Nomination for inscription on
The UNESCO World Heritage List

CULTURAL LANDSCAPE OF BALI PROVINCE

The Ministry of Culture and Tourism of the Republic of Indonesia
The Government of Bali Province
2009

NOMINATION FORM

WORLD HERITAGE LIST

Nomination Form

Under the terms of the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by the General Conference of UNESCO in 1972, the Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage, called “the World Heritage Committee” shall establish, under the title of “World Heritage List”, a list of properties forming part of the cultural and natural heritage which it considers as having outstanding universal value in terms of such criteria it shall have established.

The purpose of this form is to enable States Parties to submit to the World Heritage Committee nominations of properties situated in their territory and suitable for inclusion in the World Heritage List.

The form, completed in English, is sent in four copies to:

The Secretariat
World Heritage Committee
Division of Cultural Heritage
UNESCO
7 Place de Fontenoy
75352 Paris 07 SP

UNITED NATIONAL EDUCATIONAL SCIENTIFIC AND CULTURAL ORGANISATION

Address by
The Minister for Culture and Tourism of the Republic of Indonesia

Let us praise to God, Almighty and because of His Permission, the revised Nomination "The Cultural Landscape of Bali Province" for inscription to World Heritage List could be accomplished. It is quite ambitious to submit this dossier to UNESCO WHC after being deferred. Nevertheless, commitment to continue preserving cultural signifance of Bali which have been rooted from ancient tradition, in facing rapid development, increasing pressure of modernization, tourism and globalization is an effort to protect and safeguearding the heritage.

The island of Bali has often been referred to be a "paradise" on earth, a traditional society whose inhabitants have preserved unique cultural traditions, heritage and value systems. It is indeed a living culture of people who has grown in harmony with its natural environment, strong interaction between the human-built monuments, the social and religious life. Therefore, we are glad ICOMOS agrees that the ancient and persistent subak system of Bali, with its associated temples, rice terraces and philosophy of Tri Hita Karana, are of outstanding universal value. In connection to this revised version, we took account of to chose sites of subaks and water temples that havemostly are under threat from development (loss of agricultural land).

The preparation of this nomination has involved many stakeholders. Therefore, allow me to outset Department of Culture and Tourism's sincere thanks to the Government of Bali Province, the many experts and, of course, the local people who worked together in partnership to formulate this dossier. My special thanks go to Prof. Stephen Lansing and students for his assistance in harmonizing and finalizing the nomination dossier.

In conclusion, we hope this nomination will be considered by the UNESCO – World Heritage Center. Thank you very much.

Minister of Culture and Tourism

Jero Wacik

Address by the Governor of Bali Province

The nomination of the Cultural Landscape of Bali Province to be inscribed in the World Heritage List has been a long process of works and being revised for quite amount of times. We should acknowledge that it is a learning process of how to manage Bali's heritage which have been known worldwide in an universal perspective. Nearly 7 years of effort and finally the nomination was accepted by UNESCO WHC as a complete document in 2007, but then following to ICOMOS evaluation, the nomination has been deferred for several reason. The recommendation allow us to seek deeper understanding that nominating such sites to be inscribed in the World Heritage List should met not just criteria as described in the UNESCO Operational Guidelines, but also how well the conception being implemented in the field and manage it for future generation.

As we aware, concept of sites preservation is not only architectural and monuments remain but expanded to the living culture that still exist within the Balinese. We realized that ICOMOS evaluation gave wider view of how to conserve and preserve the Culture Landscape of Bali Province. In facing this situation, the Government of Bali Province is still committed to proceed the nomination as it is in accordance with the local government's campaign of *Ajeg Bali* to preserve Balinese culture, society, and politics from the effects of globalization. Although globalization has its advantages for our nation's progress from the benefits of the rapid transformation and development of science, globalization also causes a different effect when people cannot absorb and take advantage of these changes because of lack of culture and educational background.

In the process of finalizing the dossier, stakeholders meeting involving whole elements of community were held to gain harmonious agreement, specially among owners and foundation of newly nominated sites and work together to develop future management plan.

Therefore, I fully support the process of this nomination and do hope that with a short limit of time, we put all our effort, bringing local, national and also international experts to work with the dossier, and UNESCO WHC to consider it

And finally, to the team that has done the revision for the fifth time, I would like to say thank you. I hope for continuing cooperation from all the related stakeholders.

Governor

Made Mangku Pastika

ACKNOWLEDGEMENT

Hari Untoro Dradjat
Director General of History and Archaeology

This World Heritage Nomination dossier is the result of a very rewarding collaboration among various institutions, universities, experts, and the local communities of Bali. The long preparation of this dossier since year 2000 and until recenty ICOMOS examination has been adopted in the 32nd Session UNESCO WHC meeting in Quebec – Canada (2008) to defer the nomination. Strong committment and initiatives from the Government of Bali, immediately established Technical Working Group and provide support from national and international experts to continue and submit the dossier to UNESCO on the following year. Early 2009, new revised have been submitted to UNESCO WHC, but still need to complete spatial information on the proposed sites. In this occassion, Directorate General for History and Archaeology as National Focal Point for Cultural Heritage would express our gateful thanks to the following experts who still consistence to made contributions and comments that have helped with the preparation of the nomination. We are particularly thankful to:

Member of Technical Working Group:

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Executive Summary

State Party	**:** Indonesia
State, Province or Region	**:** Province of Bali
Name of Property	**:** The Cultural Landscape of Bali Province: Manifestation of the *Tri Hita Karana* Philosophy on *Subak* System

Introduction

The sites chosen for this nomination were selected to both represent and help to preserve the Balinese *subak* system, which manages the rice terraces of Bali. *Subak* is a Balinese word, which first appears in royal inscriptions in the eleventh century. It refers to a unique social and religious institution; self-governing, democratic associations of farmers who share responsibility for the just and efficient use of irrigation water to grow paddy rice. From a comparative perspective, two features of the subak system stand out. The first is the success of this cultural innovation in creating a landscape of spectacular beauty that has provided an ecologically sustainable foundation for Balinese civilization for the past millennium. This achievement is rooted in the second remarkable feature of the subaks: their success as a system of cooperative resource management sustained by self-governing democratic institutions.

The *subaks* and associated water temple networks of Bali reflect the Balinese philosophical principle ***Tri Hita Karana*** ("three causes of goodness"), which promotes an harmonious relationship between the individual and the realms of the spirit (*parhyangan*), the human world (*pawongan*) and nature (*palemahan*). This abstract idea is given concrete realization in the lives of the Balinese through the institutions of *subaks* and water temples, which give spiritual meaning to the governance of the rice terrace ecology. The water temples, subaks, forests, lakes and rice terraces of Bali are living expressions of the ancient and enduring concept of ***Tri Hita Karana.***

The religious aspects of the subak stem from the belief that irrigation water is a gift from the Goddess of the Lake(s), Dewi Danu. Subaks are entrusted with the management of this gift, and farmers contribute a small portion of their harvest each year to religious rites in subak temples, which are dedicated to Dewi Danu and other deities associated with the fertility of the land. These temples provide a venue for cooperative resource management by groups of subaks. Since the eleventh century, water temple networks have expanded to manage the ecology of rice terraces at the scale of whole watersheds.

The temple networks represent a unique response to the challenge of supporting a dense population on a rugged volcanic island in a monsoonal area. The mountainous nature of the island with deep ravines and seasonal rains has created an ecosystem that is prone to water scarcity and threats of disease and pests. Water temple networks cope with these problems by enabling clusters of *subaks* to adjust irrigation schedules at the watershed scale, controlling pests by inducing synchronized fallow cycles. Although each *subak* focuses on the management of its own rice terraces, a global solution to water allocation emerges from the temple networks, optimizing irrigation flows for all.

The rituals of the water temples draw inspiration from several ancient religious traditions including Saivasiddhanta and Samkya Hinduism, Vajrayana Buddhism, and Austronesian cosmology. The focus of water temple ceremonies is the maintenance of harmonious relationships between humans and the natural world. This is achieved through active engagement with spiritual concepts, emphasizing the dependence of the human community on the life-sustaining forces of the natural world. These ideas are expressed through the musical traditions of various types of orchestra; dramatic performances such as *topeng*, *gambuh*, *wayang*, *rejang,* and *baris*; the reading of poetry in four languages (Sanskrit, Balinese, Old, and Middle Javanese); the creation and dedication of offerings made of flowers, fruits and rice; and the performance of rituals by priests and the congregation. The temples themselves are continually repaired and embellished by stone masons, sculptors, woodcarvers, and painters. This thousand-year-old system is now threatened with collapse, due to development pressure, fragmentation of the landscape, and pollution from agricultural chemicals.

Three sites are proposed in this nomination for immediate inscription. Each of them highlights particular aspects of the subak system; collectively they define its most important features. The first site is the supreme subak temple Pura Ulun Danu Batur, located on the rim of the crater overlooking Lake Batur. The second site consists of a cluster of temples and subaks located at high elevation in the valley of Tampaksiring. Archaeological evidence indicates that this valley was the cradle of Balinese civilization. Today, waters from natural springs enclosed by ancient temples provide irrigation water for ancient rice terraces where native Balinese rice is still grown in the traditional manner by five centuries-old subaks. The Tampaksiring site represents the origin and historic continuity of the subak system, and dramatically illustrates its relationship to the formation and growth of early Balinese kingdoms. The third site comprises forests, lakes, springs, temples and subaks clustered around Mount Batukaru. This site is locally known as “Catur Angga Batukaru”, a sacred landscape whose boundaries are defined by a cluster of temples supported by local subaks and villages.

Further criteria for the choice of sites include the archaeological and historical significance of these water temples and subaks; the receptiveness of local farmers to

sustainable organic farming of native Balinese rice; the ecological viability of each site, and the way each site exemplifies a particular manifestation of the diversity and history of the subak system. All nominated sites meet the condition of authenticity and integrity required for the World Heritage List.

Name of Property and Geographical Coordinates

No	Name of Property	Administrative Locations			Coordinates (UTM) of Centre Points	
		Village	District	Regency		
001	Supreme Water Temple Pura Ulun Danu Batur	Batur Utara	Kintamani	Bangli	316732.71840	9087175.86378
002	Ancient Water Temples and *Subaks* of Tampaksiring					
A	Pura Pegulingan	Basangambu	Tampaksiring	Gianyar	314786.00000	9069435.00000
B	Pura Tirtha Empul	Manukaya	Tampaksiring	Gianyar	314591.00000	9069460.00000
C	Pura Mengening	Saraseda	Tampaksiring	Gianyar	314162.00000	9068862.00000
D	Pura Gunung Kawi (Rock Cut Temple)	Penaka	Tampaksiring	Gianyar	314266.00000	9068437.00000
E	*Subak* Basangambu	Tampaksiring	Tampaksiring	Gianyar	314249.41209	9069386.96840
F	*Subak* Pulagan	Tampaksiring	Tampaksiring	Gianyar	314244.26555	9067740.48626
G	*Subak* Kumba	Tampaksiring	Tampaksiring	Gianyar	313248.65485	9067515.86321
H	*Subak* Kulub	Tampaksiring	Tampaksiring	Gianyar	313862.32649	9065429.66405
003	Water temples of Batukaru and *Subaks*					
A	Pura Luhur Batukaru	Wong Gaya Gede	Penebel	Tabanan	291064.62858	9074194.43502
B	Pura Luhur Pucak Petali	Jatiluwih	Penebel	Tabanan	292201.59032	9075466.24615
C	Pura Luhur Besikalung	Utu	Penebel	Tabanan	295745.42709	9073189.71310
D	Pura Luhur Muncaksari	Sangketan	Penebel	Tabanan	289329.85712	9072601.18622
E	Pura Luhur Tamba Waras	Sangketan	Penebel	Tabanan	289805.81799	9069755.14862
F	*Subaks* of Batukaru area Consist of: Subak Jatiluwih, Gunung Sari, Umadui, Kedamaian, Kesambi, Soka, Gelaga Tabal, Wangaya Betan, Peselatan, Piling, Telaga, Puring, Anyar, Babakan, Klembang, Pesagi, Kuwum Keladi, Puluk-puluk, Deman, Puakan, Rejasa, Tegal Linggah, Darma, Buruan, Poh Gending, Anyar, Lebah, Merta Sari, Pangkung Petung, Pal, Sandan Amplas, Baru	Jatiluwih	Penebel	Tabanan	292315.71822	9069948.57548
004	Pura Taman Ayun (Royal Water Temple) and *Subak* Batan Badung					
A	Pura Taman Ayun	Mengwi	Mengwi	Badung	298828.37914	9055236.23350
B	*Subak* Batan Badung	Mengwi	Mengwi	Badung	299098.19328	9053712.92873

Textual Description of the Boundaries of the Nominated Property

ID	Name of Property	Boundaries
001	Supreme water temple Pura Ulun Danu Batur	Located on the rim of the volcanic crater overlooing Lake Batur in Kintamani District, Bangli Regency East: Settlement South: Main road West: Settlement North: Agricultural field
002	Ancient water temples and subaks of Tampaksiring	
A	Pura Pegulingan	Located on a hill above the Pakerisan River East: Desa Adat Basangambu settlement South: Agriculture field West: Pura Tirtha Empul North: Agriculture field
B	Pura Tirtha Empul	Located on Pakerisan River bank East: Pura Pegulingan South: Agriculture field West: Tampaksiring National Palace North: Agriculture field
C	Pura Mengening	Located on a hill above the Pakerisan River East: Desa Adat Mancingan settlement South: Agriculture field West: Desa Adat Saraseda settlement North: Agriculture field
D	Pura Gunung Kawi (Rock Cut Temple)	Located on Pakerisan River bank East: Agriculture field South: Agriculture field West: Desa Adat Penaka settlement North: Agriculture field
E	Subaks Basangambu, Pulagan, Kumba, and Kulub	Located on Pakerisan River bank East: Banjar Selat Telen Settlement South: Banjar Tengah Settlement West: Banjar Kawan Settlement North: Agricultural field
003	Water temples of Batukaru and *subaks*	Located on Batukaru Mountain slope
A	Pura Luhur Batukaru	Located on Batukaru Mountain slope East: Forest South: Settlement West: Forest North: Forest
B	Pura Luhur Pucak Petali	Located on Batukaru Mountain slope East: Agriculture field South: Agriculture field West: Settlement North: settlement

C	Pura Luhur Besikalung	Located on Batukaru Mountain slope East: Agriculture field South: Agriculture field West: Agriculture field North: Agriculture field
D	Pura Luhur Muncaksari	Located on Batukaru Mountain slope East: Forest South: Forest West: Forest North: Forest
E	Pura Luhur Tamba Waras	Located on Batukaru Mountain slope East: Forest South: Forest West: Forest North: Pangkung Pekandelan Valley
F	Subaks within Batukaru Area	Located on Batukaru Mountain slope East: Desa Adat Senganan South: Agriculture field West: Desa Adat Wongaya Gede settlement and Desa Adat Mangesta settlement North: Forest
004	Pura Taman Ayun (Royal water temple) and *subak* Batan Badung	Located downtown in Mengwi District East: Desa Adat Darmayasa settlement South: Desa Adat Alangkajeng West: Desa Adat Mandalawisata settlement North: Agriculture field

Justification

Statement of Outstanding Universal Value

The subaks and water temple networks of Bali reflect the Balinese philosophical principle ***Tri Hita Karana*** ("three causes of goodness"), which promotes an harmonious relationship between the individual and the realms of the spirit (*parhyangan*), the human world (*pawongan*) and nature (*palemahan*). This abstract idea is given concrete realization in the lives of the Balinese through the institutions of subaks (ancient, democratic self-governing farmer's associations) and water temples, which give spiritual meaning to the governance of the rice terrace ecology. Each year, the congregations of the water temples perform an intricate series of rituals, offerings and artistic performances that are intended to sustain an harmonious relationship with their natural and spiritual existence. Over the centuries, the physical landscape of Bali has been reshaped in conformity with these philosophical ideas. Water temple networks have expanded to manage the ecology of rice terraces at the scale of whole watersheds, transforming the volcanic landscape into faceted terraces whose jewel-like perfection creates general prosperity.

Balinese water temples are unique institutions, which for more than a thousand years have drawn inspiration from several ancient religious traditions including Saivasiddhanta and Samkya Hinduism, Vajrayana Buddhism and Austronesian cosmology. The focus of water temple rites is the maintenance of harmonious relationships between humans and the natural world. This is achieved through active engagement with spiritual concepts, emphasizing the dependence of the human community on the life-sustaining forces of the natural world. These ideas are expressed through the musical traditions of various types of orchestra; dramatic performances such as topeng, gambuh, wayang, rejang and baris; the reading of poetry in four languages (Sanskrit, Balinese, Old and Middle Javanese); the creation and dedication of offerings made of flowers, fruits and rice; and the performance of rituals by priests and the congregation. The temples themselves are continually repaired and embellished by stone masons, sculptors, woodcarvers and painters.

The temple networks represent a unique response to the challenge of supporting a dense population on a rugged volcanic island in a monsoonal area. The mountainous nature of the island with deep ravines and seasonal rains has created an ecosystem that is prone to water scarcity and threats of disease and pests. Water temple networks traditionally cope with these problems by enabling clusters of subaks to adjust irrigation schedules at the watershed scale, controlling pests by inducing synchronized fallow cycles. Although each subak focuses on the management of its own rice terraces, a global solution to water allocation emerges from the temple networks, optimizing irrigation flows for all. This thousand-year-old system is now threatened with collapse, due to development pressure, fragmentation of the landscape, and pollution from agricultural chemicals.

Criteria under which the Property is Nominated

(iii) *Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared*

(v) *Exhibit an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change*

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

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EXECUTIVE SUMMARY

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CHAPTER ONE

IDENTIFICATION OF THE PROPERTY

CHAPTER ONE

IDENTIFICATION OF THE PROPERTY

1.a. Country (and State Party if different) :

INDONESIA

1.b. State, Province or Region :

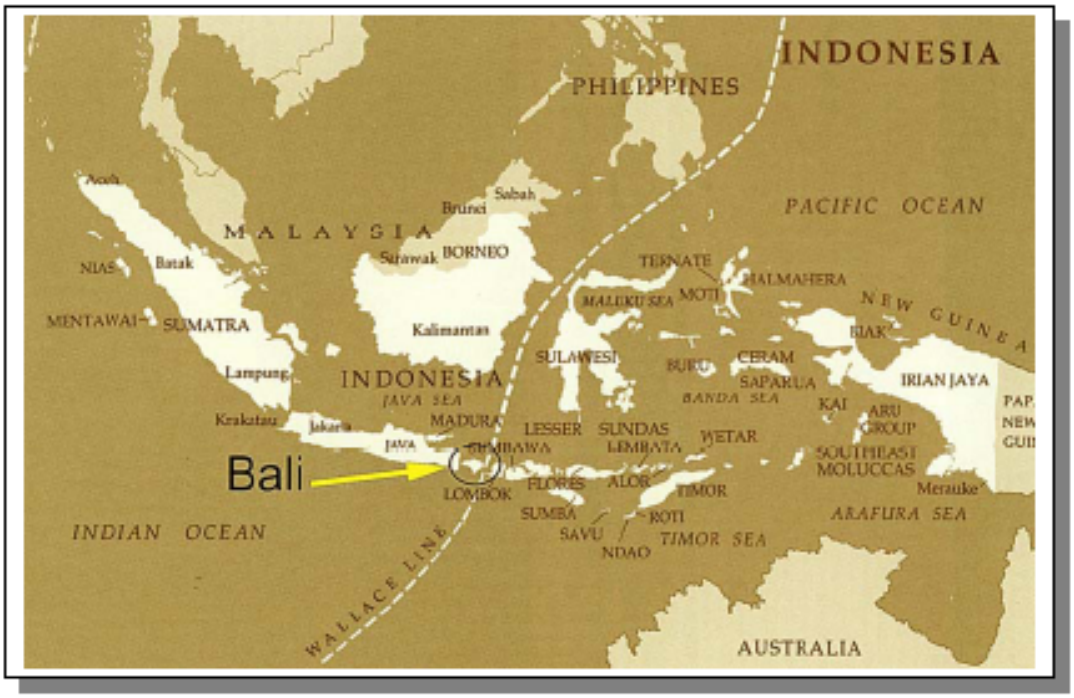
BALI PROVINCE

1.c. Name of Property :

THE CULTURAL LANDSCAPE OF BALI PROVINCE:

MANIFESTATION OF THE *TRI HITA KARANA* PHILOSOPHY

ON *SUBAK* SYSTEM



Map of Indonesia

1.d. Geographical Coordinates to the Nearest second

A. Supreme Water Temple Pura Ulun Danu Batur

District of Kintamani, Bangli Regency

B. Ancient Water Temples and *Subaks* of Tampaksiring

District of Tampaksiring, Gianyar Regency

C. Water temples of Batukaru and *Subaks*

District of Penebel, Tabanan Regency and District of Sukasada, Buleleng Regency

D. For Serial Nomination: Pura Taman Ayun (Royal Water Temple) and *Subak* Batan Badung

No	Name of Property	Administrative Locations			Coordinates (UTM) of Centre Points	
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	Subak Pulagan	Tampaksiring	Tampaksiring	Gianyar	314244.26555	9067740.48626
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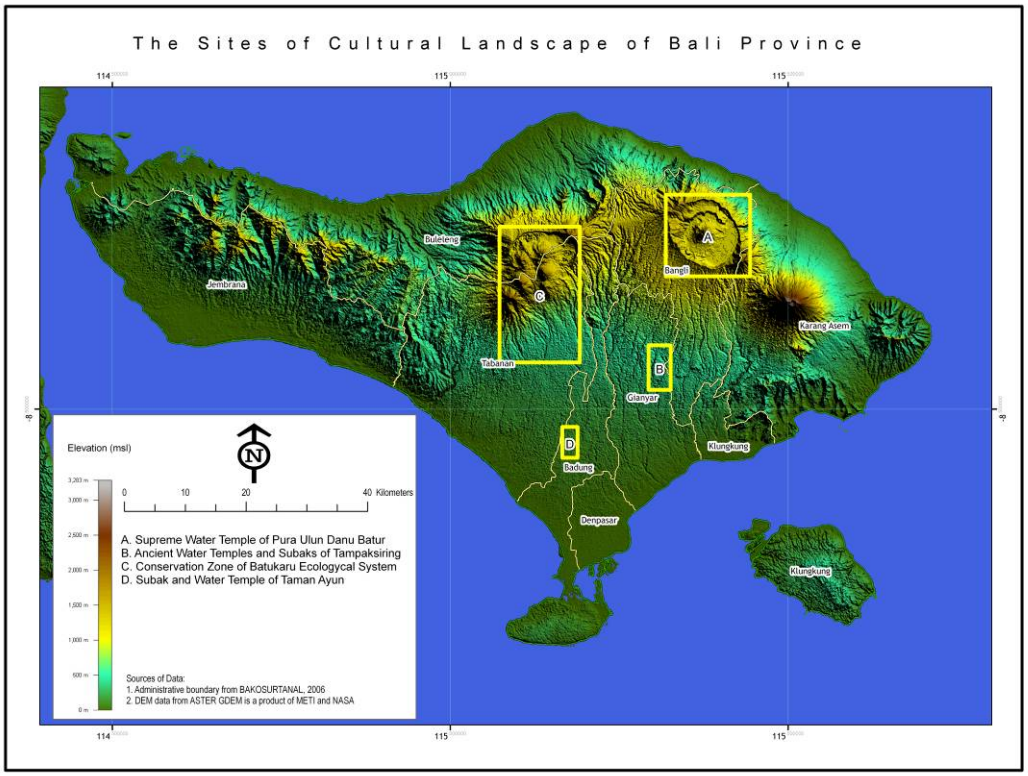
	Pura Luhur Besikalung	Utu	Penebel	Tabanan	295745.42709	9073189.71310
	Pura Luhur Muncaksari	Sangketan	Penebel	Tabanan	289329.85712	9072601.18622
	Pura Luhur Tamba Waras	Sangketan	Penebel	Tabanan	289805.81799	9069755.14862
	Subak of Batukaru area Consist of: Subak Jatiluwih, Subak Gunung Sari, Subak Umadui, Subak Kedamaian, Subak Kesambi, Subak Soka, Subak Gelaga Tabal, Subak Wangaya Betan, Subak Peselatan, Subak Piling, Subak Telaga, Subak Puring, Subak Anyar, Subak Babakan,	Jatiluwih	Penebel	Tabanan	292315.71822	9069948.57548

