OUV.



**(2) Full-scale Restoration Work**

- As well as a detailed survey to record the state of the damages, a detailed geological survey necessary for the basic design of the full-scale restoration work will be conducted in order to finalize the restoration method.
- In establishing the full-scale restoration method, discussions and examinations from a professional standpoint will be carried out by members of the Kagoshima City Shuseikan District Conservation and Utilization Expert Committee with the guidance and advice of the Agency for Cultural Affairs and the Cabinet Secretariat of the Government of Japan, and views will also be coordinated with overseas experts concerned with industrial heritage.

**(3) Division of Roles among the Parties Concerned**

To ensure that the conservation and management of the Sites of Japan's Meiji Industrial Revolution is carried out in an integrated manner, local conservation councils have been established in each area, tasked with sharing information with each other and building consensus.

In this case, the points listed below will be confirmed among the relevant organizations that make up the Council for the Management and Preservation of the Shuseikan Area (Member organizations: Cabinet Secretariat, Ministry of Land, Infrastructure, Transport and Tourism, Ministry of the Environment, Kagoshima Prefecture government, Kagoshima Prefectural Education Agency, Shimadzu Limited, Iso Residents' Association, Kagoshima City government, Kagoshima City Board of Education).

- The municipality of Kagoshima City, as the owner of the historic Terayama Charcoal Kiln site, will work together with relevant organizations to secure financial resources and repair damaged areas on the grounds of the component part.
- Affected areas in the buffer zone will be restored in a steady manner after discussions with the landowner on the scope of restoration, parties responsible for implementation, and cost burdens.
- In the event that other sites affected by the disaster are newly identified in future, discussions will be held on the division of roles among the relevant organizations with regards to restoration.

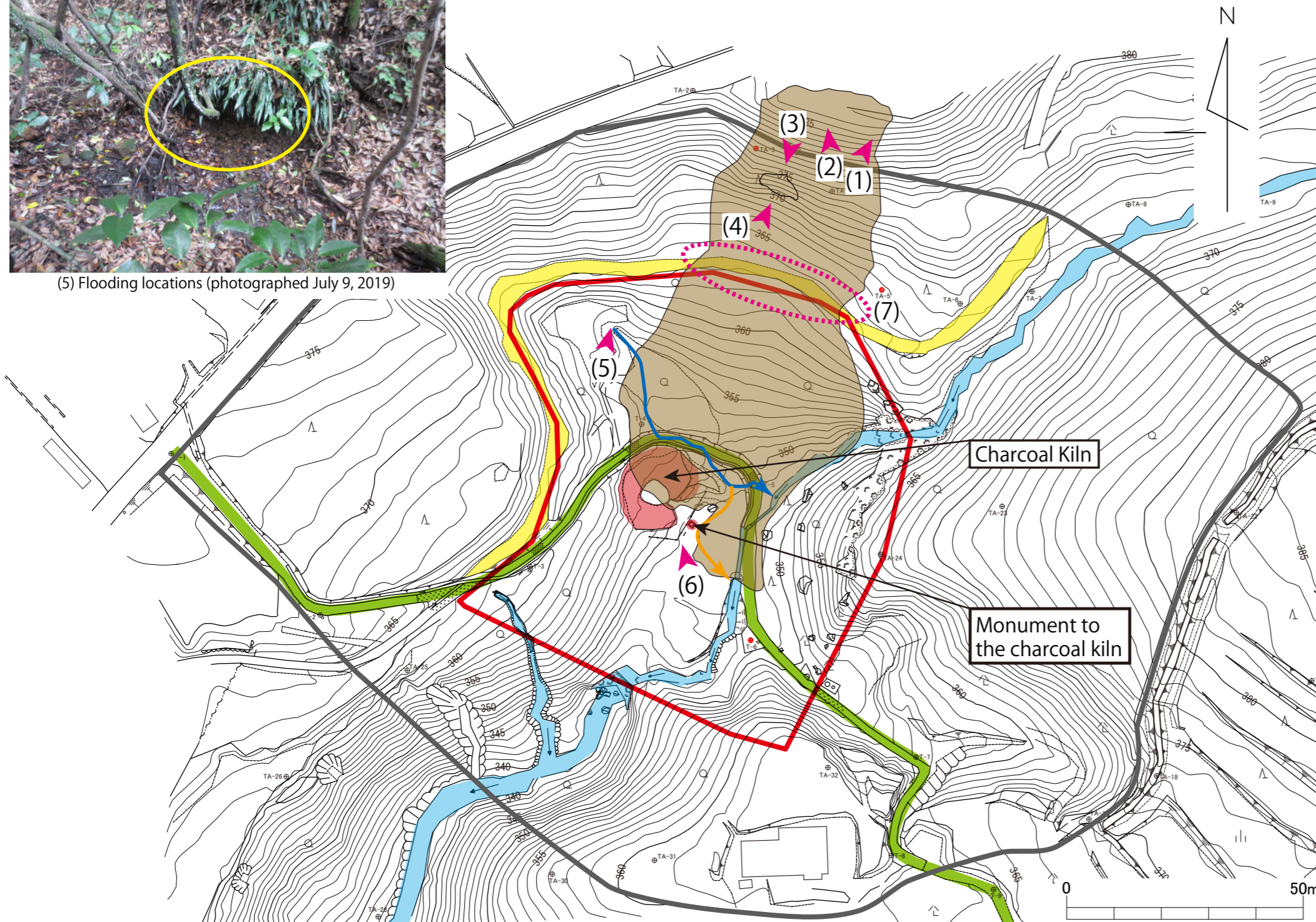
**6. Other Matters**

In future, we hope to provide additional information to the UNESCO World Heritage Centre as necessary in line with the progress of restoration.

**Appendix 1: Drawings and photos of damage places**  
(Surveyed and drawn July 9, 2019)



(5) Flooding locations (photographed July 9, 2019)



(6) Kiln soon after damage occurred (photographed July 1, 2019)



(1) Upper part 1 of landslide (photographed July 9, 2019)



(2) Upper part 2 of landslide (photographed July 9, 2019)



(3) View from upper part of landslide (photographed July 9, 2019)



(4) Midslope of landslide (photographed July 9, 2019)