	Subak Klembang, Subak Pesagi, Subak Kuwum Keladi, Subak Puluk-puluk, Subak Deman, Subak Puakan, Subak Rejasa, Subak Tegal Linggah, Subak Darma, Subak Buruan, Subak Poh Gending, Subak Anyar, Subak Lebah, Subak Merta Sari, Subak Pangkung Petung, Subak Pal, Subak Sandan Amplas, Subak Baru					
D.	Pura Taman Ayun (Royal Water Temple) and *Subak* Batan Badung					
	Pura Taman Ayun	Mengwi	Mengwi	Badung	298828.37914	9055236.23350
	Subak Batan Badung	Mengwi	Mengwi	Badung	299098.19328	9053712.92873



1.e. Maps and Plans Showing the Boundaries of the Nominated Property and Buffer Zones

List of Maps and Plans (see maps and plans after 1.f)

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Map 001.2	Site Plan of Pura Ulun Danu Batur	Pura Ulun Danu Batur
Map 002	Ancient water temples and *subaks* of Tampaksiring	1. Pura Pegulingan 2. Pura Tirtha Empul 3. Pura Mengening 4. Pura Gunung Kawi (Rock Cut Temple) 5. *Subak* Basangambu 6. *Subak* Pulagan 7. *Subak* Kumba 8. *Subak* Kulub
Map 002.1	Integrated Zonation of Pegulingan, Tirtha Empul, Mengening, and Gunung Kawi	Pura Pegulingan, Pura Tirtha Empul, Pura Mengening, Pura Gunung Kawi

Map No	Description	Nominated Site
Map 002.2	Zonation of Pura Pegulingan	Pura Pegulingan
Map 002.3	Core Zone of Pura Pegulingan	Pura Pegulingan
Map 002.4	Site plan of Pura Pegulingan	Pura Pegulingan
Map 002.5	Zonation of Pura Tirtha Empul	Pura Tirtha Empul
Map 002.6	Core Zone of Pura Tirtha Empul	Pura Tirtha Empul
Map 002.7	Site plan of Pura Tirtha Empul	Pura Tirtha Empul
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Map 002.9	Core zone of Pura Mengening	Pura Mengening
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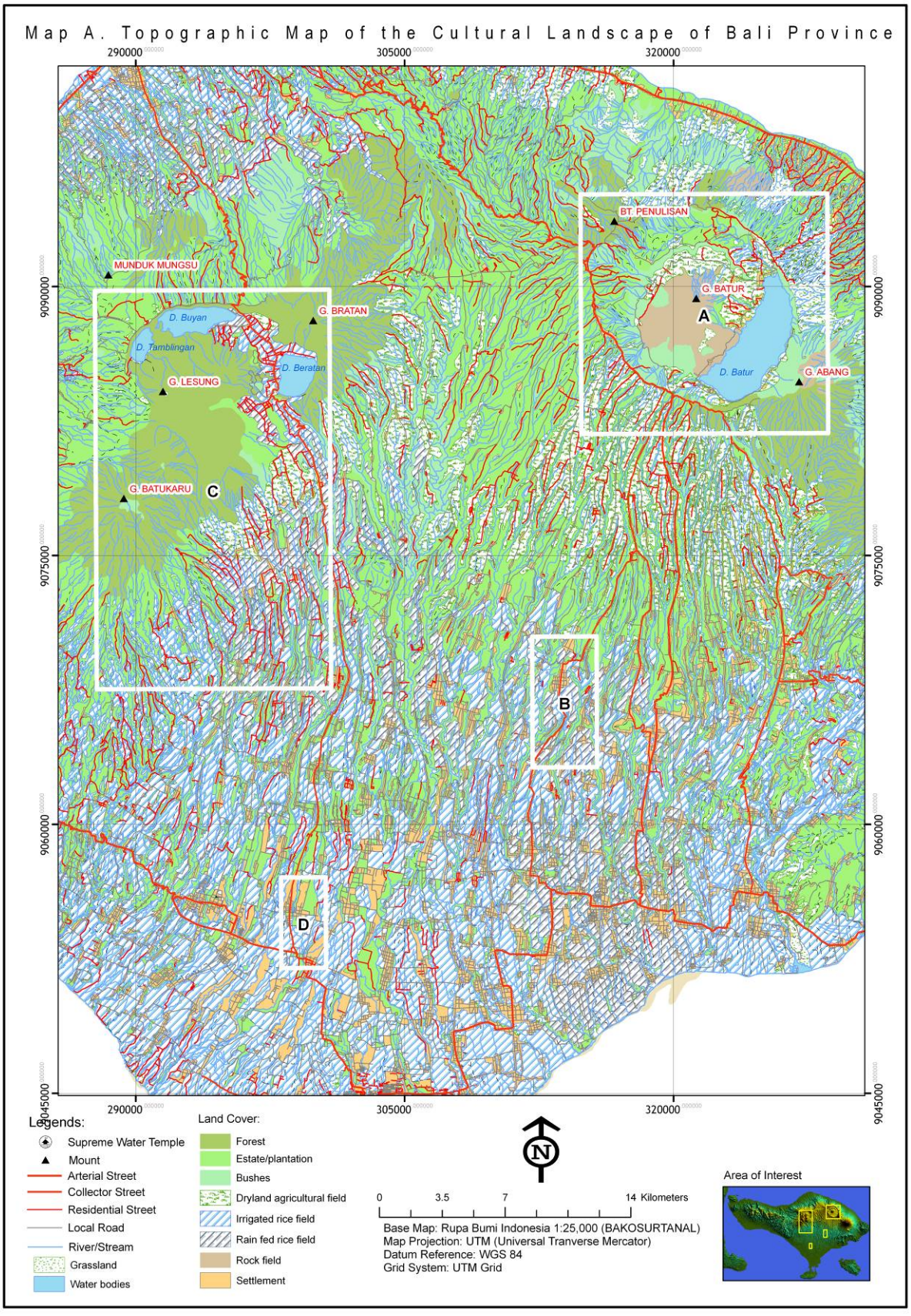
Map 002.11	Zonation of Pura Gunung Kawi (Rock Cut Temple)	Pura Gunung Kawi (Rock Cut Temple)
Map 002.12	Core Zone of Pura Gunung Kawi (Rock Cut Temple)	Pura Gunung Kawi (Rock Cut Temple)
Map 002.13	Site plan of Pura Gunung Kawi (Rock Cut Temple)	Pura Gunung Kawi (Rock Cut Temple)
Map 002.14	Section and Elevation of Pura Gunung Kawi (Rock Cut Temple)	Pura Gunung Kawi (Rock Cut Temple)
Map 003	Conservation Zone of Batukaru Ecological System	1. Pura Luhur Batu Karu 2. Pura Luhur Pucak Petali 3. Pura Luhur Besikalung 4. Pura Luhur Muncaksari 5. Pura Luhur Tamba Waras
Map 003.a	*Subaks* and water temples of Batukaru	1. Pura Luhur Batu Karu 2. Pura Luhur Pucak Petali 3. Pura Luhur Besikalung 4. Pura Luhur Muncaksari 5. Pura Luhur Tamba Waras 6. *Subak* Jatiluwih *7. Subak* Gunung Sari *8. Subak* Umadui *9. Subak* Kedamaian *10. Subak* Kesambi *11. Subak* Soka *12. Subak* Gelaga Tabal *13. Subak* Wangaya Betan *14. Subak* Peselatan *15. Subak* Piling *16. Subak* Telaga *17. Subak* Puring *18. Subak* Anyar

Map No	Description	Nominated Site
		19. Subak Babakan *20. Subak* Klembang *21. Subak* Pesagi *22. Subak* Kuwum Keladi *23. Subak* Puluk-puluk *24. Subak* Deman *25. Subak* Puakan *26. Subak* Rejasa *27. Subak* Tegal Linggah *28. Subak* Darma *29. Subak* Buruan *30. Subak* Poh Gending *31. Subak* Anyar *32. Subak* Lebah *33. Subak* Merta Sari *34. Subak* Pangkung Petung *35. Subak* Pal *36. Subak* Sandan Amplas 37. *Subak* Baru
Map 003.1	Zonation of Pura Luhur Batukaru	Pura Luhur Batukaru
Map 003.2	Site Plan of Pura Luhur Batukaru	Pura Luhur Batukaru
Map 003.3	Zonation of Pura Luhur Pucak Petali	Pura Luhur Pucak Petali
Map 003.4	Site Plan of Pura Luhur Pucak Petali	Pura Luhur Pucak Petali
Map 003.5	Zonation of Pura Luhur Besikalung	Pura Luhur Besikalung
Map 003.6	Site Plan of Pura Luhur Besikalung	Pura Luhur Besikalung
Map 003.7	Zonation of Pura Luhur Muncaksari	Pura Luhur Muncaksari
Map 003.8	Site Plan of Pura Luhur Muncaksari	Pura Luhur Muncaksari
Map 003.9	Zonation of Pura Luhur Tamba Waras	Pura Luhur Tamba Waras
Map 003.10	Site Plan of Pura Luhur Tamba Waras	Pura Luhur Tamba Waras
Map 004	Pura Taman Ayun (Royal Water Temple) and *Subak* Batan Badung	1. Pura Taman Ayun 2. *Subak* Batan Badung
Map 004.1	Zonation of Pura Taman Ayun	Pura Taman Ayun
Map 004.2	Site Plan of Pura Taman Ayun	Pura Taman Ayun

1.f. Area of Nominated Property (ha) and Proposed Buffer Zone (ha)

No	Name of Property	Administrative Location	Area of Nominated Properties (ha)
			Conservation Area
A.	Supreme water temple Pura Ulun Danu Batur	District of Kintamani, Bangli Regency	89.952
B.	Ancient water temples and *subaks* of Tampaksiring	District of Tampaksiring, Gianyar Regency	2347.646
C.	Water temples of Batukaru and Subaks	District of Penebel, Tabanan Regency and District of Sukasada, Buleleng Regency	6690.42
D.	*Subaks* and water temple of Taman Ayun	District of Mengwi, Badung Regency	282.302

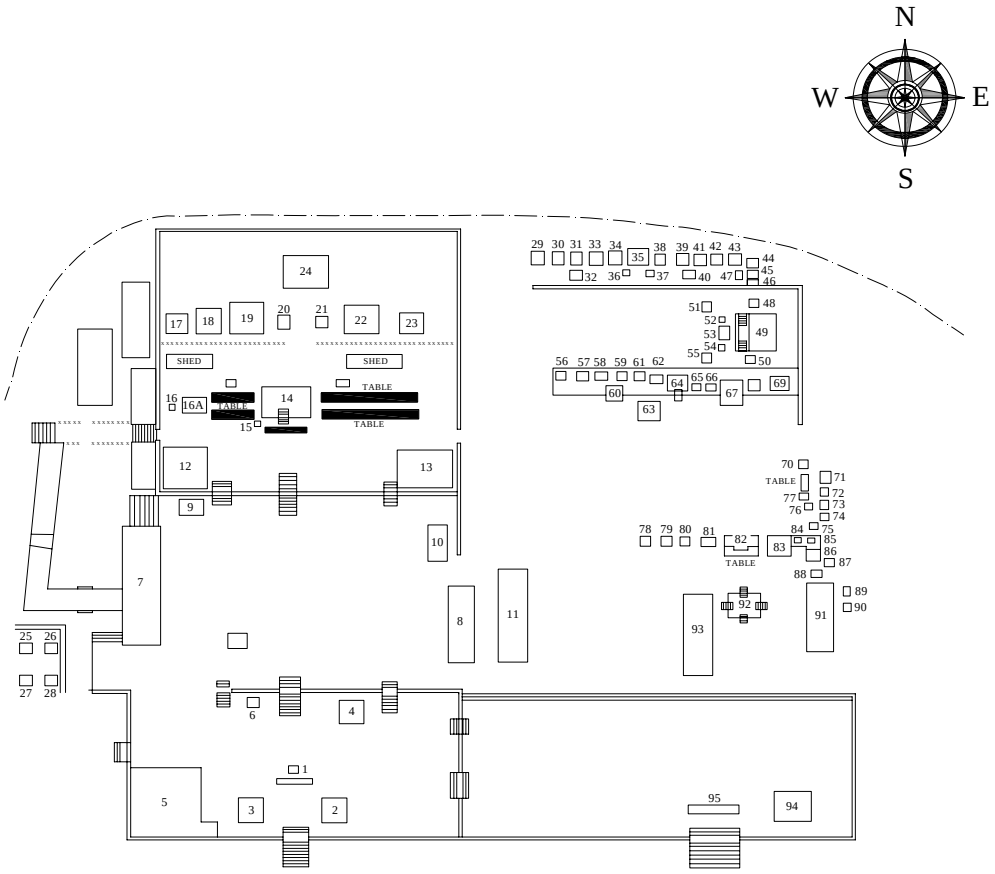
No	Name of Property	Administrative Location	Area of Nominated Properties (ha)	
			Core Zone	Buffer Zone
1.	Pura Ulun Danu Batur	District of Kintamani, Bangli Regency	11.535	78.417
2.	Pura Pegulingan	District of Tampaksiring, Gianyar Regency	1.17	10.65
3.	Pura Tirtha Empul	District of Tampaksiring, Gianyar Regency	2.73	24.13
4.	Pura Mengening	District of Tampaksiring, Gianyar Regency	2.45	13.43
5.	Pura Gunung Kawi	District of Tampaksiring, Gianyar Regency	5.38	14.87
6.	Pura Luhur Batukaru	District of Panebel, Tabanan Regency	0.661	29.557
7.	Pura Luhur Pucak Petali	District of Panebel, Tabanan Regency	0.092	4.807
8.	Pura Luhur Besikalung	District of Panebel, Tabanan Regency	0.331	4.268
9.	Pura Luhur Muncaksari	District of Panebel, Tabanan Regency	0.346	10.545
10.	Pura Luhur Tamba Waras	District of Panebel, Tabanan Regency	0.251	5.555
11.	Pura Taman Ayun	District of Mengwi, Badung Regency	8.44	37.05


Map A. Topographic Map of the Cultural Landscape of Bali Province
290000
305000
320000
9090000
9075000
9060000
9045000
BT. PENULISAN
MUNDUK MUNGSU
G. BATUR
A
D. Buyan
G. BRATAN
D. Tamblingan
D. Beratan
D. Batur
G. ABANG
G. LESUNG
G. BATUKARU
C
B
D
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Grassland
Water bodies
Land Cover:
Forest
Estate/plantation
Bushes
Dryland agricultural field
Irrigated rice field
Rain fed rice field
Rock field
Settlement
N
0 3.5 7 14 Kilometers
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest

Map 001. Supreme Water Pura Ulun Danu Batur

Map 001.1. Zonation of Pura Ulun Danu Batur

Map 001.2 Site Plan of Pura Ulun Danu Batur



1. Anantabogha
2. Bale Kulkul
3. Bale Kulkul
4. Bale Pekajah
5. Bale Gong Gde
6. Kertamasa
7. Bale Pengeraosan
8. Bale Gajah
9. Pesepilan
10. Bale Angklung
11. Dapur Suci
12. Bale Badung
13. Bale Pemujan
14. Peparuman Agung
15. Jajan Gumi
16. Pelinggih I Ratu Gde Subandar
16.a. Peparuman Ratu Gde Subandar
17. Meru Tumpang Tiga
18. Meru Tumpang Lima
19. Meru Tumpang Sembilan
20. Pelinggih Penyarikan
21. Pelinggih Penyarikan
22. Meru Tumpang Sembilan
23. Meru Tumpang Tiga
24. Meru Tumpang Sebelas
25. Bebali Courtyard
26. Nawa-Sangha
27. Wali
28. Temporary Bale for Panca Wali Krama
28.a. Temporary Plat For Bale for Pries
29. Temple for Ratu Ayu Pecatu
30. Temple for Ratu Ayu Pinget
31. Temple for Ratu Ayu Kling
32. Temple for Ratu Ayu Shri Penpen
33. Temple for Ratu Ayu Kebek Sai
34. Temple for Ratu Ayu Teka Sai
35. Temple for offering Ratu Gde Pasek
36. Pepelik
37. Pepelik
38. Ratu Gde Manik Blabur
39. Temple for Ratu Gde Manik Melele
40. Pepelik
41. Temple for Ratu Manik Senjata
42. Temple for Ratu Gde Malegadan
43. Temple for Ratu Ngurah Runcing
44-47 No longger exist
48. Temple for Ratu Gde Perahu
49. Meru Tumpang Tiga
50. Temple for ratu Magening
51-55. Offerings shrines and statue
56. Temple for Ratu Sumampat
57. Temple for Ratu Bunut
58. Temple for Ratu Manukan
59. Temple for Ratu Ayu Mas Magelung
60. Temple Ratu Ayu Tusan
61. Temple for Ratu Mas Sakti
62. Temple for Ratu Bangun Sakti
63. Temple for Ratu Ayu Kentel Bumi
64. Pesamuan
65. Temple for Ratu Pekiisan
66. Temple for Ratu Ayu Jelung
67. Temple for Ratu Gde Makolem
68. Temple for Ratu Gulem
69. Temple for Baturrenggong
78. Temple for Ida Iratu Majapahit
79. Temple for Ida Iratu Tambang Layar
80. Temple for Ida Iratu Dalem Mesim
81. Temple for Ida Iratu Gde Dalam Mekah
82. Sanggar Agung: Surya, Chandra, Bayu
83. Bale Kulkul Tengeran Ida Batara
84. Pretiwi Ulung Bale Agung
85. Divider
86. Temple for I Ratu Rambut Sedana
87. Temple for I Ratu Bhatari Chi
88. Pepelik Batari Chi
89. Temple for Ratu Paumbungkang
90. Pepelik
91. Bale Agung Pedanginan Solas Lobang
92. Bale Pesamuan Agung
93. Bale Agung Pedauhan Siu Lubang
94. Bale Perabuan
95. Apit Lawang

THE ARCHAEOLOGICAL HERITAGE CONSERVATION OFFICE FOR BALI-WEST NUSA TENGGARA AND EAST NUSA TENGGARA PROVINCES

Site Plan of Pura Ulun Danu Batur

PLAN OF THE TEMPLE OF THE CRATER LAKE (PURA ULUN DANU BATUR)

1. Anantabogha
   Shrine for the World Serpent

2. Bale kulkul
   Tower for drum

3. Bale kulkul
   Tower for drum

4. Bale pekajah
   Here one requests purification by holy water before entering the inner courtyards

5. Bale Gong Gde
   Orchestra pavilion for the 50-piece gong gde orchestra

6. Kertamasa
   Shrine for offerings keyed to Icaka months

7. Bale Pengeraosan
   "Speech Pavilion", where guests are welcomed

8. Bale Gajah
   Pavilion for priests and Elders

9. Pesepilan
   "Secrets" shrine

10. Bale Angklung
    Pavilion for angklung orchestra

11. Dapur Suci
    Temple kitchens and store-rooms

12. Bale Badung
    General purpose pavilion named for the kingdom of Badung
    Here the scribe receives delegations; priests and guests rest; offerings are readied for presentation at the main shrines; anthropologists take notes.

13. Bale Pemujan
    "Pavilion for worship", similar to #12.

14. Peparuman Agung
    Sacred storehouse for images of the gods and Temple heirlooms.

15. Jajan Gumi
    Pedestal for the offering called Jajan Bumi, a cosmological symbol made of edible ingredients

Tables: These permanent tables were recently installed to replace the temporary tables made of bamboo. Their purpose is to provide a place for offerings to the deities. Beneath the innermost row of tables, the priests store containers for holy water, and rest during the long rituals.

16. Pelinggih I Ratu Gde Subandar
Shrine for the "Great Lord Harbormaster", provisioner to the supreme gods. This shrine, and 16A, are supported and maintained by Balinese of Chinese descent.

16A. Peparuman Ratu Gde Subandar
Sacred storehouse for the "Great Lord Harbormaster", a god of money.

17. Meru Tumpang 3
Three-storied meru shrine, associated with a Deity of the district of Tejakula in North Bali.

18. Meru Tumpang 5
Five-storied meru shrine for Bhatari Sakti Manik Astagina, a goddess associated with the ancestry of the former kingdom of Mengwi in south-central Bali.

19. Meru Tumpang 9
Nine-storied meru shrine, for Ratu Gde Meduwe Gumi ("Great Lord who owns the Realm", associated with the temple of Lempuyang.

20. Pelinggih Penyarikan
Shrine for the Scribe (Penyarikan). The ambiguity of this name is intentional, for the shrine refers both to a divinized Scribe who is the servant of the greater gods, and the human Scribe of the Temple.

21. Pelinggih Penyarikan
The hierarchy of Temple priests includes two Scribes, the Greater and Lesser. Perhaps for this reason, there are also two of these shrines.

22. Meru Tumpang 9
Nine-storied meru shrine for Bhatara Gde Gunung Agung, the supreme deity of Mount Agung and of Besakih Temple.

23. Meru Tumpang 5
Five-storied meru shrine for the Deity of the former princedom of Blahbatuh.

24. Meru Tumpang 11
The supreme shrine of the Temple, with eleven stories, which is the maximum. This shrine is identified in two ways: either as the shrine of Dewi Danu, the Goddess of the Lake, or as the shrine for Bhatara Kalih Putranjaya. Bhatara Kalih Putranjaya means "The Two Gods of Putranjaya", or "The Dual God Putranjaya", the Goddess of the Lake

and the God of Mount Agung. However, it is that the Goddess is supreme in this shrine, even when she is symbolically linked to the God.

25. Bebali courtyard
Middle courtyard of the main temple, usually used for performances by the Baris Gde and Rejang dancers, the Gong Gde orchestra, Topeng dancers and other bebalian performances.

26. Nawa-Sangha
During the Panca Wali Krama ceremonies of 1987, the nawa-sangha temporary offerings enclosure was situated here.

27. Wali
The innermost courtyard of the main Temple.

28. Temporary bale for Panca Wali Krama.
Here the emblems and images (arca) of the deities were placed for blessings by Brahmana priests (pedanda) at the conclusion of Panca Wali Krama.

28a. Temporary platforms for Brahmana priests
During the final phases of Panca Wali Krama, four pedandas conducted their prayers (dewa yajna) from temporary bamboo and wood platforms situated here.

29-34: These six shrines form a group. The names of the deities worshipped in them are as follows:

29. Ratu Ayu Pecatu
30. Ratu Ayu Pinget
31. Ratu Ayu Kling
32. Ratu Ayu Shri Penpen
33. Ratu Ayu Kebek Sai
34. Ratu Ayu Teka Sai

The meaning of this collection of shrines is suggested by the names of the deities. "Ratu" is a royal title, and "Ayu" means "attractive", and has a feminine connotation. The meaning of the names of the goddesses is as follows:

"Pecatu" is a measure of rice. "Pingit" means sacred, and is described as the "sibling" of Pecatu. "Shri" means the Rice Goddess. "Penpen" means to keep or save. "Kling" means utterance or command. "Kebek sai" means always full, always present, and "Teka sai" means always comes or comes every day.

The relationships among these deities are described in terms of a process. "After the command of Ratu Kling, the Rice Goddess retains the rice. The rice is saved in sacred (pinget) measures (pecatu), it always comes and the pecatu is always full (kebek sai)".

Shrine 35 is a three-storied Meru shrine for the Deity of the Pasek clans. All of the priests of the Temple belong to one of the Pasek clans. The Greater Jero Gde belongs to the Paseks of the Black Wood (Kayu Selem), while the Lesser Jero Gde is a Pasek of Gelgel, the legendary southern kingdom. See text for interpretation.

35. I Ratu Gde Pasek (or Kepasekan)
36. pepelik (offering shrine for #35)
37. pepelik " " " "

The next set of shrines also form a group. The identities of the deities worshipped in the shrines are as follows:

38. Ratu Gde Manik Blabur
39. Ratu Gde Manik Melele
40. pepelik (offering shrine for #39 and #41)
41. Ratu Gde Manik Senjata
42. Ratu Gde Manik Malegadan
43. Ratu Ngurah Runcing

These shrines are often used by the metalsmiths (Pande clans). "Melele" means sharp; "Malegadan" means burnished or gleaming; "Senjata" means edged weapon and "Runcing" means sharp. "Blabur" means rain. Some informants suggest a link between rain and the cooling of metal after it has been forged; others insist that this shrine is not connected with the smith shrines directly. Rather, they say, it is a shrine where one may ask for rain.

44-47: no longer exist

48. Ratu Gde Perahu
    The Deity of boats. One informant suggested that this deity is a messenger, who travels along waterways.

49. Meru Tumpang 3
    Three-storied shrine for Ratu Mpu Dwijendra/Ratu Pura Jati
    Shrine to the divinized priest Mpu Dwijendra, linked to the origin of the lineage of the Greater Jero Gde, the Paseks of the Black Wood.

50. Ratu Magening
    The Deity of Purification. This deity and #49 play an important role in the concept of a mandala of sacred waters supplying irrigation water to the subaks. On the floor of the crater near the lake there is a subsidiary temple, called Pura Jati. The principal deity enshrined at the Pura Jati is #49. Beside the lake there is a small shrine to Ratu Magening, where water for holy water is sought. It is said that Ratu Magening causes the waters of the lake to circulate, and so decides how much water will flow in a given direction. The main odalan (festival) at the Pura Jati occurs at the Full Moon of the First Month, in the midst of the dry season, and is well attended by the subaks.

51-55: offerings shrines and statues for #49

The following nine shrines form a group:

56. Ratu Sumampat
57. Ratu Bunut
58. Ratu Manukan
59. Ratu Ayu Mas Magelung
60. Ratu Ayu Tusan
61. Ratu Mas Sakti
62. Ratu Bangun Sakti
63. Ratu Ayu Kentel Gumi
64. Pesamuan #61-#63

    Ratu Ayu Kentel Gumi, "Lord of the Thick Earth", is the ruler of this group. The first shrine in the row (#56) is used for offerings to control agricultural pests. "Bunut" is a type of tree. "Manuk" means bird. "Mas Magelung" is a dancer's golden head-dress. "Tusan" is the name of the legendary smith who created metal-working. "Mas sakti" means sacred gold. "Bangun sakti" means sacred building.

65. Ratu Pekiisan

    "Pekiisan" comes from the word for a procession to seek holy water (mekiis). This deity provides holy water to candidates for priesthood at the Temple.

66. Ratu Ayu Jelung

67. Ratu Gde Makolem

    "Mekolem" means sleep. Offerings for couples planning marriage are made here.

68. Ratu Gulem

    "Gulem" means rain clouds.

69. Ratu Gde Baturrenggong

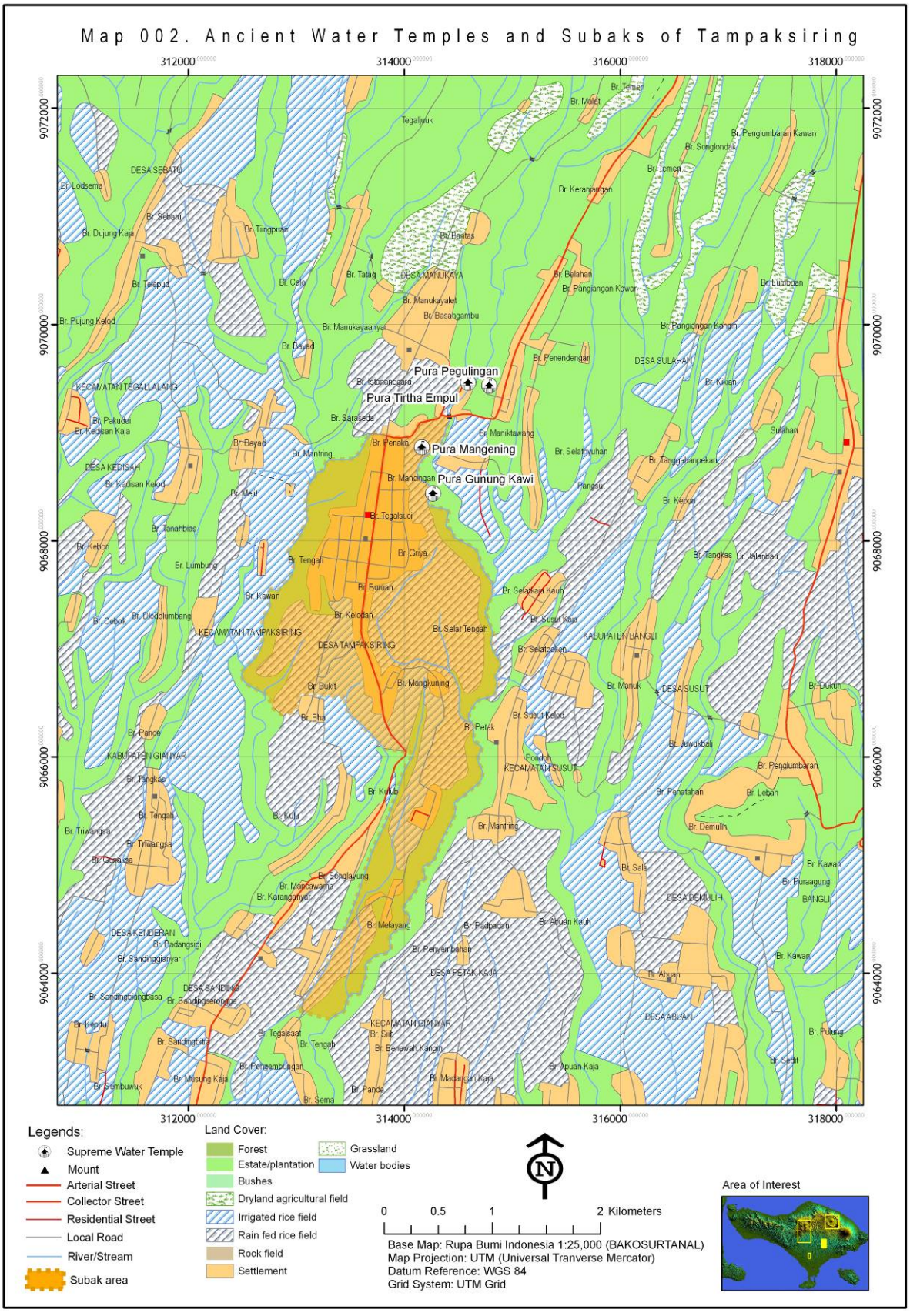
    The remaining shrines (#70-94) constitute a separate temple, the Pura Puseh Batur (Navel temple of the Village of Batur). A single exception is #83, the drum tower, which is struck forty five times every morning, in honor of the forty five principal deities of the Temple.

78. Ida Iratu Dalem Majapahit
79. Ida Iratu Tambang Layar
80. Ida Iratu Gde Dalem Mesim
81. Ida Iratu Gde Dalem Mekah
82. Sanggar Agung: Surya, Chandra, Bayu
83. Bale kulkul tengeran Ida Bhatara
84. Pretiwi Ulun Bale Agung
85. Divider
86. I Ratu Rambut Sedana
87. I Ratu Bhatari Cri
88. Pepelik Bhatari Cri
89. Ratu Paumbukang

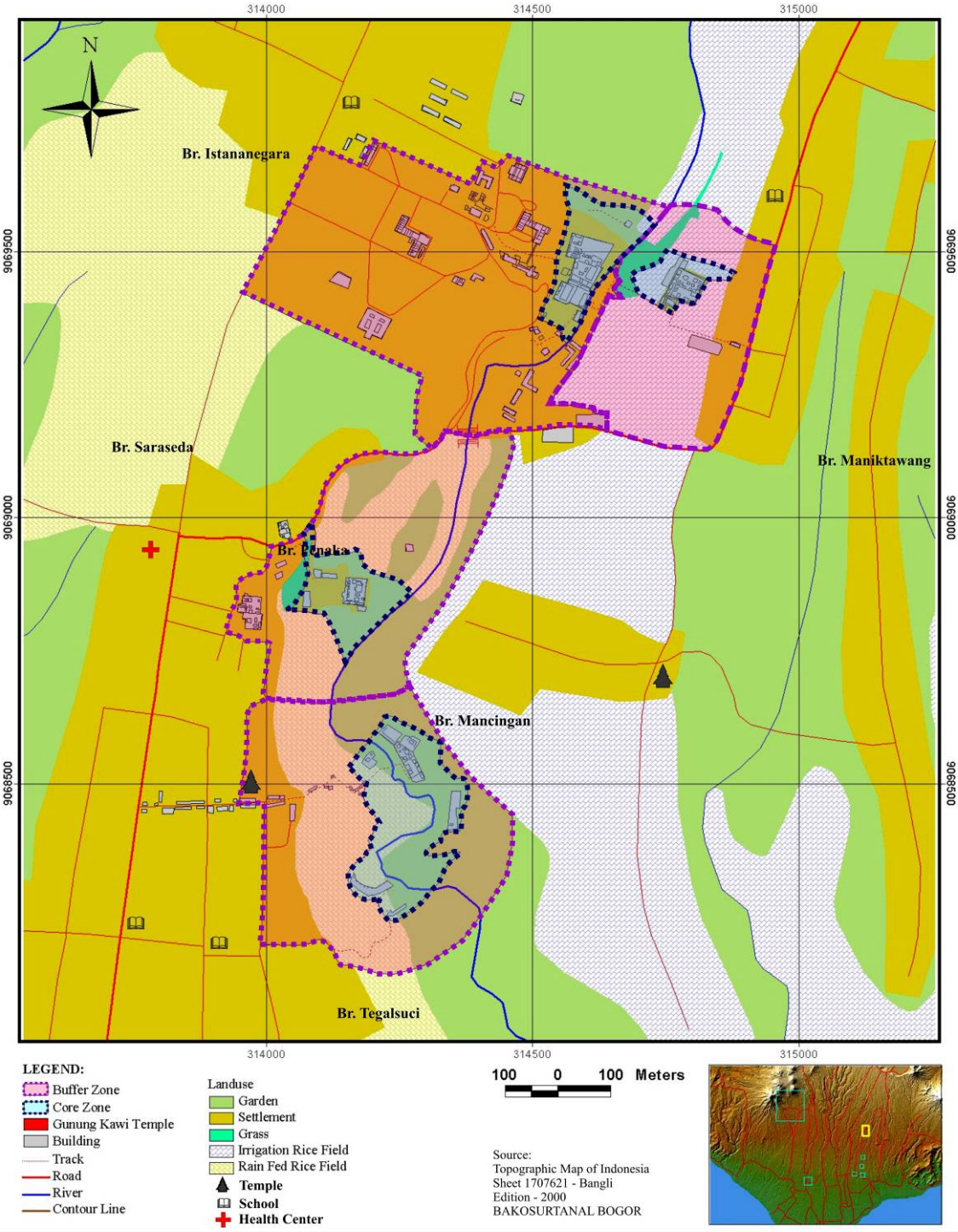
90. Pepelik
91. Bale Agung Bedanginan solas lobang
92. Bale Pesamuan Agung
93. Bale Agung Bedauhan siu lobang
94. Bale Perebuan
95. Apit lawang

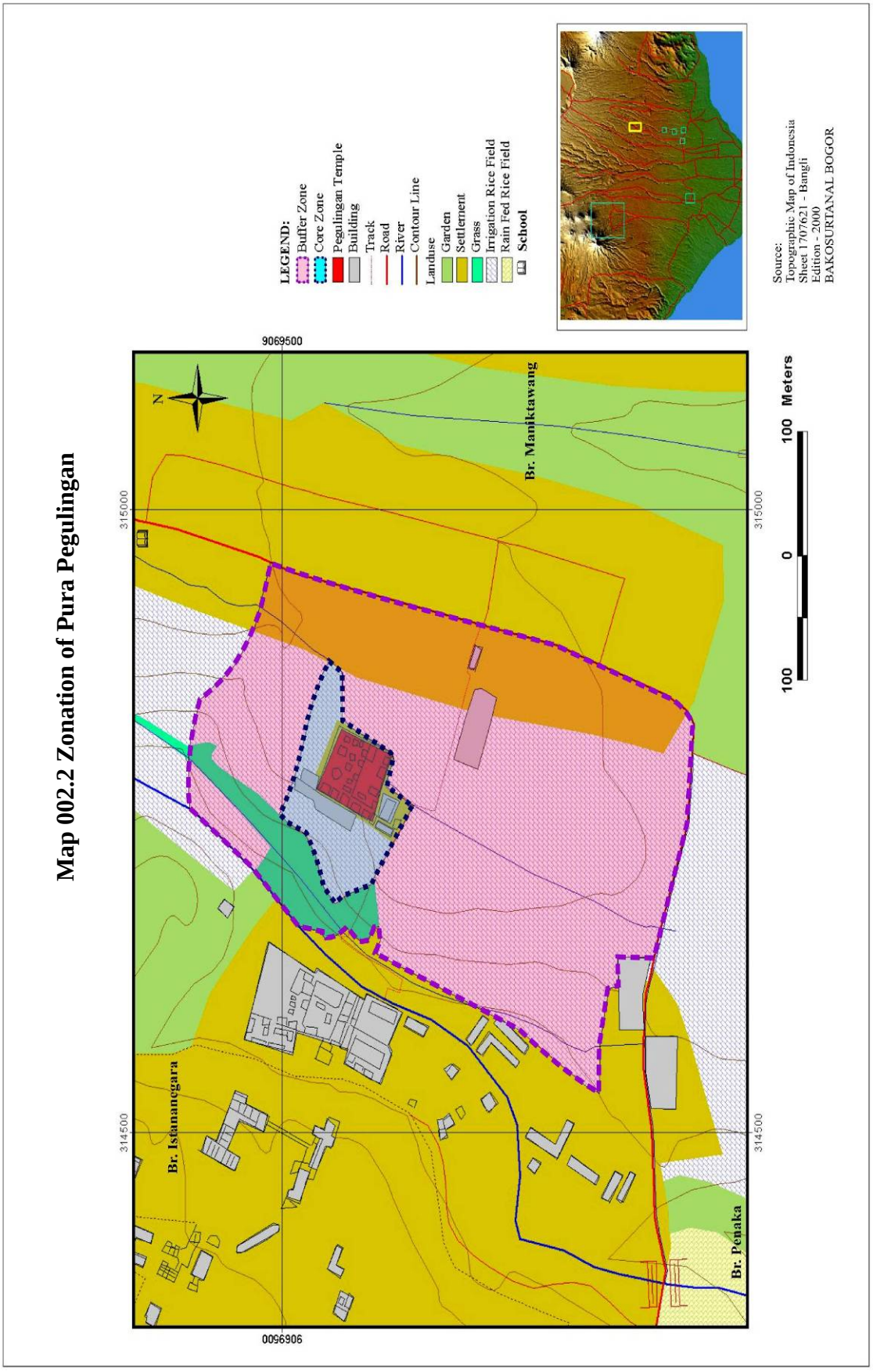
The Mandala of Waters

Danu Gadang- to south central Bali Pelisan seked-to Pakisan, and via tunnels to lakes Bratan and Tamblingan and the west Danu Kuning- to southern Bali Telaga Waja- to the west "Holy water from the summit" (Tirtha puncak Gunung Batur) comes from the caldera. From the center of the lake come three types of holy water: siwamurti, sadasiwamurti, and sunyamurti. The center of the lake is referred to as tengahing segara, the "center of the ocean". Magening- alongside the Pura Jati temple; sends waters in different directions Bantah Anyut- to Klungkung and the east Reijang Anyar- to Tejakula and the north.


Map 002. Ancient Water Temples and Subaks of Tampaksiring
312000
314000
316000
318000
9072000
9070000
9068000
9066000
9064000
Pura Pegulingan
Pura Tirtha Empul
Pura Mangening
Pura Gunung Kawi
DESA SEBATU
DESA MANUKAYA
DESA SULAHAN
DESA KEDISAH
KECAMATAN TEGALALANG
KECAMATAN TAMPAKSIRING
DESA TAMPAKSIRING
KABUPATEN GIANYAR
KABUPATEN BANGLI
DESA SUSUT
KECAMATAN SUSUT
DESA DEMULIH
DESA KEDERAN
DESA PETAK KAJA
DESA SANDING
DESA ABIAN
KECAMATAN GIANYAR
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Subak area
Land Cover:
Forest
Estate/plantation
Bushes
Dryland agricultural field
Irrigated rice field
Rain fed rice field
Rock field
Settlement
Grassland
Water bodies
N
0 0.5 1 2 Kilometers
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest

MAP 002.1 INTEGRATED ZONATION OF PEGULINGAN, TIRTHA EMPUL, MENGENING, AND GUNUNG KAWI




Map 002.2 Zonation of Pura Pegulingan
LEGEND:
Buffer Zone
Core Zone
Pegulingan Temple
Building
Track
Road
River
Contour Line
Landuse
Garden
Settlement
Grass
Irrigation Rice Field
Rain Fed Rice Field
School
Source:
Topographic Map of Indonesia
Sheet 1707621 - Bangli
Edition - 2000
BAKOSURTANAL BOGOR
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9069000
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314500
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Br. Istananegara
Br. Penaka
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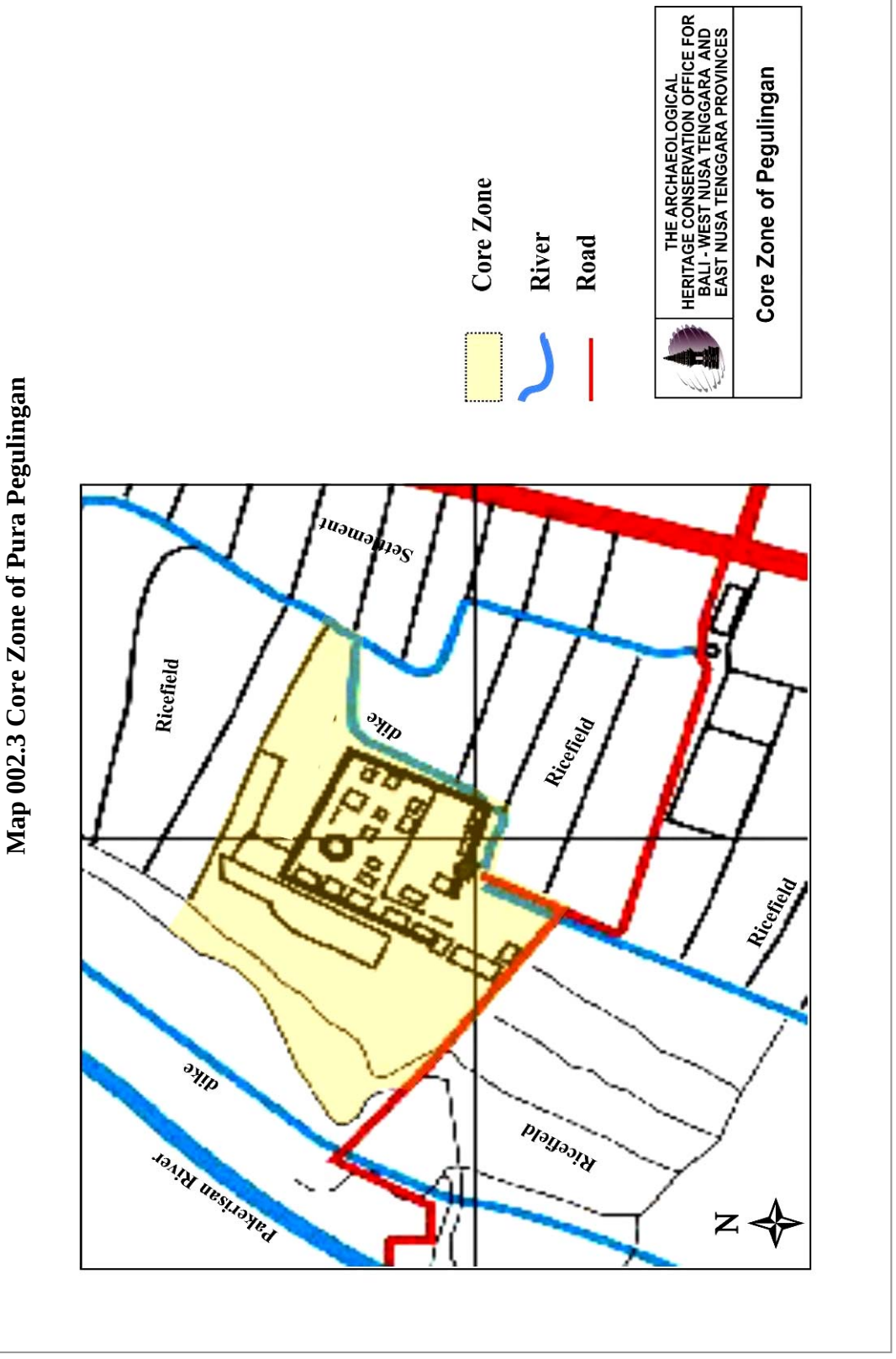
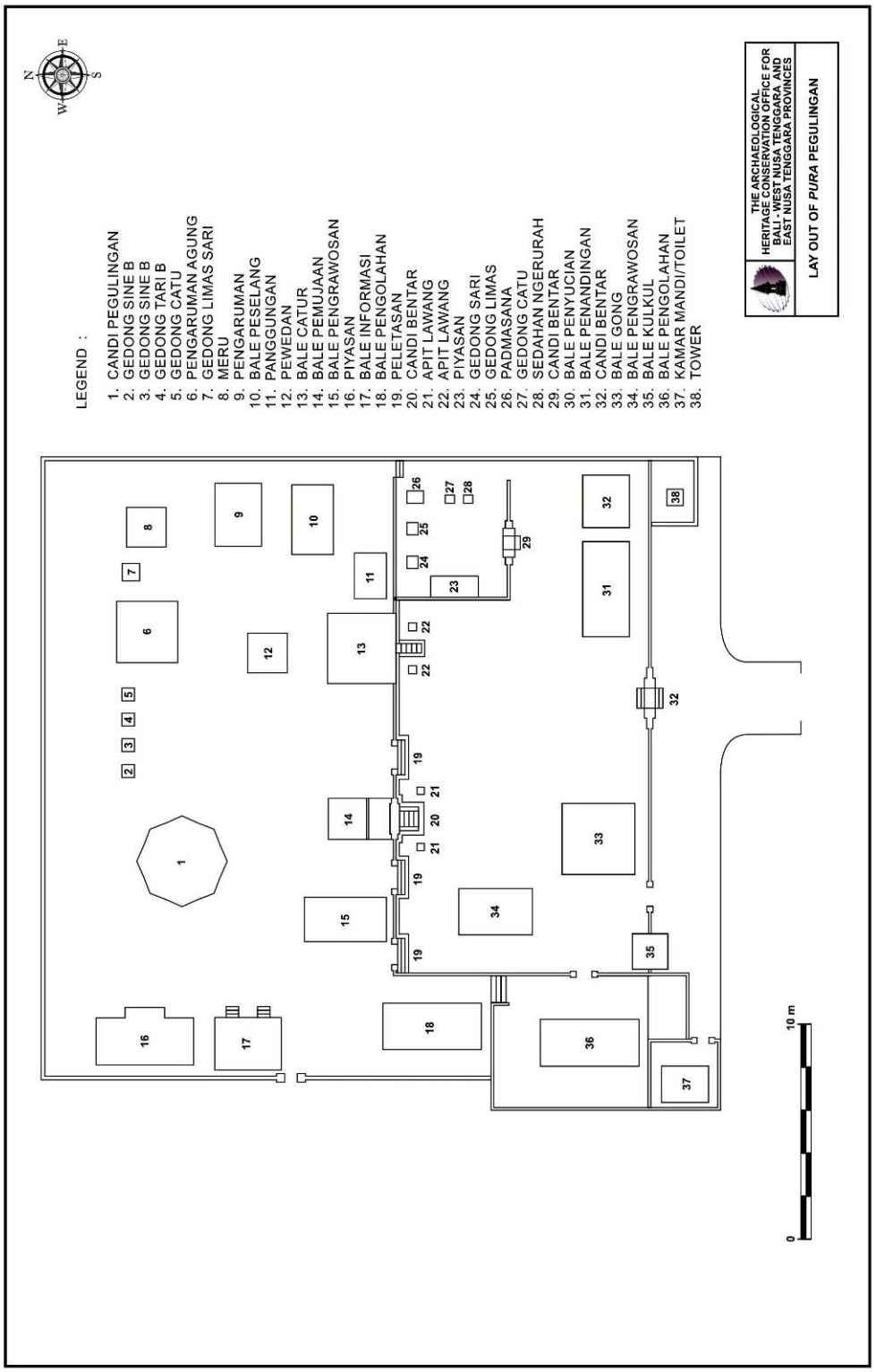
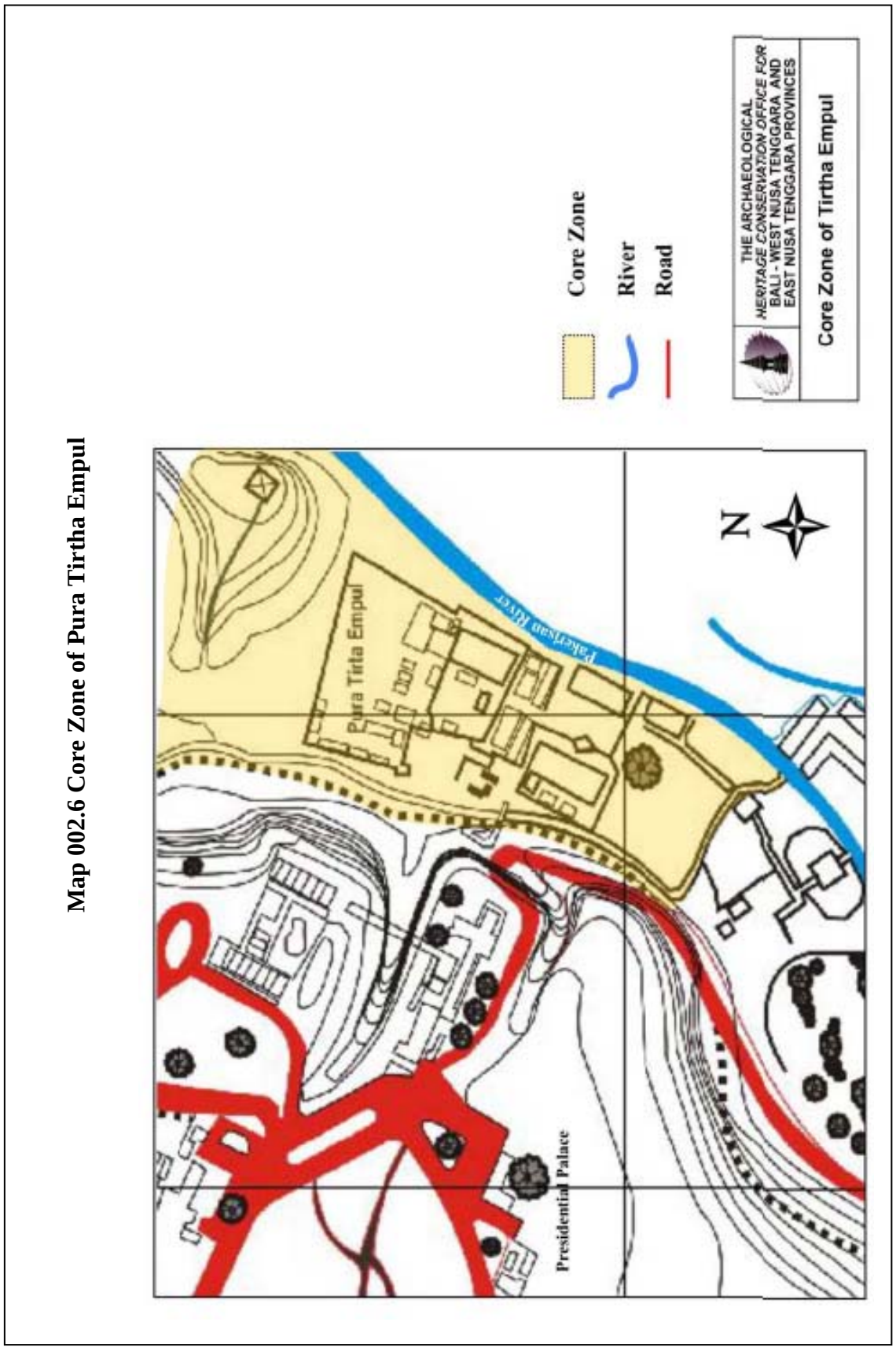

Map 002.3 Core Zone of Pura Pegulingan
Core Zone
River
Road
THE ARCHAEOLOGICAL HERITAGE CONSERVATION OFFICE FOR BALI - WEST NUSA TENGGARA AND EAST NUSA TENGGARA PROVINCES
Core Zone of Pegulingan
Settlement
Ricefield
dike
Ricefield
Ricefield
dike
Ricefield
Pakerisan River
N

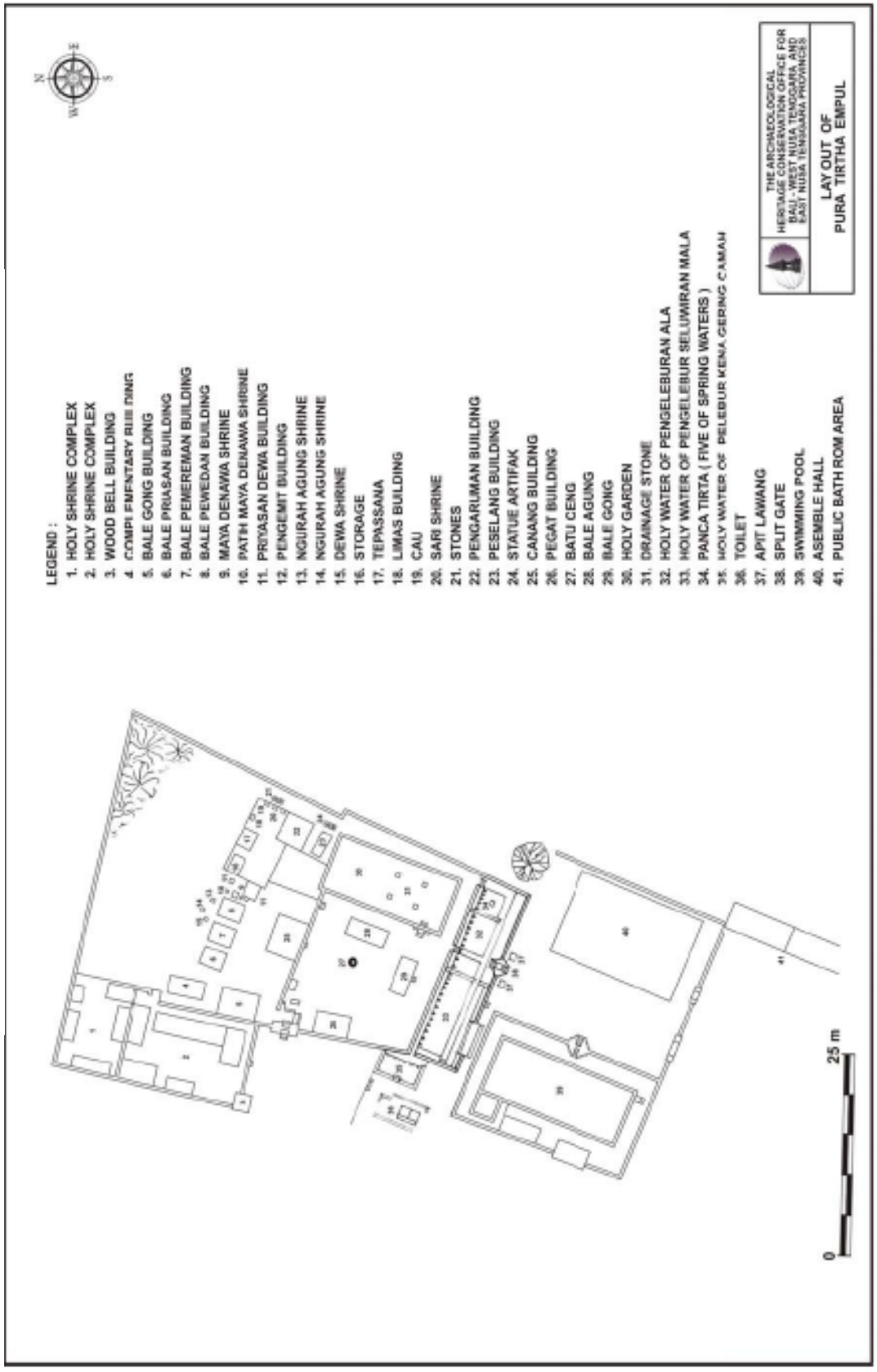


Map 002.4 Site Plan of Pura Pegulingan

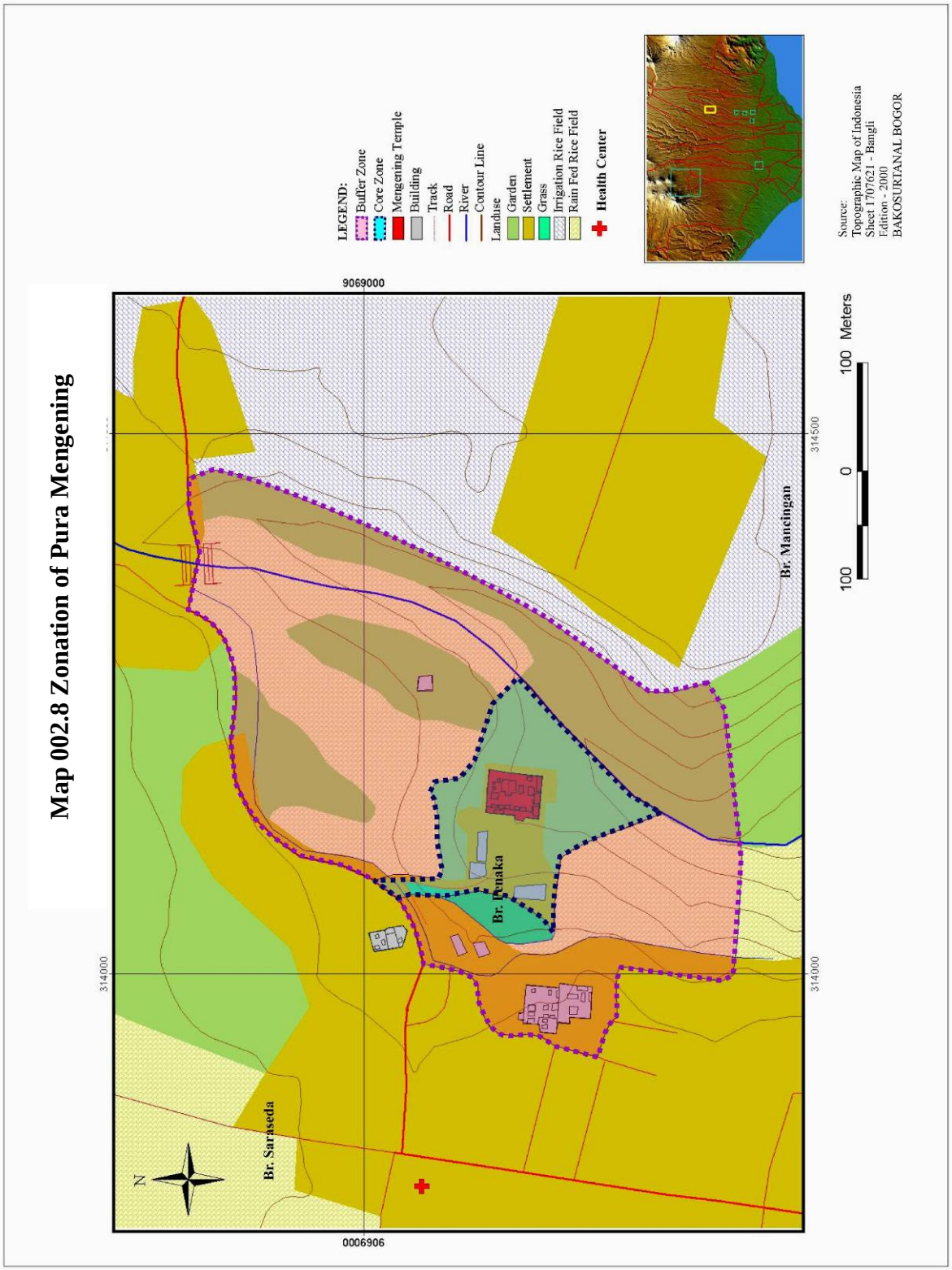
Map 002.5 Zonation of Pura Tirtha Empul



Map 002.6 Core Zone of Pura Tirtha Empul



Map 002.7 Site Plan of Pura Tirtha Empul


Map 002.8 Zonation of Pura Mengening
LEGEND:
Buffer Zone
Core Zone
Mengening Temple
Building
Track
Road
River
Contour Line
Landuse
Garden
Settlement
Grass
Irrigation Rice Field
Rain Fed Rice Field
Health Center
Source:
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Br. Punaka
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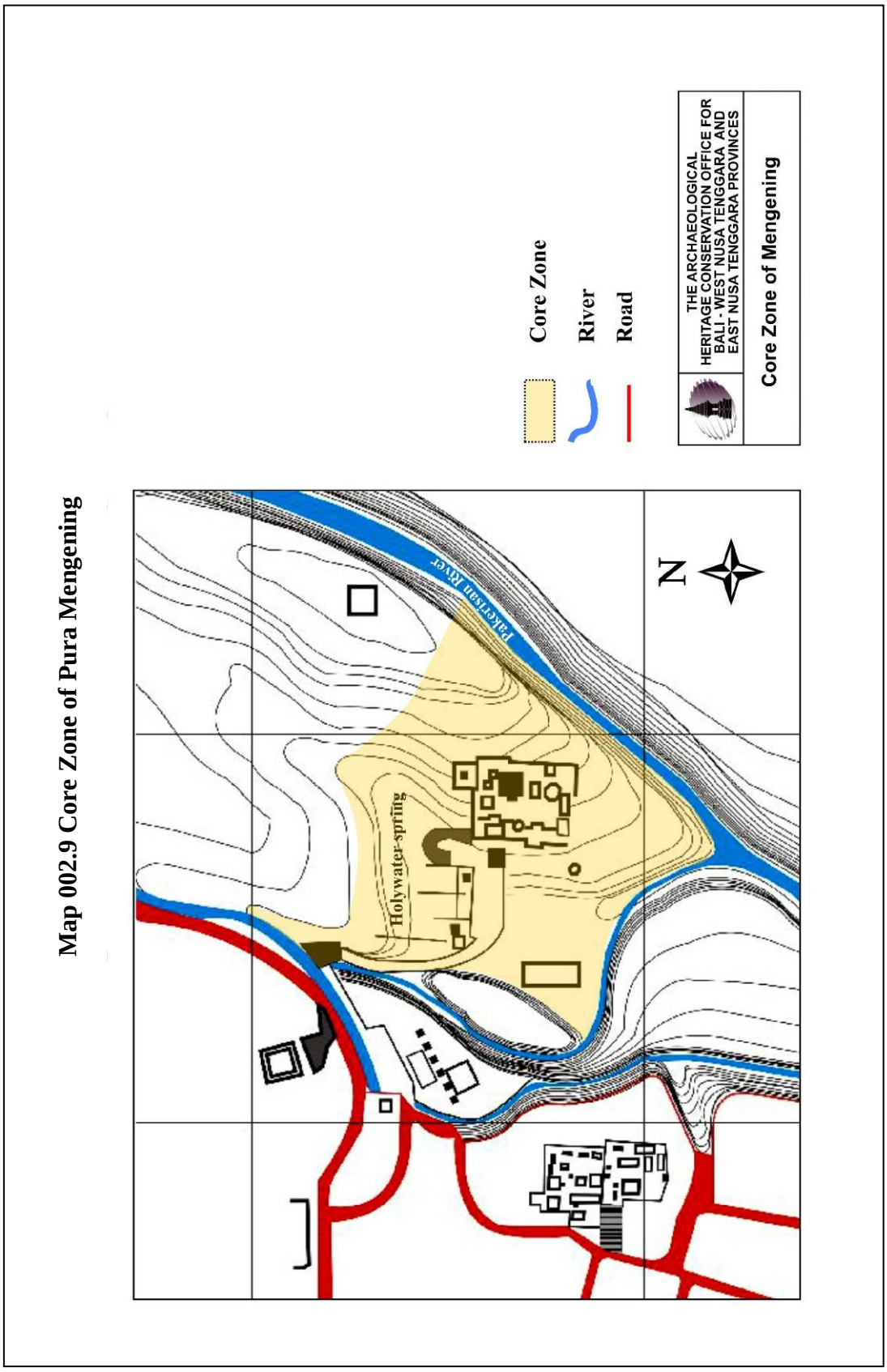
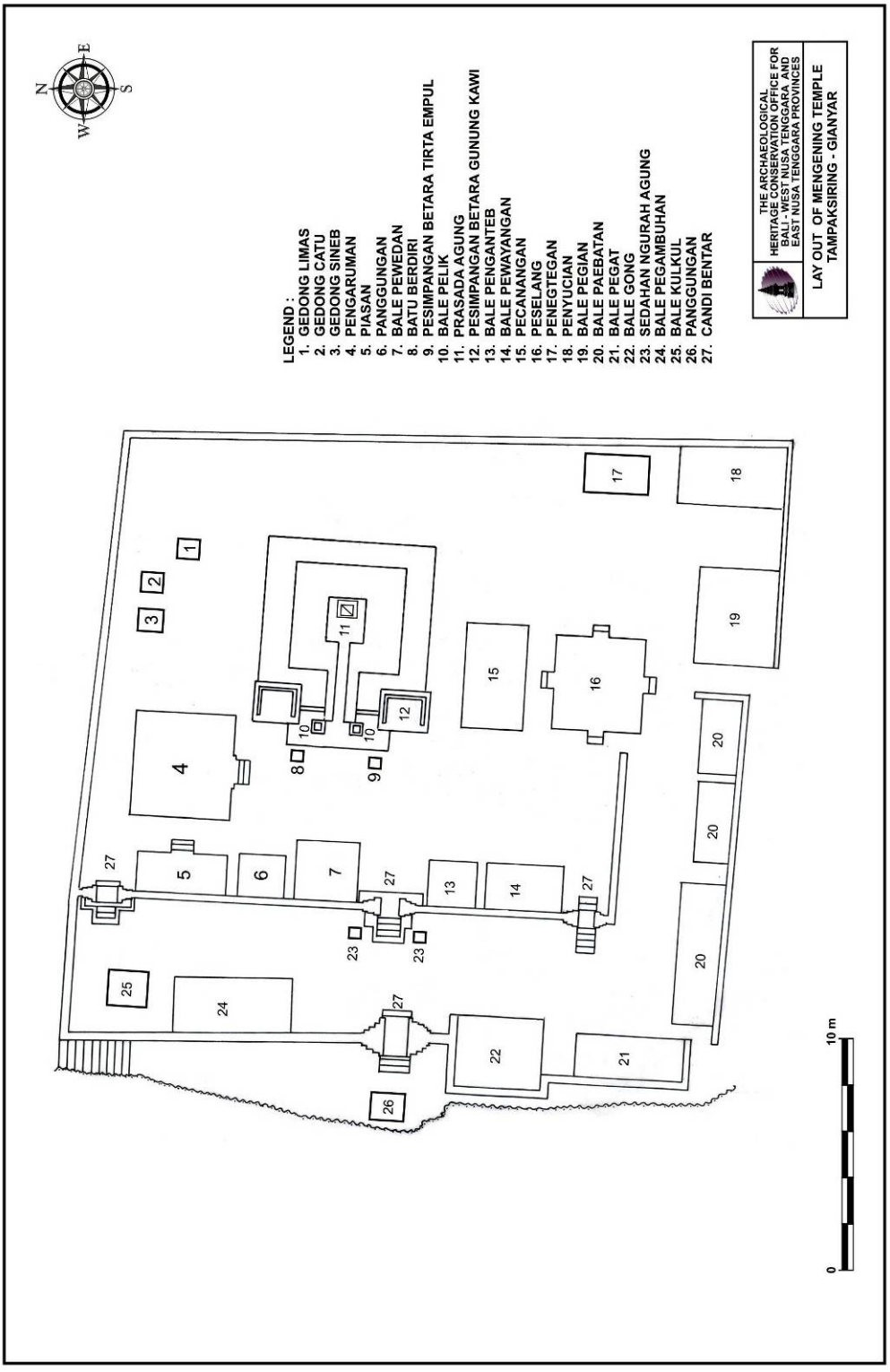
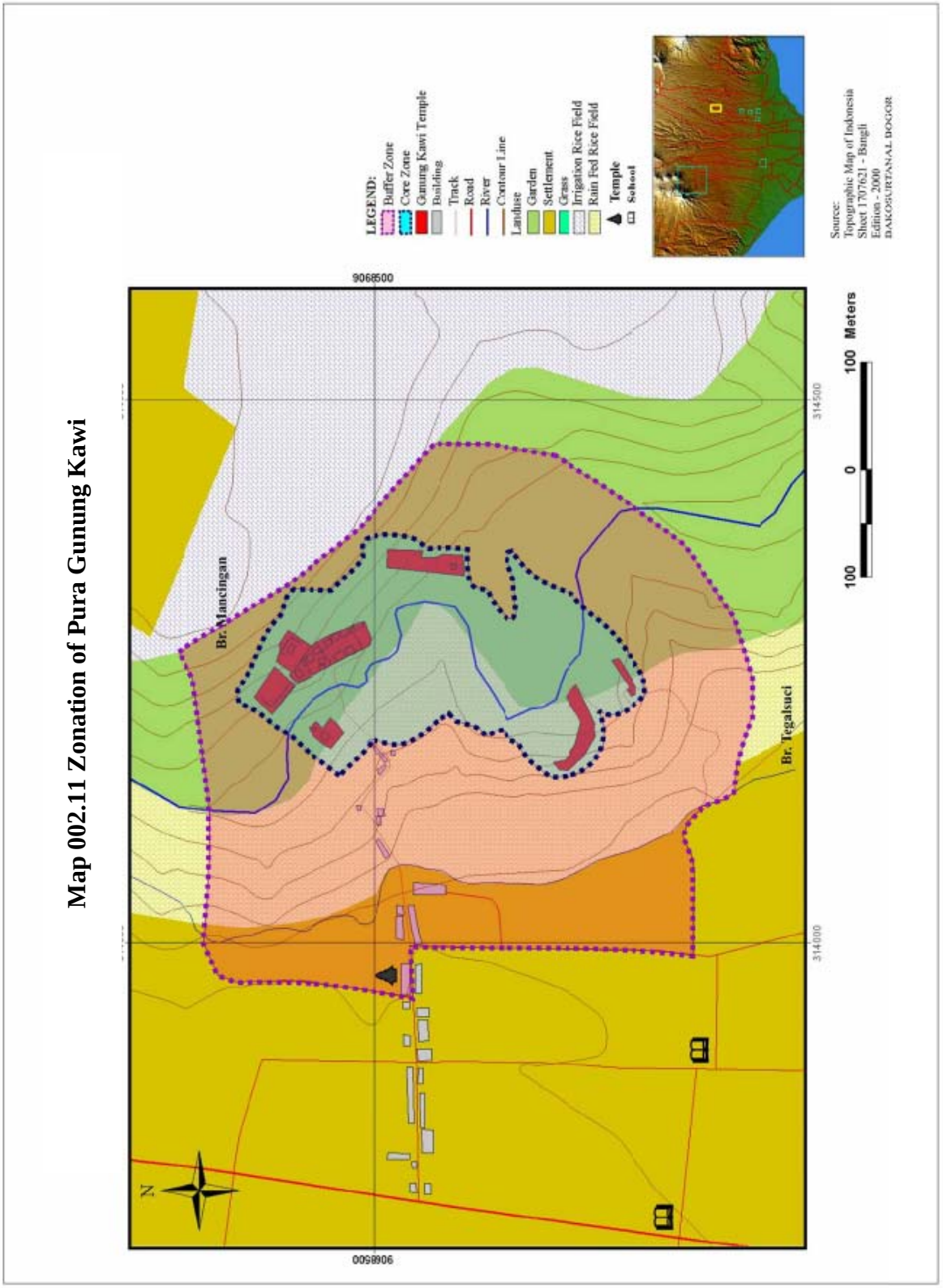
100
0



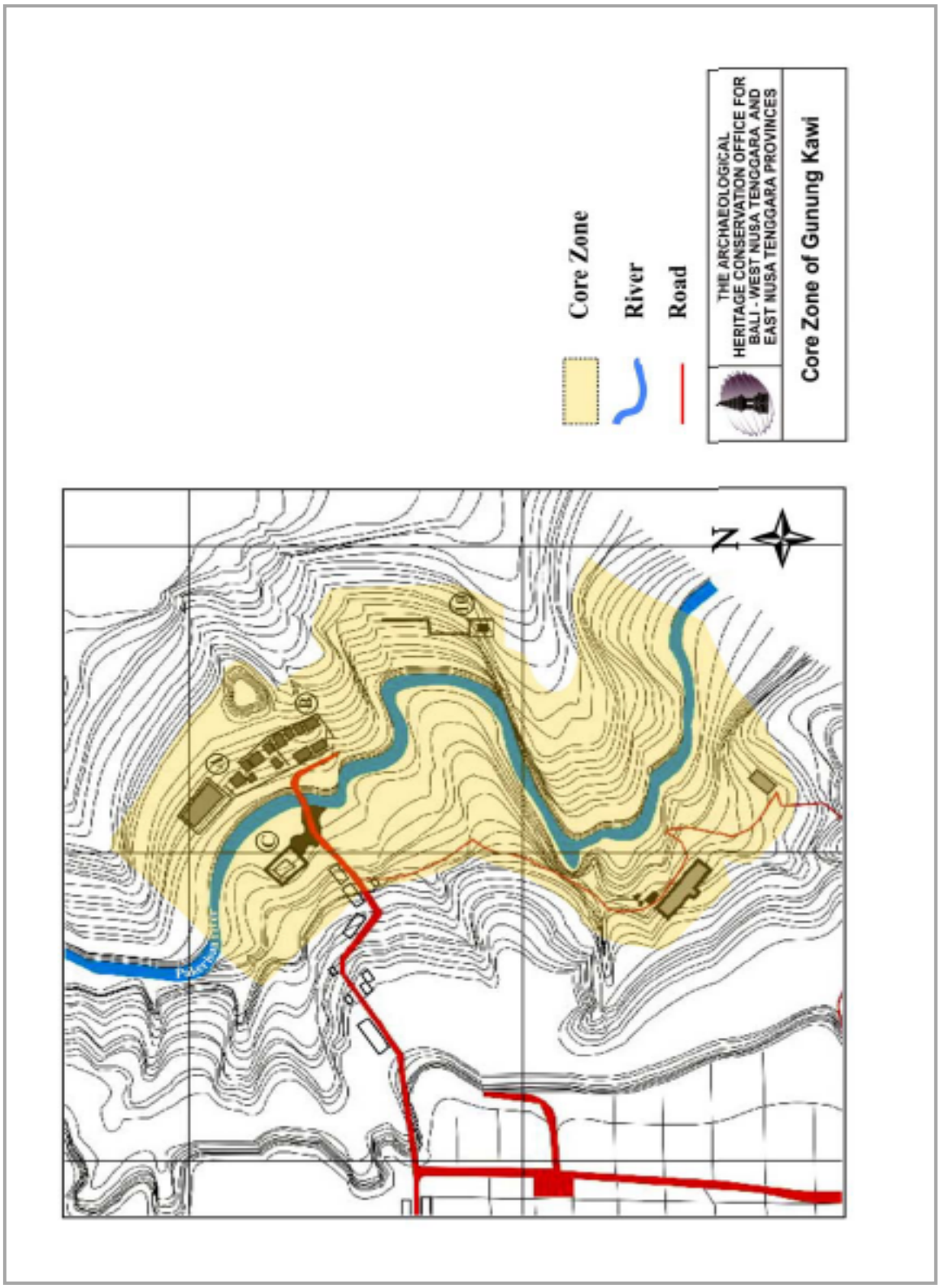
Map 002.9 Core Zone of Pura Mengening



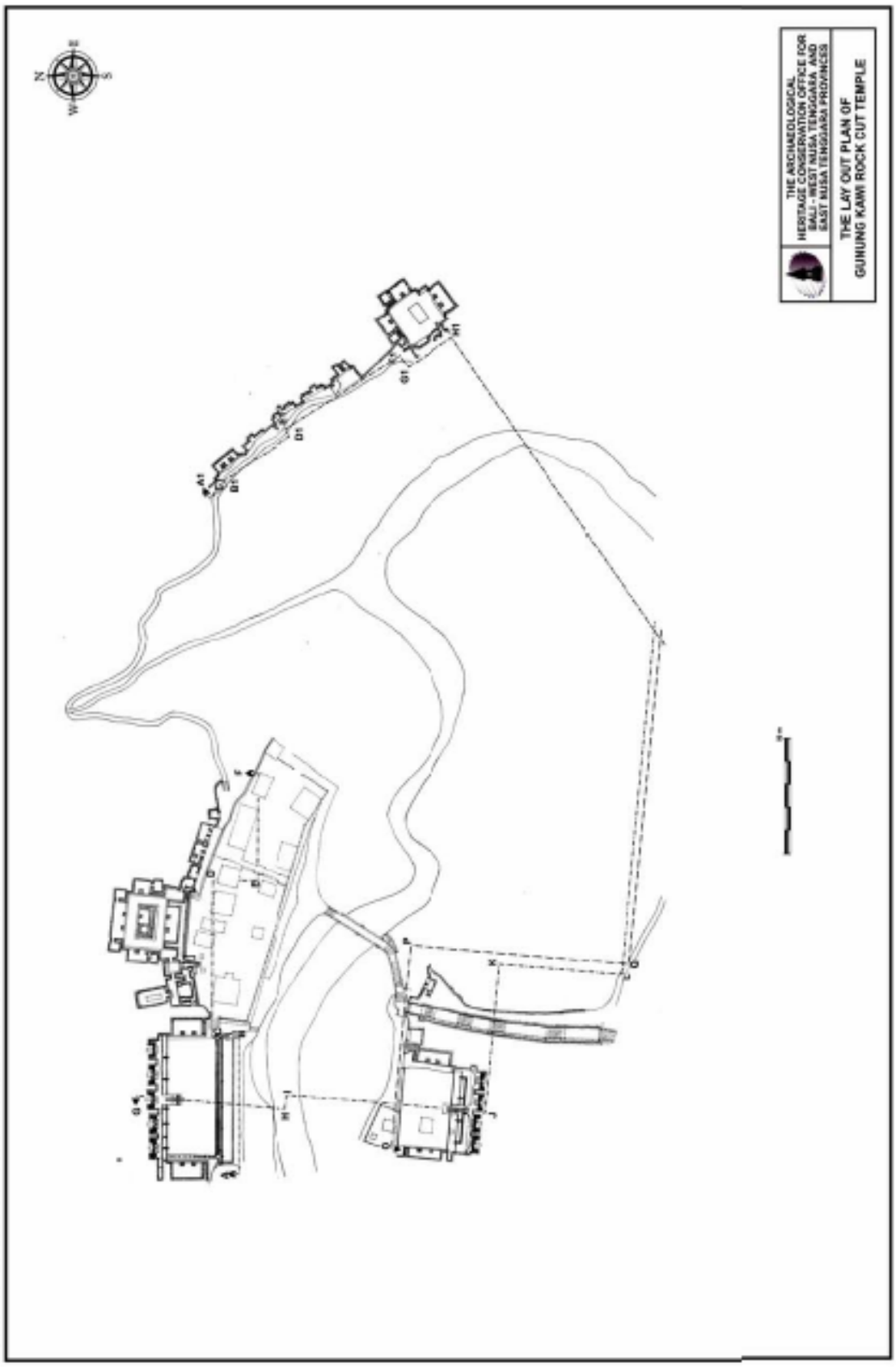
Map 002.10 Site Plan of Pura Mengening



Map 002.11 Zonation of Pura Gunung Kawi

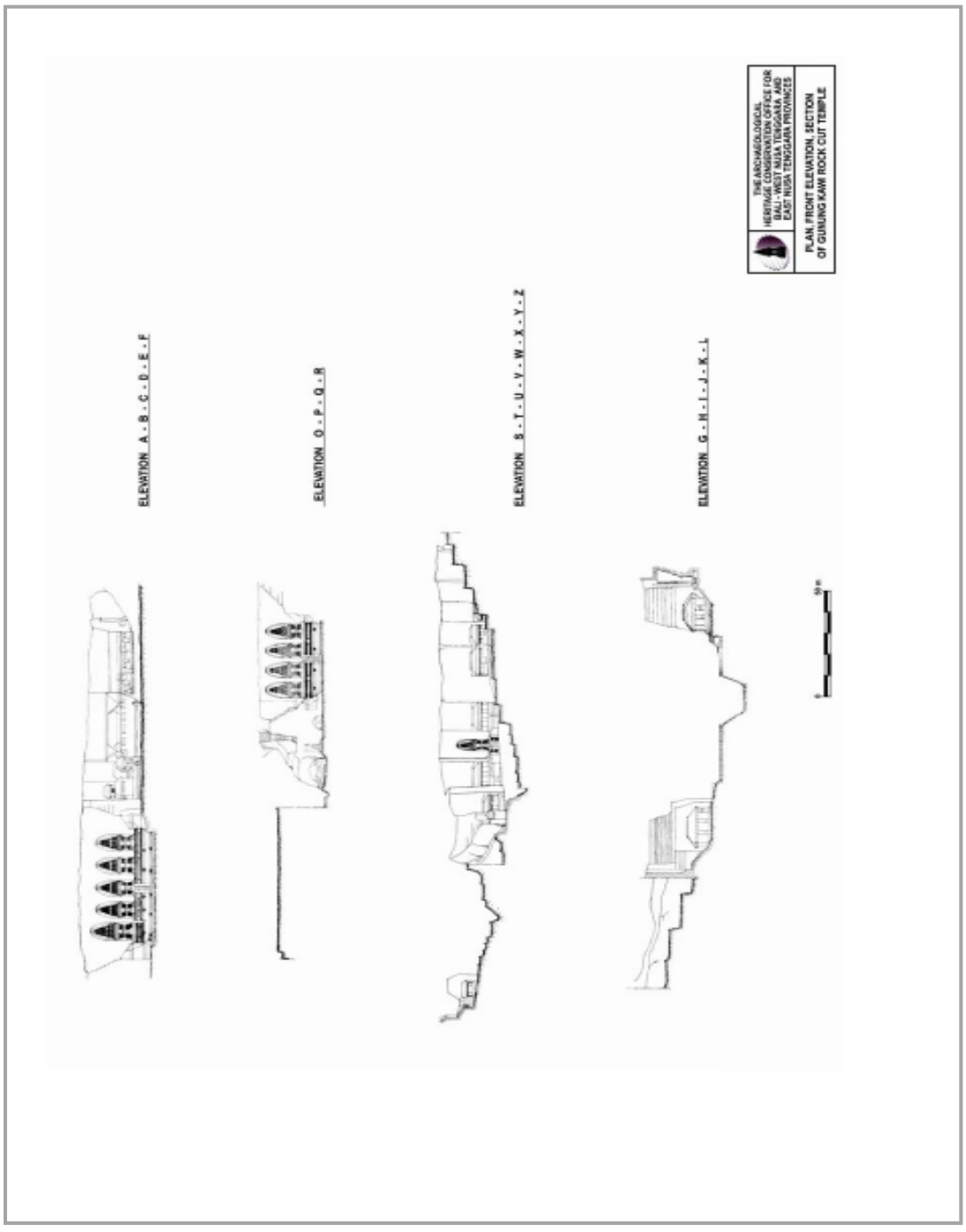


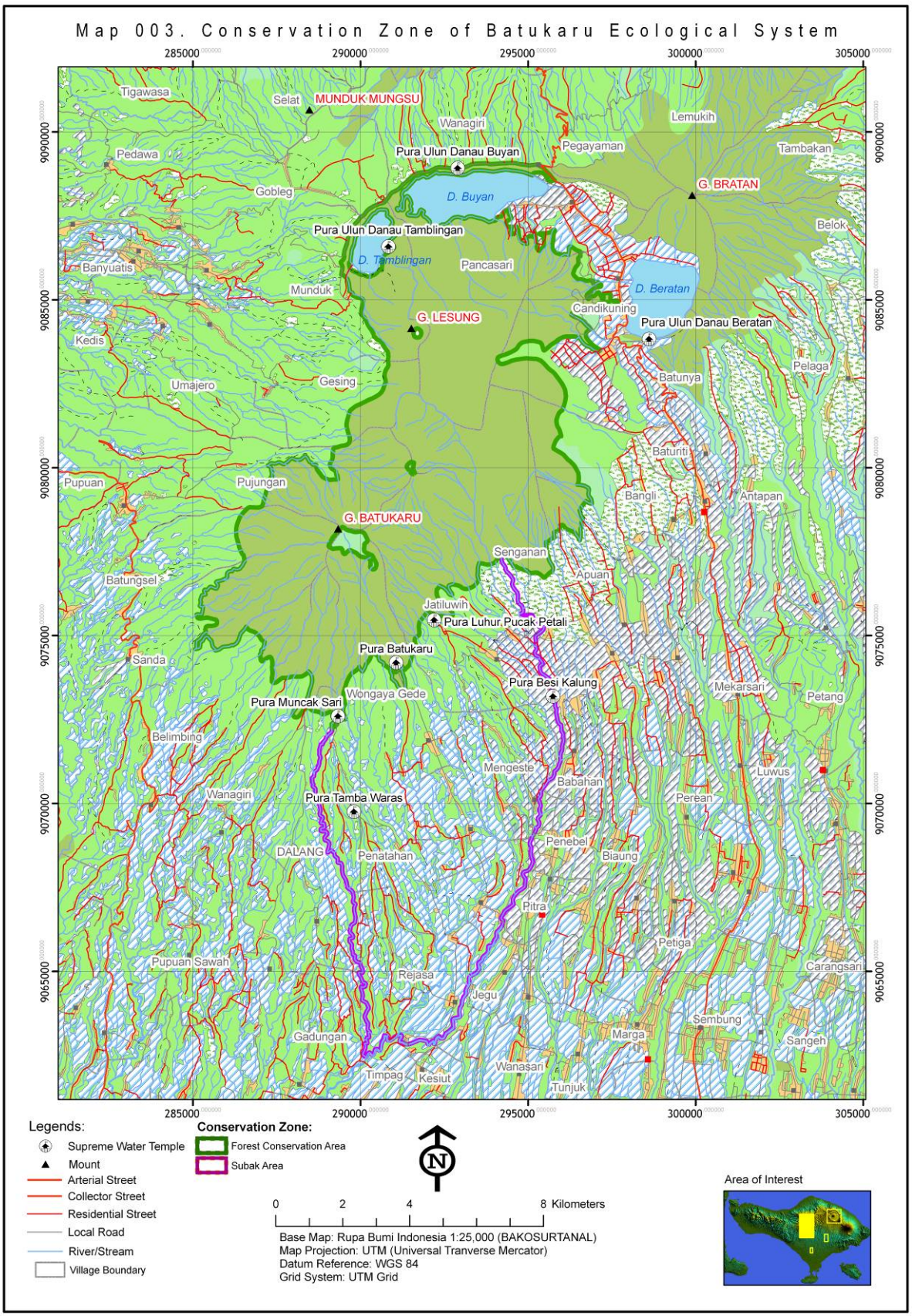
Map 002.12 Core Zone of Pura Gunung Kawi



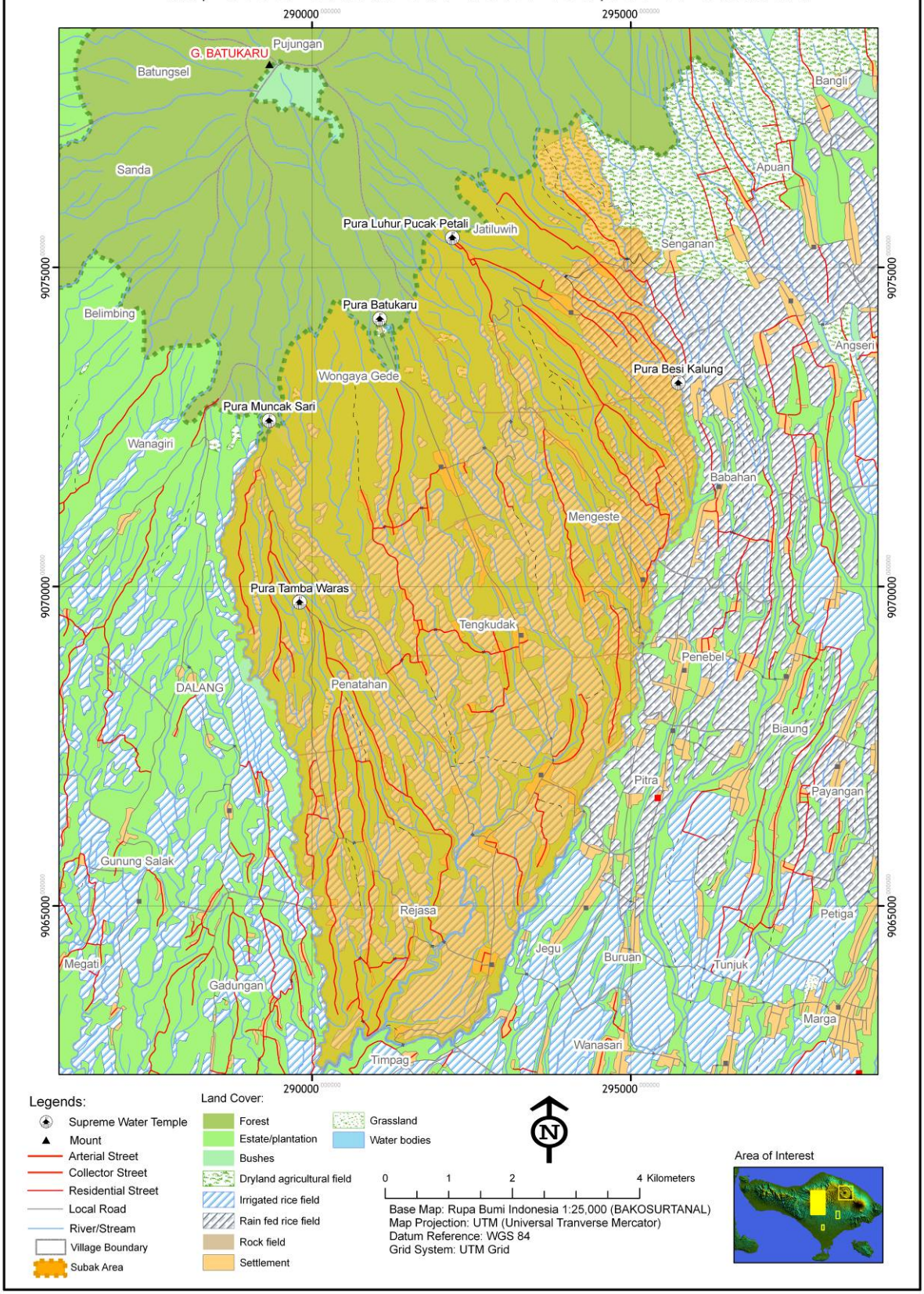
Map 002.13 Site Plan of Pura Gunung Kawi (Rock Cut Temple)

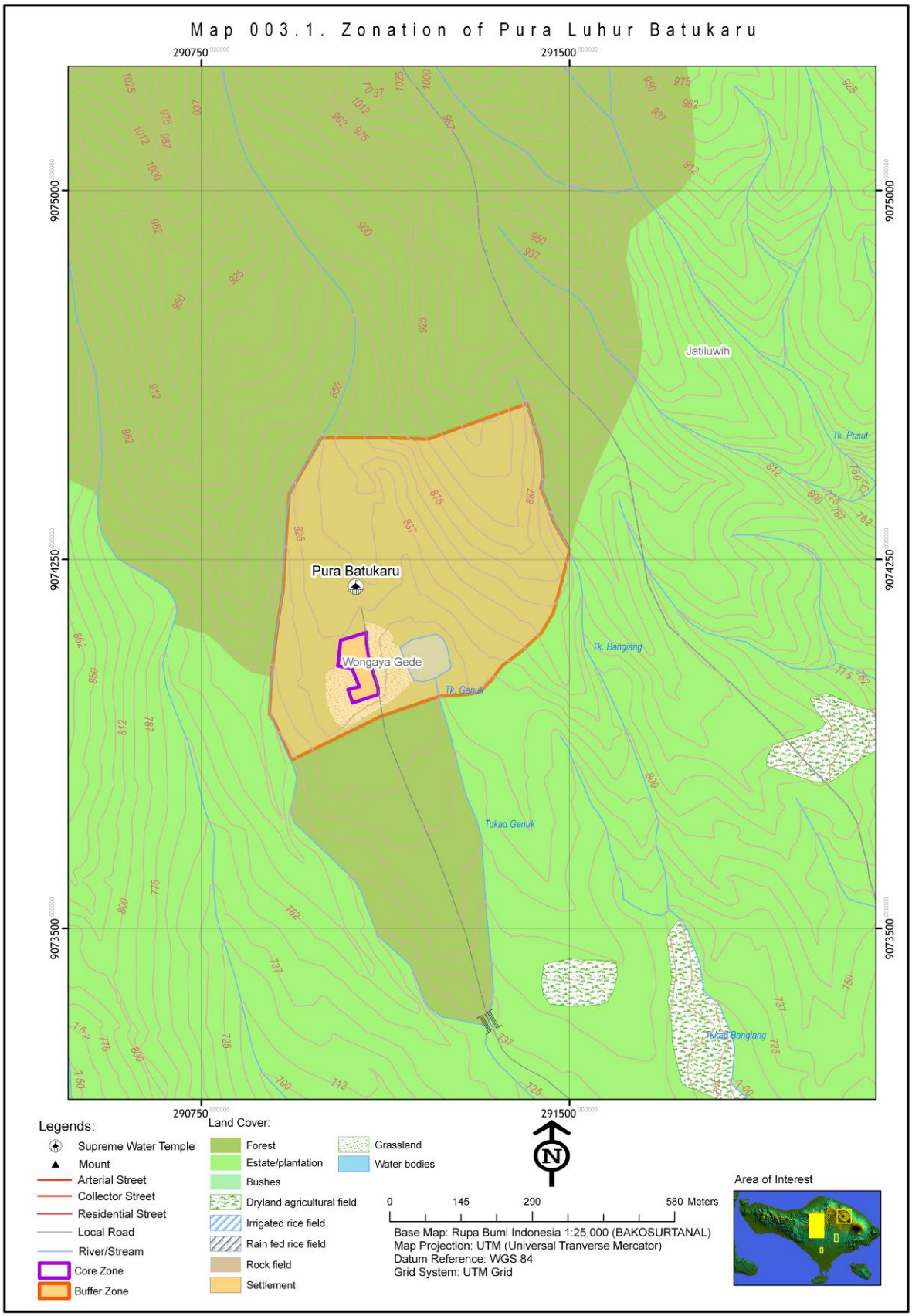
Map 002.14 Section and Elevation of Pura Gunung Kawi (Rock Cut Temple)



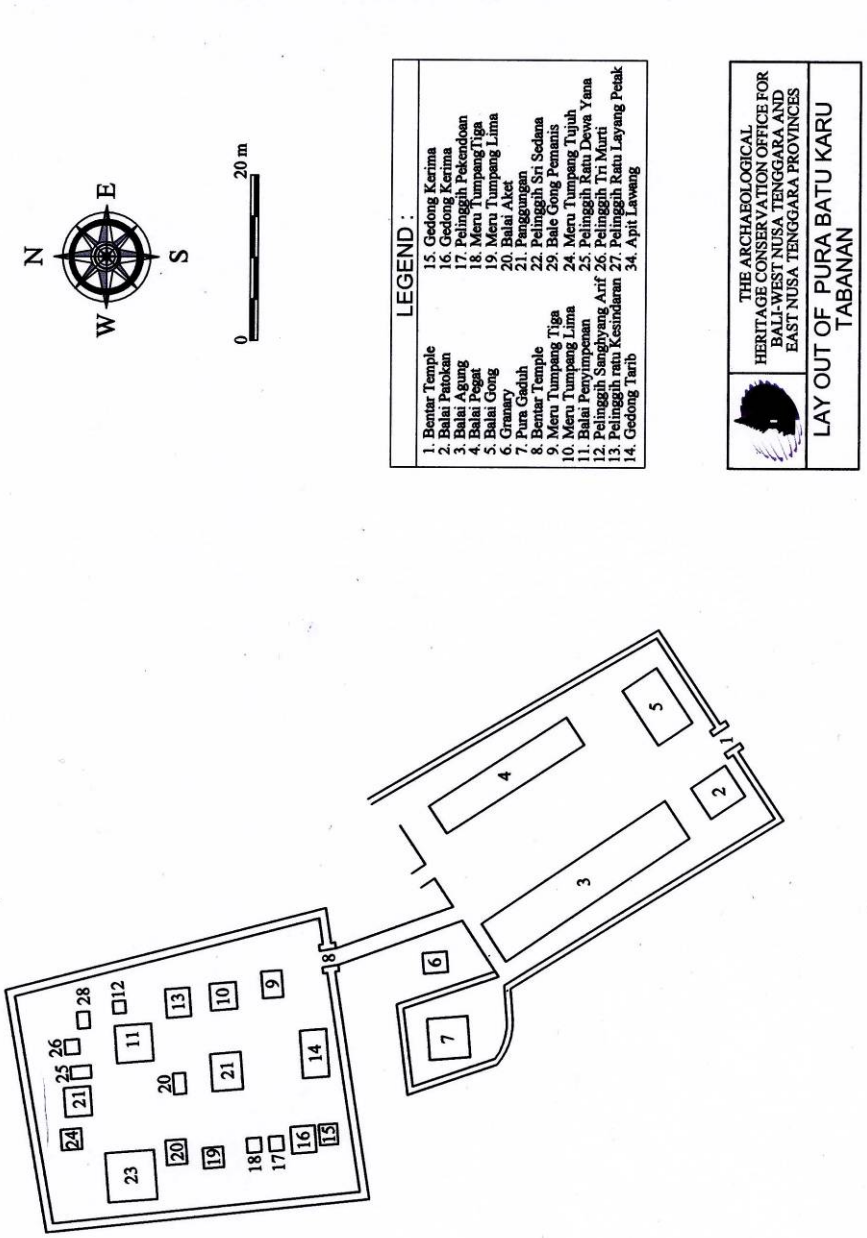

Map 003. Conservation Zone of Batukaru Ecological System
285000
290000
295000
300000
305000
9090000
9085000
9080000
9075000
9070000
9065000
Tigawasa
Selat
MUNDUK MUNGSU
Wanagiri
Lemukih
Pedawa
Pura Ulun Danau Buyan
Pegayaman
Tambakan
Gobleg
D. Buyan
G. BRATAN
Belok
Pura Ulun Danau Tamblingan
D. Tamblingan
Pancasari
Banyuatis
Munduk
D. Beratan
Candikuning
G. LESUNG
Pura Ulun Danau Beratan
Kedis
Pelaga
Umajero
Gesing
Batunya
Baturiti
Pupuan
Pujungan
Bangli
Antapan
G. BATUKARU
Senganan
Apuan
Batungsel
Jatiluwih
Pura Luhur Pucak Petali
Pura Batukaru
Sanda
Pura Besi Kalung
Mekarsari
Petang
Wongaya Gede
Pura Muncak Sari
Belimbing
Mengeste
Luwus
Babahan
Wanagiri
Pura Tamba Waras
Perean
Penebel
DALANG
Penatahan
Biaung
Pitra
Petiga
Pupuan Sawah
Rejasa
Carangsari
Jegu
Sembung
Gadungan
Marga
Sangeh
Timpag
Kesiut
Wanasari
Tunjuk
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Village Boundary
Conservation Zone:
Forest Conservation Area
Subak Area
N
0
2
4
8 Kilometers
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest

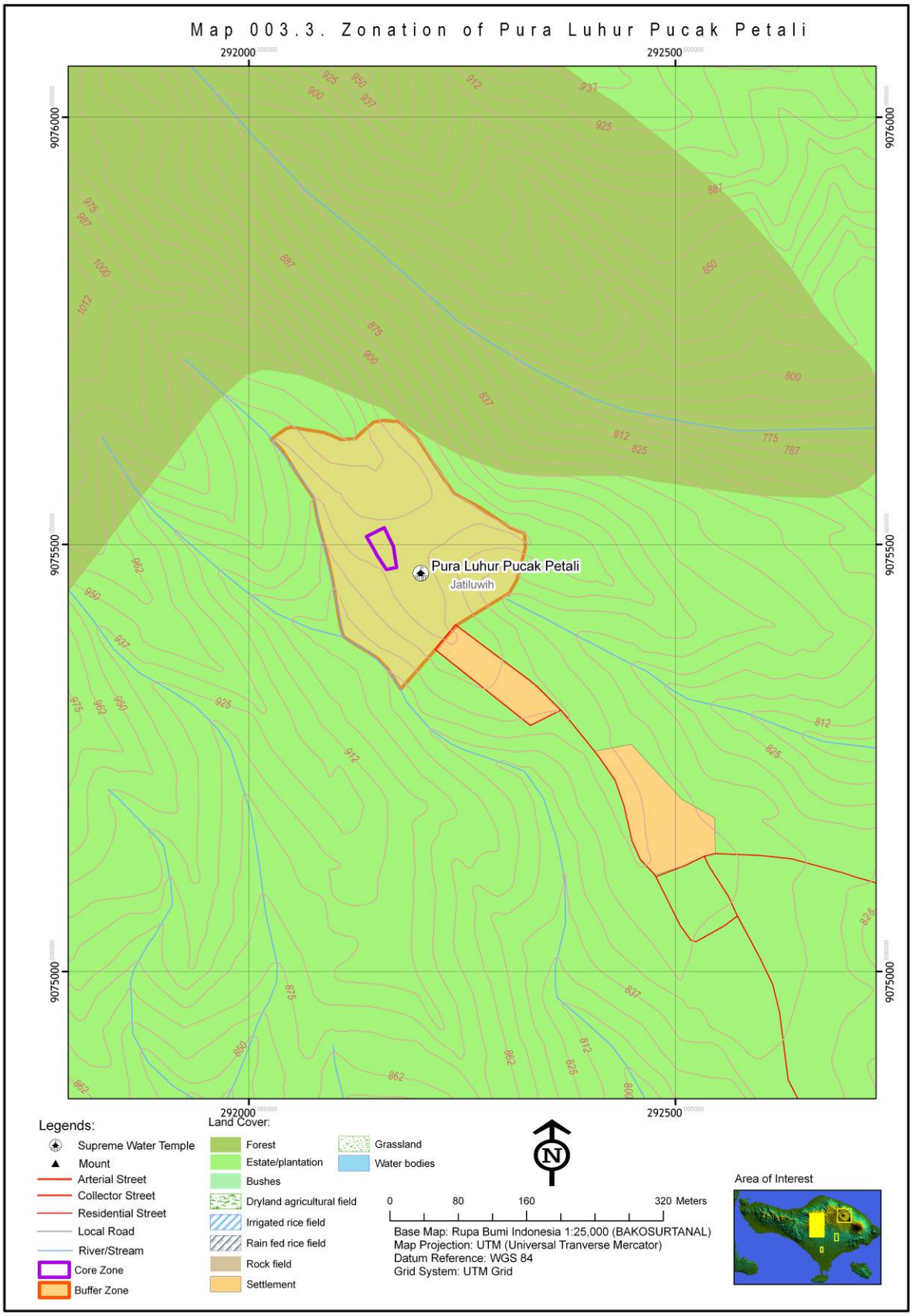
Map 003a. Subaks and Water Temples of Batukaru

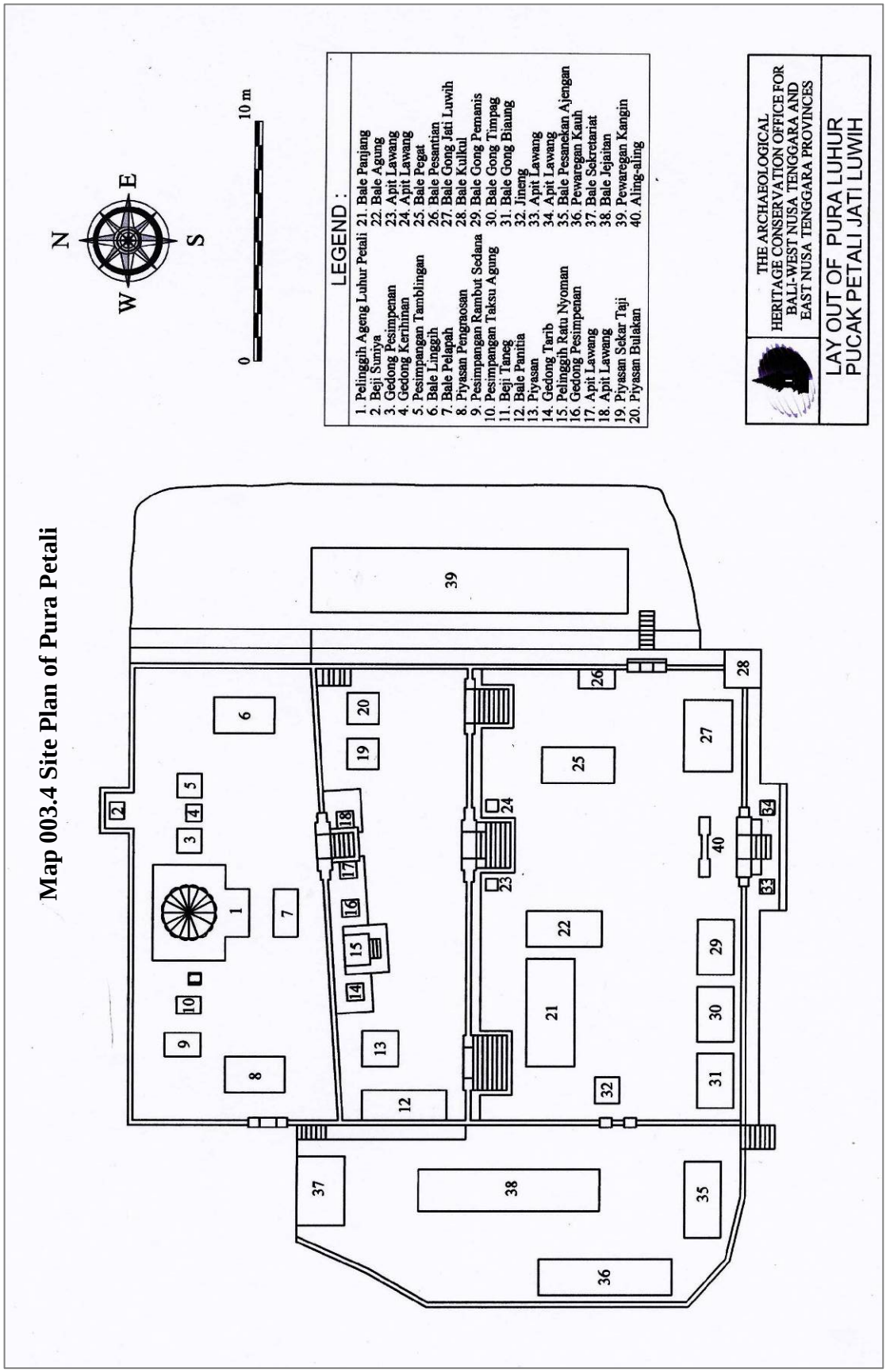



Map 003.1. Zonation of Pura Luhur Batukaru
290750
291500
9075000
9074250
9073500
Jatiluwih
Tk. Pusut
Pura Batukaru
Wongaya Gede
Tk. Genuk
Tk. Bangiang
Tukad Genuk
Tukad Bangiang
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Core Zone
Buffer Zone
Land Cover:
Forest
Estate/plantation
Bushes
Dryland agricultural field
Irrigated rice field
Rain fed rice field
Rock field
Settlement
Grassland
Water bodies
N
0 145 290 580 Meters
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest

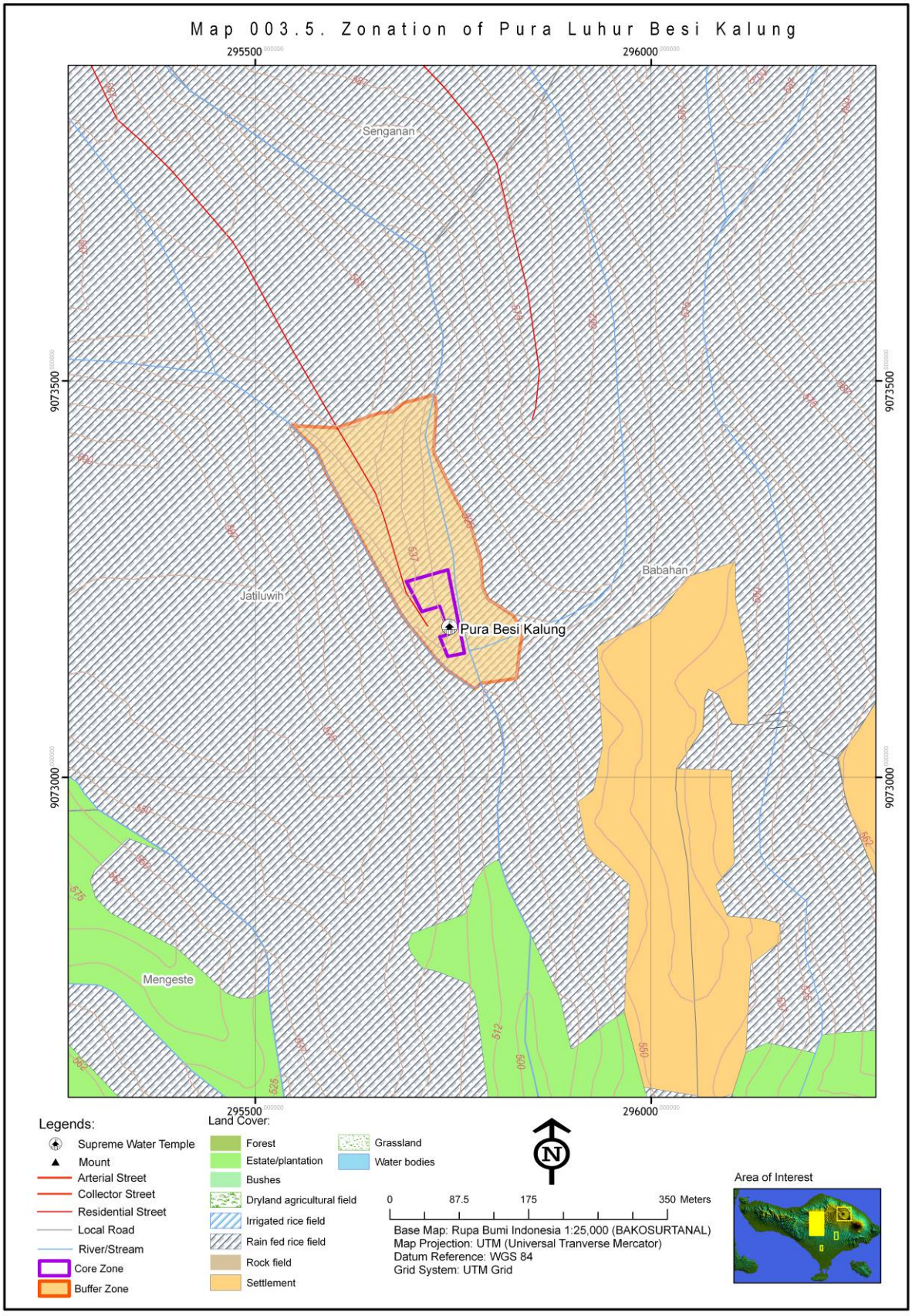
Map 003.2 Site Plan of Pura Luhur Batu Karu

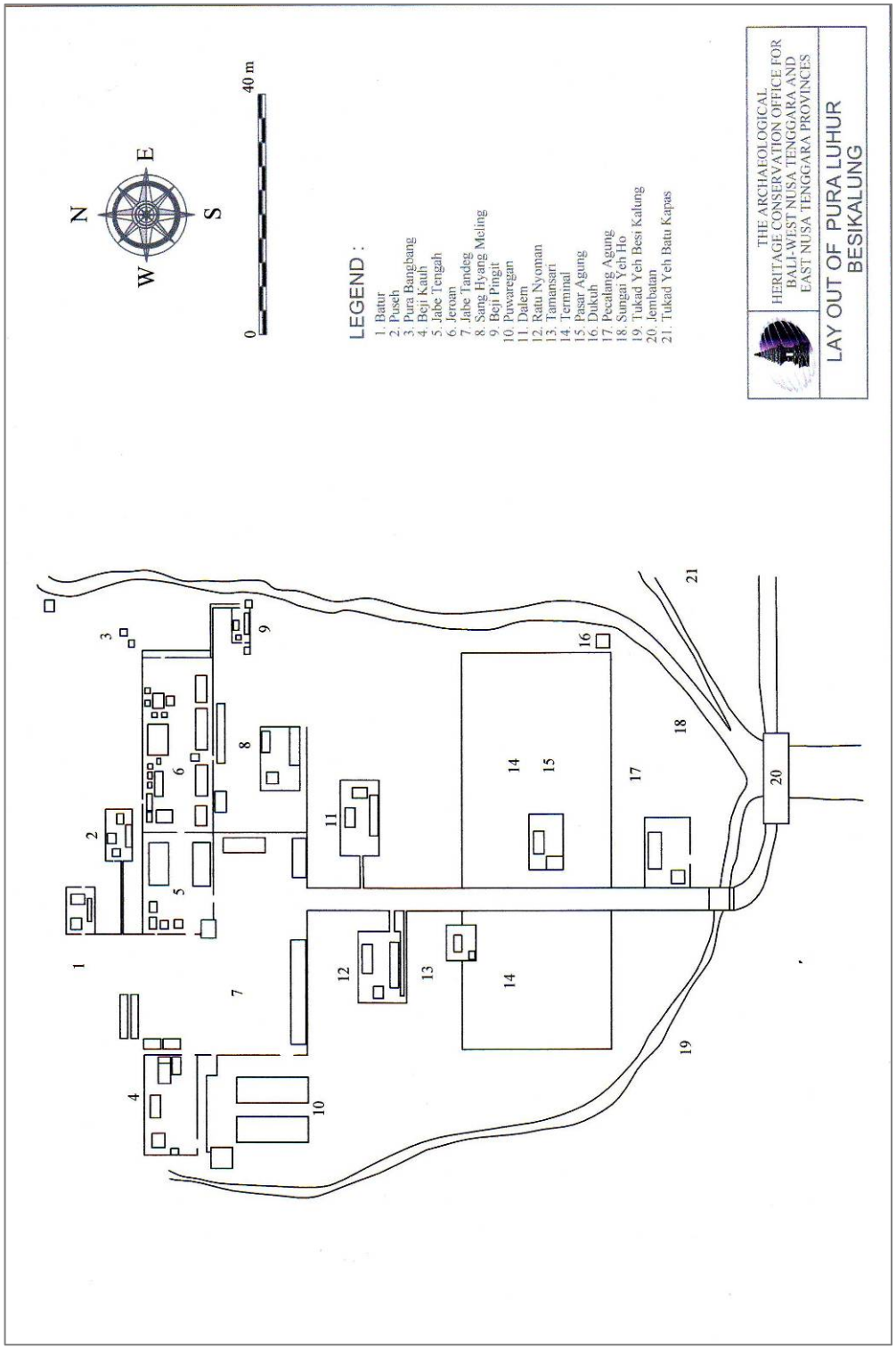



Map 003.3. Zonation of Pura Luhur Pucak Petali
292000
292500
9076000
9075500
9075000
Pura Luhur Pucak Petali
Jatiluwih
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Core Zone
Buffer Zone
Land Cover:
Forest
Estate/plantation
Bushes
Dryland agricultural field
Irrigated rice field
Rain fed rice field
Rock field
Settlement
Grassland
Water bodies
N
0
80
160
320 Meters
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest



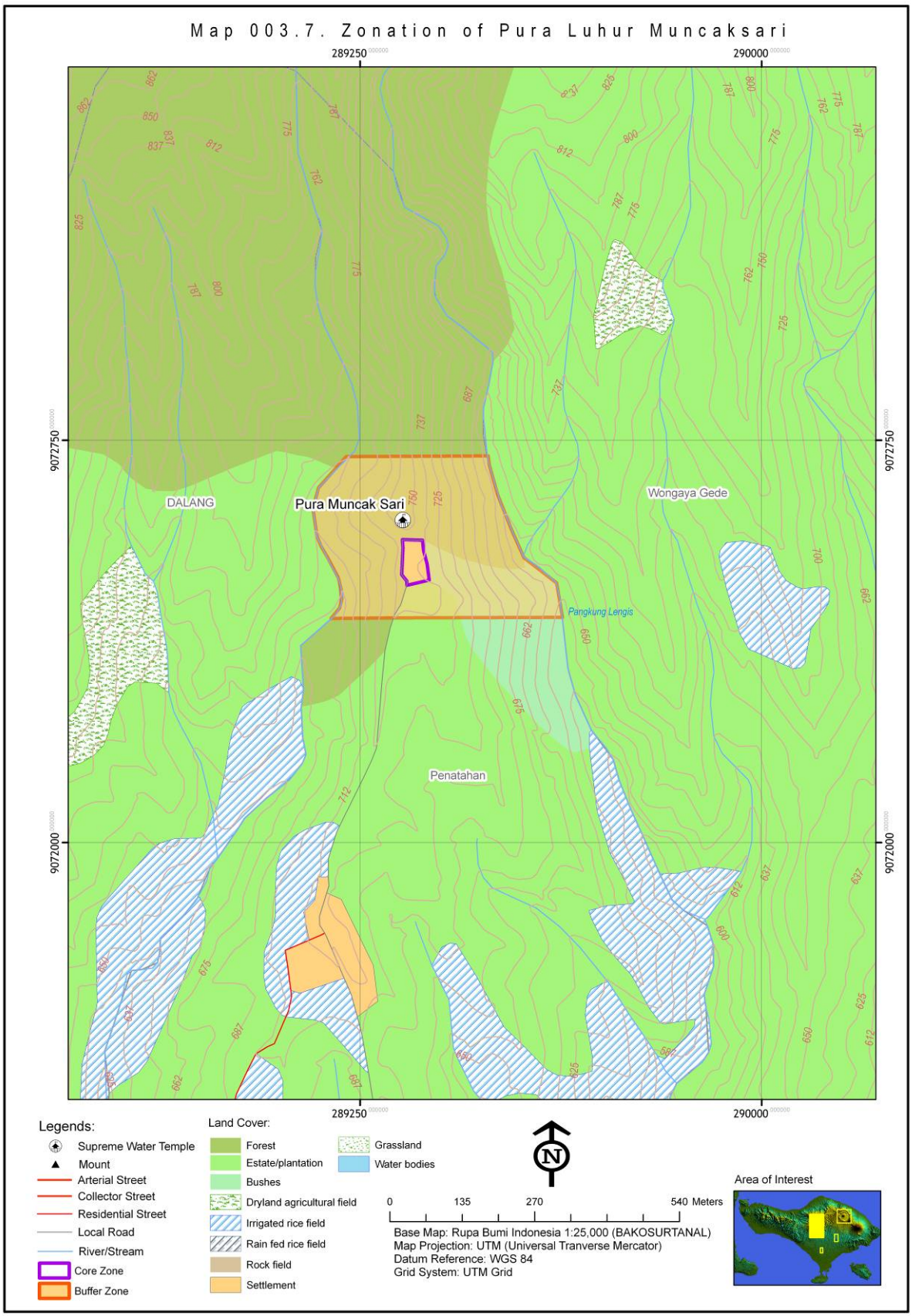
Map 003.4 Site Plan of Pura Petali


Map 003.5. Zonation of Pura Luhur Besi Kalung
295500
296000
9073500
9073000
Senganan
Jatiluwih
Babahan
Mengeste
Pura Besi Kalung
Legends:
Supreme Water Temple
Mount
Arterial Street
Collector Street
Residential Street
Local Road
River/Stream
Core Zone
Buffer Zone
Land Cover:
Forest
Estate/plantation
Bushes
Dryland agricultural field
Irrigated rice field
Rain fed rice field
Rock field
Settlement
Grassland
Water bodies
N
0 87.5 175 350 Meters
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid
Area of Interest

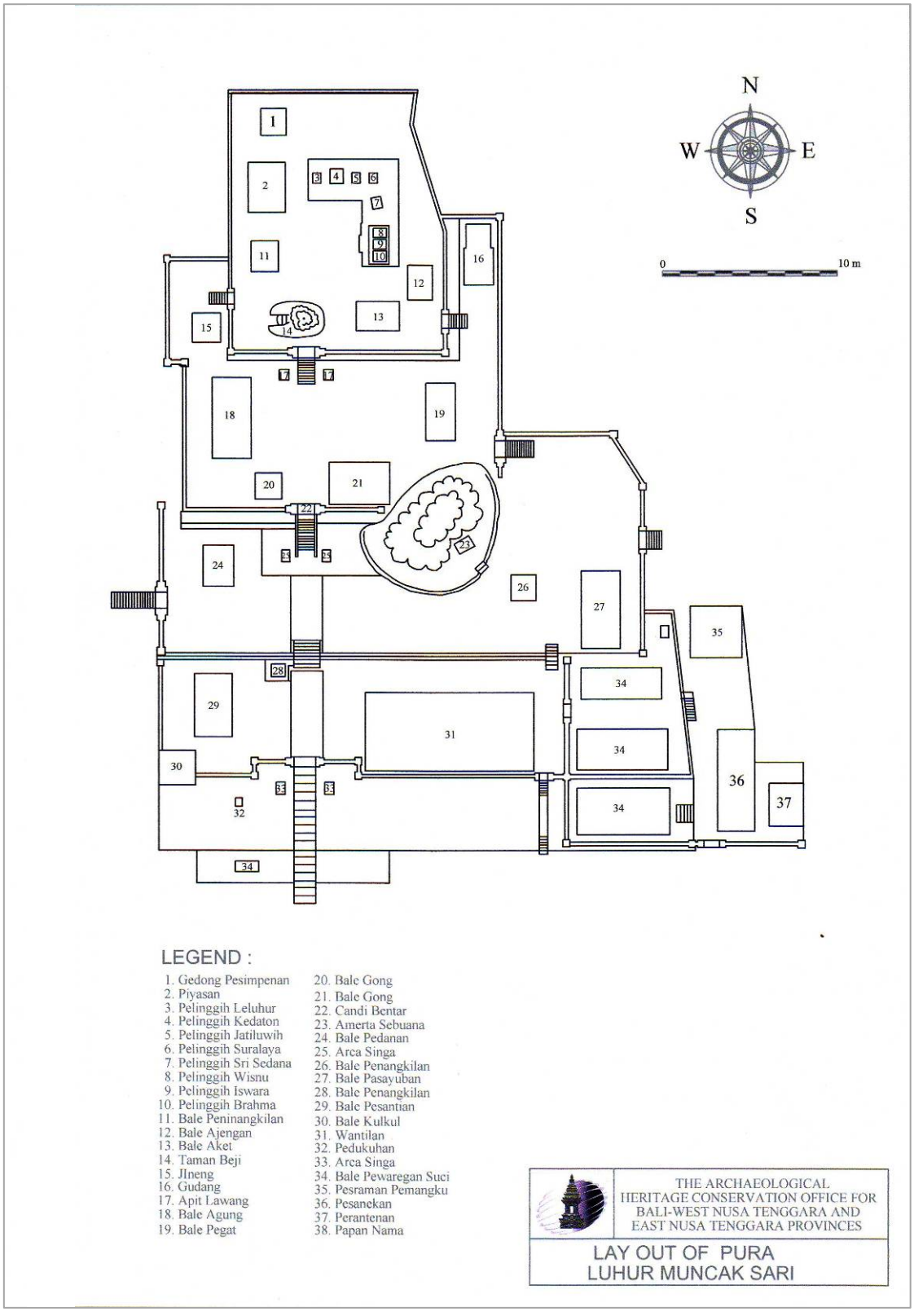


Map 003.6 Site Plan of Pura Luhur Besikalung

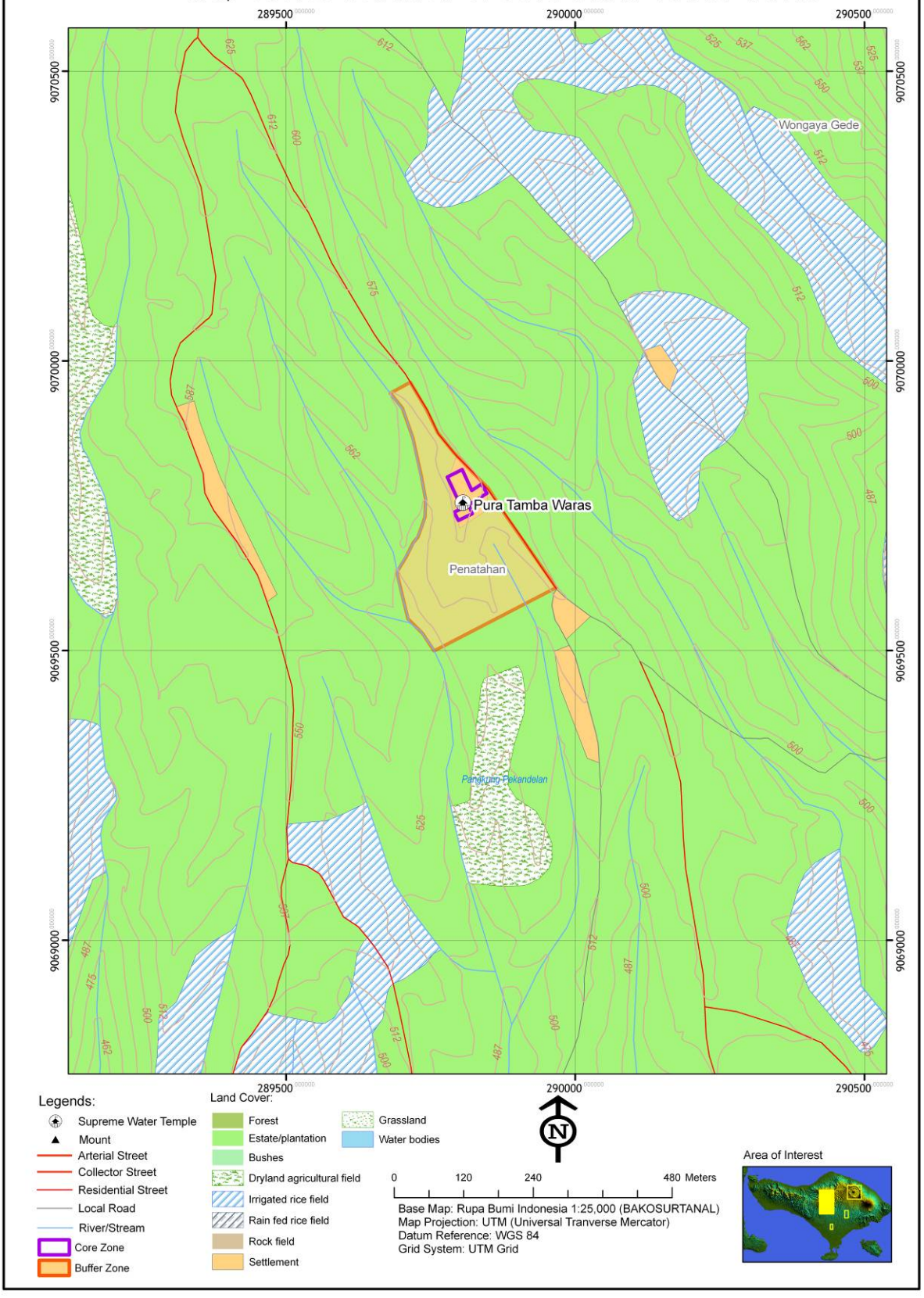
Map 003.7. Zonation of Pura Luhur Muncaksari



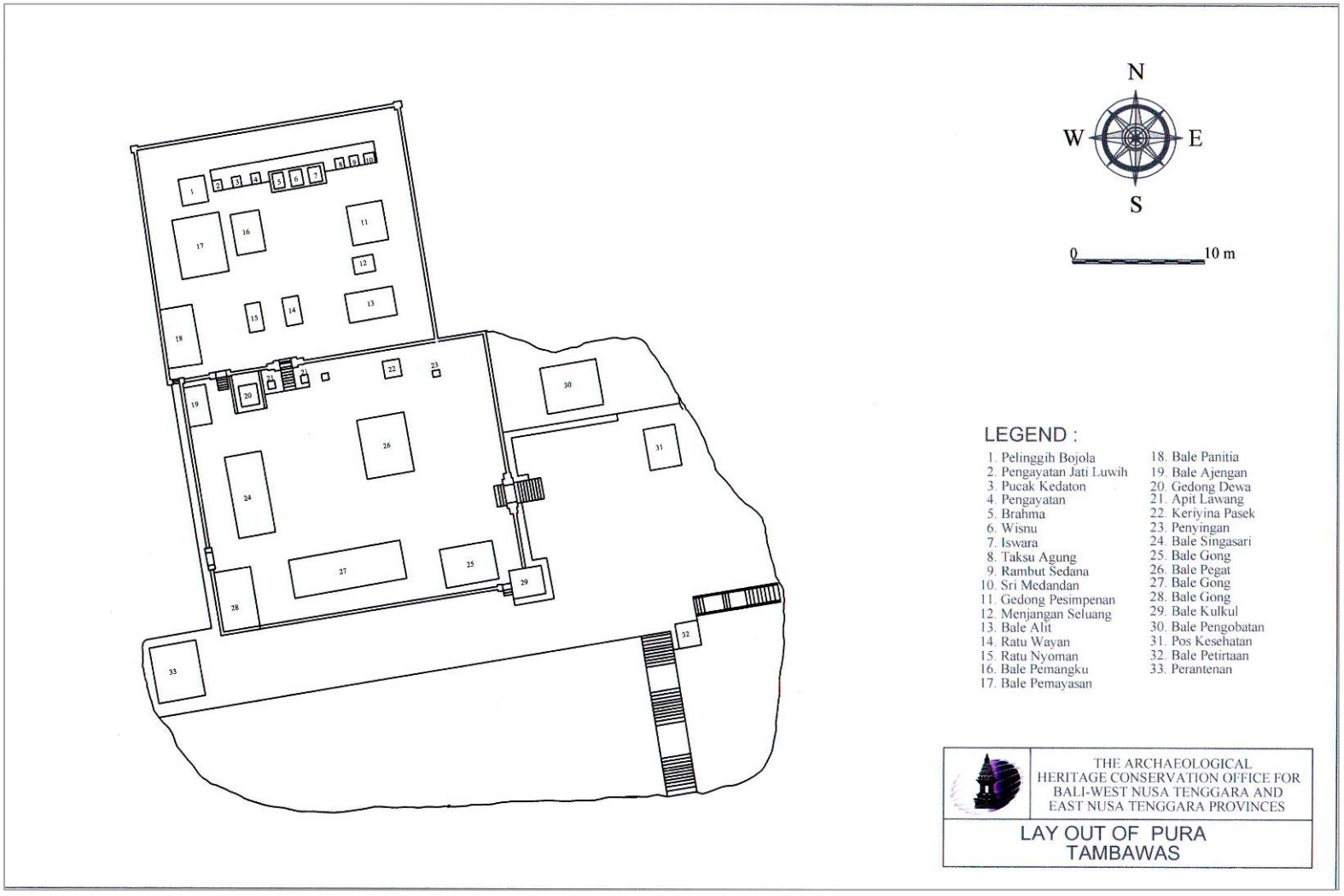
Map 003.8 Site Plan of Pura Luhur Muncaksari



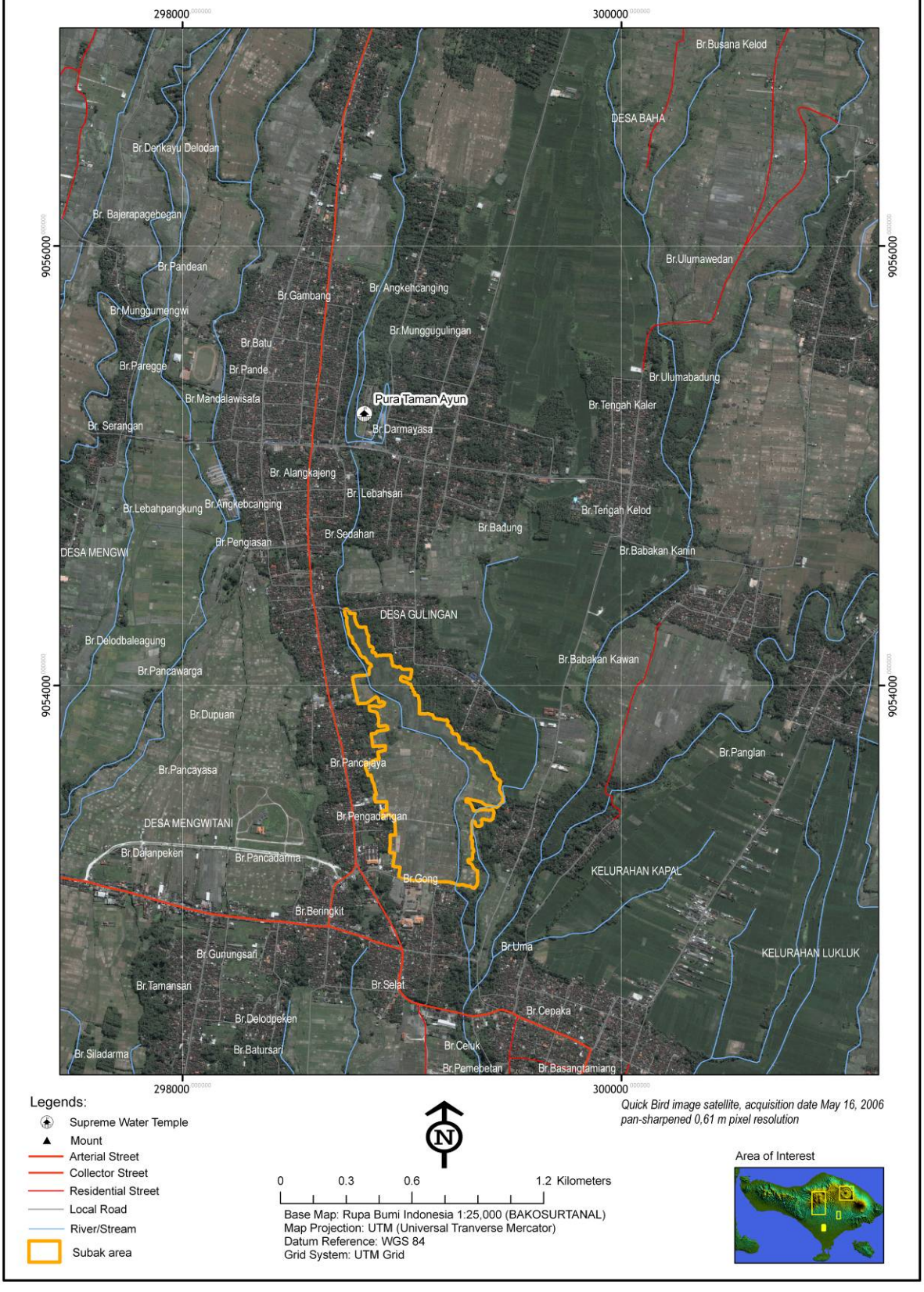
Map 003.9. Zonation of Pura Luhur Tamba Waras



Map 003.10 Site Plan of Pura Luhur Tamba Waras



Map 004. Image Map of Pura Taman Ayun and Subak Batan Badung



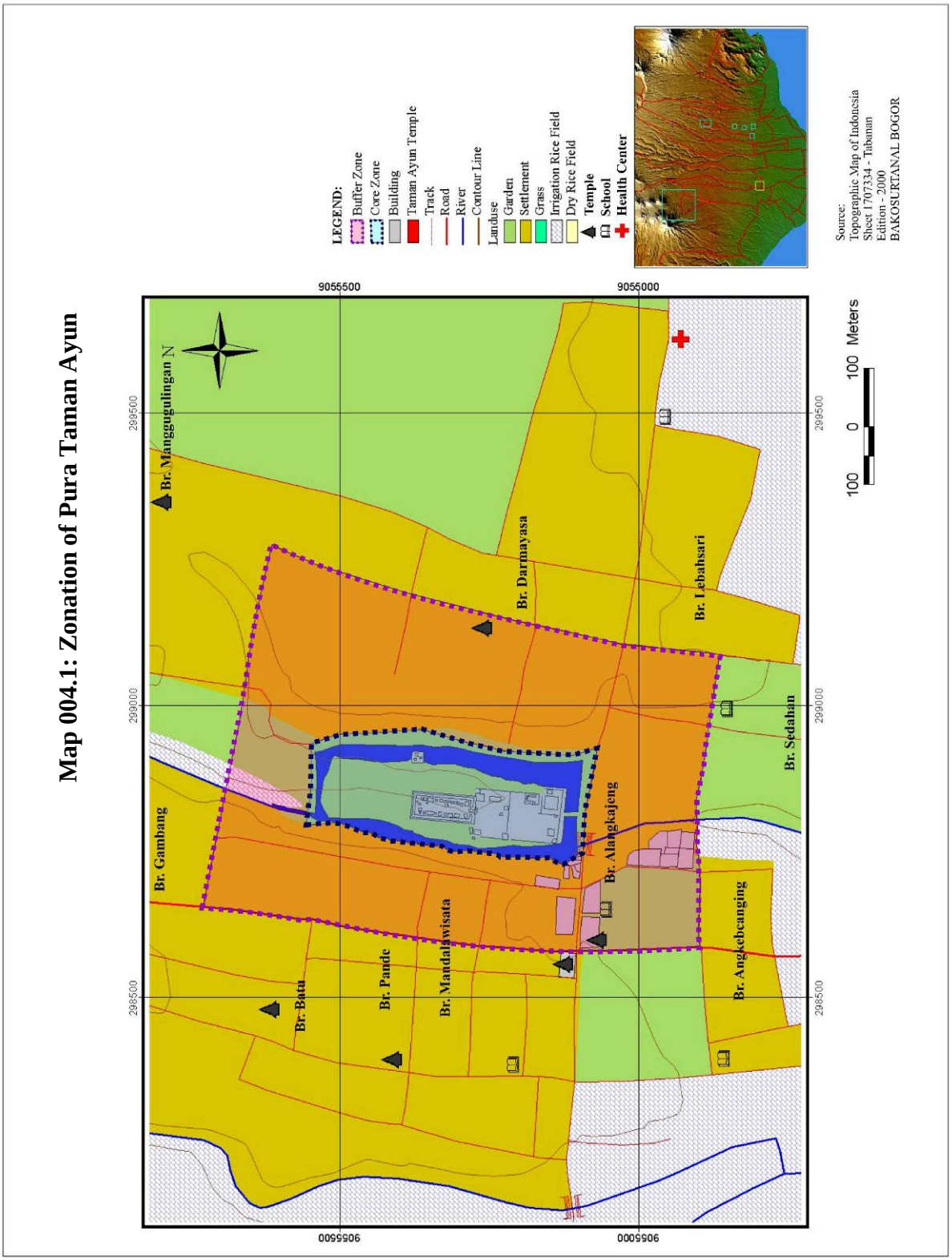
Legends:
- Supreme Water Temple
- Mount
- Arterial Street
- Collector Street
- Residential Street
- Local Road
- River/Stream
- Subak area

Quick Bird image satellite, acquisition date May 16, 2006
pan-sharpened 0,61 m pixel resolution

0 0.3 0.6 1.2 Kilometers

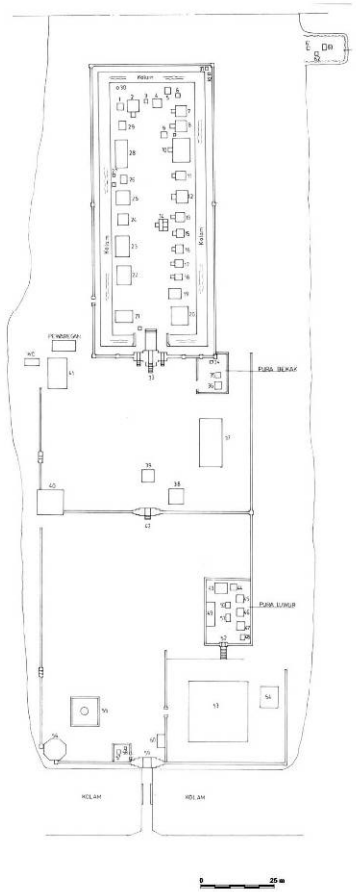
Base Map: Rupa Bumi Indonesia 1:25,000 (BAKOSURTANAL)
Map Projection: UTM (Universal Tranverse Mercator)
Datum Reference: WGS 84
Grid System: UTM Grid

Area of Interest



Map 004.1: Zonation of Pura Taman Ayun

Map 004.2 : Site Plan of Pura Taman Ayun

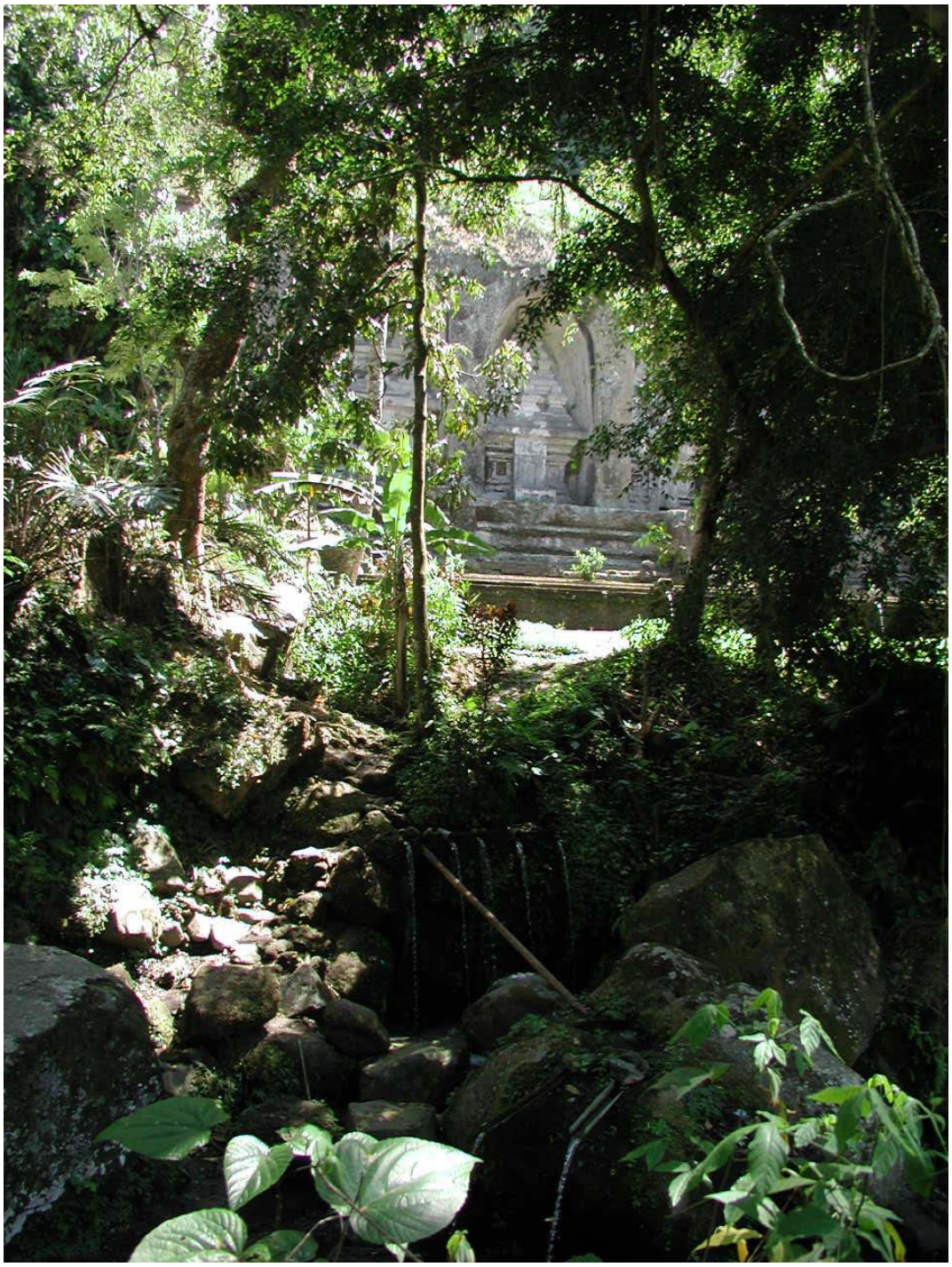


LEGEND :

1. PERSIMPANGAN PUNCAK PADANG DAWA
2. PERSIMPANGAN GUNUNG BATUKARU
3. PELINGGIH RATU NYOMAN SAKTI
4. CANDI PENGHAYAT SARU GADING
5. PERSIMPANGAN PEDANDA SAKTI WAWU RAWUH
6. PELINGGIH RATU NGURAH SAKTI
7. PERSIMPANGAN ULUNSUWI / ULUWATU
8. PERSIMPANGAN PURA SAKENAN
9. PERSIMPANGAN PURA SADA
10. PAIBON
11. PERSIMPANGAN GUNUNG BATUR
12. PERSIMPANGAN GUNUNG AGUNG
13. PERSIMPANGAN GUNUNG BRATAN
14. PADMA TIGA
15. PERSIMPANGAN MASPAHIT
16. PERSIMPANGAN BATU NGAUS
17. PERSIMPANGAN PASURUHAN
18. PELINGGIH RATU PASEK
19. BALE PANCA RESI
20. BALE MURDA
21. GEDONG PENGANGGE
22. BALE SAKA KUTUS
23. BALE SAKA ENAM
24. BALE PEWEDAN
25. PENGARUMAN
26. PANGGUNGAN
27. TEMPAT CUCI TANGAN
28. SAMBYANGAN
29. PANGGUNGAN
30. SUMUR
31. PELINGGIH RATU ALIT
32. PIYASAN
33. KORI AGUNG
34. PEPELIK
35. GEDONG
36. PANGGUNGAN
37. BALE GONG
38. BALE SAKA PAT
39. PENGUBENGAN
40. BALE KULKUL
41. BALE PASANEKAN
42. KORI AGUNG
43. PELINGGIH BETARA DILUWUR
44. PADMASANA
45. PELINGGIH BETARA DALEM TUNGKUB
46. PELINGGIH BETARA DESA PUSEH
47. PELINGGIH RATU GEDE NUSA
48. PELINGGIH RATU NYOMAN SAKTI
49. PIYASAN
50. TEMPAT SESAJEN
51. TEMPAT SESAJEN
52. CANDI BENTAR
53. WANTILAN
54. WC
55. KOLAM AIR MANCUR
56. BALE BUNDAR
57. SAMBYANGAN
58. PELINGGIH SILUH RESI
59. CANDI BENTAR
60. TEMPAT KARCIS MASUK
61. PANGGUNGAN
62. PEPELIK

THE ARCHAEOLOGICAL HERITAGE CONSERVATION OFFICE FOR BALI - WEST NUSA TENGGARA AND EAST NUSA TENGGARA PROVINCES

LAY OUT OF TAMAN AYUN MENGWI - BADUNG



CHAPTER TWO

DESCRIPTION

CHAPTER TWO

DESCRIPTION

Mount and Lake Batur

Introduction: Subaks and Water Temples

The sites chosen for this nomination were selected to exemplify the Balinese *subak* system. *Subak* is a Balinese word, which first appears in royal inscriptions in the eleventh century.[1] It refers to a unique social and religious institution; a self-governing, democratic organization of farmers who share responsibility for the just and efficient use of irrigation water to grow paddy rice. Most subaks possess written legal codes, called *awig-awig*, which detail the rights and responsibilities of subak membership. The religious aspects of the subak stem from the belief that irrigation water is a gift from the Goddess of the Lake(s), Dewi Danu. Subaks are entrusted with the management of this gift, and farmers are expected to contribute a small portion of their harvest each year to religious rites in subak temples, which are dedicated to Dewi Danu and other deities associated with the fertility of the land. The boundaries of a *subak* are usually defined by the collection of paddy fields that are irrigated by a shared tertiary irrigation infrastructure. *Subak* territories may range from a few hectares in the uplands to

[1] The first appearance of the term "subak" is as the root of the word *kasuwakan* in the Pandak Bandung inscription of 1071 AD (No. 436). Sukarto K. Atmodjo, M. M. 1986. Some short notes on agricultural data from ancient Balinese inscriptions. In *Papers of the Fourth Indonesian-Dutch History Conference, Yogyakarta 24-29 July 1983, Vol. I: Agrarian History* (ed. Sartono Kartodirdjo). Yogyakarta: Gadjah Mada University Press, pp. 32-33.

several hundred hectares in the lower reaches of a river. Presently there are approximately 82,000 hectares of irrigated rice terraces in Bali. During the period 2002-2006 an average of 641 hectares per year were converted to other uses. This rate of loss is estimated by the Agricultural Ministry in Bali to have increased to about 1000 hectares per year.

The expansion of the subak system of wet rice cultivation over roughly the last thousand years transformed the Balinese landscape. Balinese volcanoes are part of the Sunda-Banda arc, a continuous geological structure that extends for approximately 4700 km from the northern tip of Sumatra in the west to the island of Nila in the east.[2] The formation of the Batur caldera circa 23,670± 210 y. B.P. deposited a mineral-rich ignimbrite layer over most of southern Bali, which became the Balinese "ricebowl", with irrigated rice terraces developing by the eighth century A.D.[3] According to Balinese mythology, the volcanic peaks are fragments of the cosmic mountain that were brought to the island by the Hindu gods. The flanks of the volcanoes are deeply incised by ravines containing small rivers and streams. At the bottom of the ravines, over the centuries the subaks have constructed hundreds of small diversionary dams and weirs. The highest weirs are located near the maximum elevation where rice will grow. More weirs are situated downstream, spaced a few kilometers apart until they reach the coast. Each weir diverts the flow from a short stretch of river into a small irrigation tunnel, usually no taller than a man and about a meter in width. The tunnels angle sidewise and emerge a kilometer or more downslope to flood blocks of rice terraces that have been carved into the flanks of the volcanoes. Each subak manages one or more blocks of terraces. When the water supply exceeds the amount needed for the first subak, canals and tunnels are often extended to transport the excess flow to more distant subaks downstream. Using traditional engineering techniques, the subaks are able to deliver small quantities of water with astonishing accuracy to terraces located as much as several kilometers from a water source. With this traditional engineering technology, over the centuries rice cultivation spread over much of the island, as small teams of skilled workers

[2] Wheller, G.E., Varne, R., Foden, J.D., Abbot, M.J., 1987. Geochemistry of quaternary volcanism in the Sunda-Banda Arc, Indonesia, and three-component genesis of island-arc basaltic magmas. *J. Volcanol. Geotherm. Res. 32*, 137–160.

[3] Lansing, J. Stephen, Vanda Gerhart, James N. Kremer , Patricia Kremer, Alit Arthawiguna, Suprapto, Ida Bagus Suryawan, I Gusti Arsana, Vernon L.Scarborough and Kimberly Mikita. 2001. "Volcanic Fertilization of Balinese Rice Paddies", *Ecological Economics* 38 (2001):383-390.

drew the water out in long spidery threads that crisscrossed the slopes of the sacred mountains.

Pura Ulun Danu Beratan, Beratan Lake

Because the right of each subak to use irrigation water is based on the performance of annual cycles of rituals honoring the Goddess of the Lake and other deities, the cultural landscape created by the subaks includes water temples and shrines as well as the engineered landscape of dams, tunnels, aqueducts, and rice terraces. Each subak maintains a local network of shrines and water temples, where farmers make offerings to their gods. The schedule of ritual activities in these shrines and temples is keyed to the growth cycle of native Balinese rice, and the complex Balinese system of time reckoning finds one of its fullest expressions in these rites.[4]

As well as honoring the gods, the interlocking cycles of water temple rites also provide a template for the management of ecological processes in the paddy

[4] Vernon L. Scarborough, John W. Schoenfelder and J. Stephen Lansing. 2000. "Early Statecraft on Bali: The Water Temple Complex and the Decentralization of the Political Economy". *Research in Economic Anthropology*, Vol. 20: 299-330.

fields. By adjusting the flow of irrigation water, farmers can exert control over many ecological processes in their fields. Mineral nutrients needed by the rice are leached from the volcanic landscape by the monsoon rains, and transported to the fields in the irrigation water. Water can also be used to manage rice pests (rodents, insects and diseases) by synchronizing fallow periods in large contiguous blocks of rice terraces. After harvest, the fields are flooded, depriving pests of their habitat and thus causing their numbers to dwindle. The success of this method of pest control depends on the ability of the farmers to schedule simultaneous harvests over large areas, so that the pests cannot migrate to a new food source. This requires a smoothly functioning, cooperative system of water management, physically embodied in proportional irrigation dividers, which make it possible to tell at a glance how much water is flowing into each canal, and so verify that the division is in accordance with the agreed-upon schedule.[5]

The effective management of water often requires groups of subaks to coordinate their irrigation and planting schedules. These multi-subak groupings form the congregations of regional water temples. Such temples are larger and more imposing than ordinary subak temples. They exist to acknowledge the sites where water originates, such as crater lakes and springs. All of the farmers who benefit from a particular flow of water share an obligation to provide offerings at the temple where their water originates. For example, if six subaks obtain water from a given source, all six belong to the congregation of the water temple associated with that source. Thus the larger the water source, the larger the congregation of the water temple. The largest congregation, which presently includes more than 250 subaks, supports the supreme water temple, Pura Ulun Danu Batur, which is located on the rim of the volcanic crater overlooking Lake Batur. This temple receives annual offerings from its entire subak congregation, and its priests are often consulted by the subaks on questions about water rights and the development of new irrigation systems.

The Subak Landscape Defined

From a comparative perspective, two features of the subak system stand out. The first is the success of this cultural innovation in creating a landscape of

[5] Lansing, J. Stephen and John H. Miller. 2005. Cooperation Games and Ecological Feedback: Some Insights from Bali. *Current Anthropology* 46(2): 328-334.

spectacular beauty that has provided an ecologically sustainable foundation for Balinese civilization for the past millennium. This achievement is rooted in the second remarkable feature of the subaks: their success as a system of cooperative resource management sustained by self-governing democratic institutions (the subaks). Like all traditional civilizations, in the premodern era Bali was ruled by princes and kings. Elsewhere in Asia, the power of princes was often associated with control of irrigation. But in Bali, water is regarded as the gift of a Goddess, and over the centuries Bali's rulers cooperated with the subaks to promote harmony with the natural and spiritual realms, in keeping with the philosophy of Tri Hita Karana. The rituals of the subak temples define specific complementary roles for farmers, princes and priests in sustaining the productivity of the landscape. Importantly, the components of the landscape cared for by the subaks extend beyond the rice terraces. They also include the lakes, springs and rivers that provide irrigation water; the weirs, tunnels, canals, aqueducts and rice terraces built and managed by the subaks; and the nested hierarchies of water temples that both honor the gods and provide an institutional framework for the management of irrigation and cropping cycles. All of these landscape features are referenced in the traditional legal mandate of the subaks, defined in *awig-awig* lawbooks.[6] In addition, the subaks are also ritually connected to two other important landscape features. The first consists of the forested areas that provide the rainfall catchments that feed the irrigation systems. The second consists of the village communities. Farmers are also villagers, and the life of the subak is deeply entwined with the life of the community. Traditional houses possess wooden rice barns, called *lumbung*, where rituals are held to honor the Rice Goddess, Dewi Sri, and other deities associated with the fertility of the countryside.

Choice of Sites

Today much of the Balinese rural landscape is still managed by subaks, but in recent years this landscape has become fragmented due to intense pressure from commercial development, and soil fertility has declined due to over-use of chemical fertilizers in many areas. There is a strong desire among the Balinese people to recognize and preserve the integrity of the traditional subak landscape while there is still time (a prominent topic of discussion in Bali's newspapers,

[6] Adatrechtsbundels XXXVII: Bali en Lombok. 's-Gravenhage: Nijhoff, 1934.

television programs and seminars). The sites chosen for the World Heritage nomination were selected to reflect the key features of the subak system, and to recognize this historical achievement of the Balinese people. Three sites are proposed for immediate designation as World Heritage sites, because they are still intact, having so far largely escaped commercial development, and because of their historic and symbolic significance. Another site has also been selected for possible inclusion as a serial nomination, and will be described below.

The three sites proposed for immediate designation were carefully selected as the most appropriate to reflect the historic scope and continuing cultural role of the subak system. It is important to recognize that subaks are not simple water-user associations managed by single communities. Instead, the subaks and their water temples articulate a cosmological grid which attaches meaning to landscape features over entire watersheds. Further, they define specific responsibilities for the ongoing care and preservation of particular landscape features by designated social groups. This system has evolved over approximately a millennium, and there are important differences in the ways it is manifest in different regions of Bali. Each of the three sites highlights particular aspects of the subak system; collectively they define its most important features. Here we provide a brief overview of all three sites, to clarify the overall logic of the nomination. This is followed by a detailed description of each site. Subsequently, the site selected for consideration as a serial nominations is discussed.

Proposed sites:

A. Supreme Water Temple Pura Ulun Danu

District of Kintamani, Bangli Regency

B. Ancient Water Temples and Subaks of Tampaksiring

District of Tampaksiring, Gianyar Regency

1. Pura Pegulingan
2. Pura Tirtha Empul
3. Pura Mengening
4. Pura Gunung Kawi (Rock Cut Temple
5. Subaks Basangambu, Pulagan, Kumba, and Kulub

C. Water Temples of Batukaru and Subaks

District of Penebel, Tabanan Regency and District of Sukasada, Buleleng Regency

1. Pura Luhur Batukaru
2. Pura Luhur Pucak Petali
3. Pura Luhur Tambawaras
4. Pura luhur Besikalung
5. Pura Luhur Muncaksari
6. Subaks Batu Karu Area; consist of Subak Jatiluwih, Gunung Sari, Umadui, Kedamaian, Kesambi, Soka, Gelaga Taba, Wengaya Betan, Peselatan, Piling, Telaga, Puring, Anyar, Babakan, Klembang, Pesagi, Kuwum Keladi, Puluk-puluk, Deman, Puakan, Rejasa, Tel Linggah, Darma, Buruan, Poh Gending, Anyar, Lebah, Merta Sari, Pangkung Petung, Pal, Sandan Amplas, Baru.

Site under consideration for future serial nomination:

D. Pura Taman Ayun (Royal Water Temple) and *Subak* Batan Badung

District of Mengwi, Badung Regency

Criteria for Selection: Overview

Pura Ulun Danu Batur

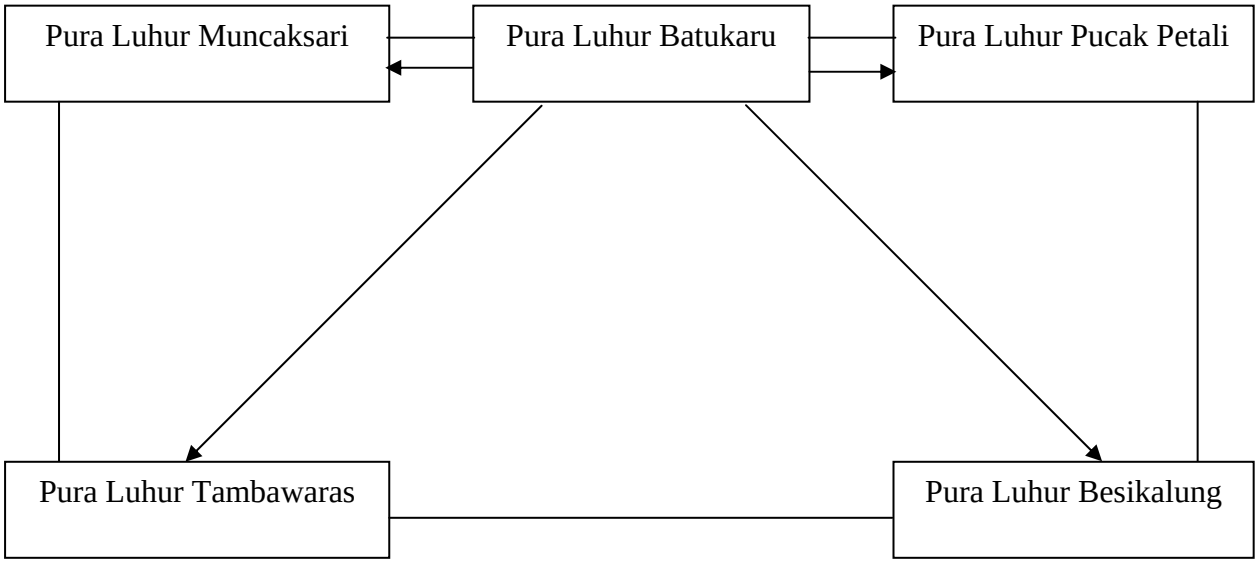
Three sites are proposed for immediate inscription. The first is the water temple Pura Ulun Danu Batur, located on the crater rim overlooking Lake Batur, which is believed to be the home of the Goddess of the Lake, Dewi Danu. The crater lake, caldera, forests and village land located within the caldera of Mount Batur are also included in this site. This water temple and associated lands are managed by the people of the village of Batur. The temple is supported by the village of Batur and a congregation of 250 subaks. As will be described below, it is considered to be the supreme water subak temple of Bali.

The second site consists of a cluster of temples and subaks located at high elevation in the valley of Tampaksiring. Archaeological evidence indicates that this valley was the cradle of Balinese civilization. Today, waters from natural springs enclosed by ancient temples provide irrigation water for ancient rice terraces where native Balinese rice is still grown in the traditional manner by five centuries-old subaks. The Tampaksiring site represents the origin and historic continuity of the subak system, and dramatically illustrates its relationship to the formation and growth of early Balinese kingdoms.

The third site comprises forests, lakes, springs, temples and subaks clustered around Mount Batukaru. This site exemplifies the multi-layered structure of the

Balinese subak system, and its historic expansion in western Bali. From the standpoint of Bali as a whole, this site is significant because it encompasses two mountain lakes and associated temples, which are regarded as the origin of waters for all the subaks downstream in the western "ricebowl" region of Tabanan. At these lake temples, the subaks of the former kingdom of Tabanan perform the "Water-opening" rituals that mark the beginning of the annual cycles of cultivation. In addition to its importance as a sacred water-origin source for western Bali, Batukaru is also home to a local cluster of ancient water temples and subaks, which have so far successfully resisted pressures for commercial development.

Five important temples define the boundaries of a region called "Catur Angga Batukaru", the Four Components of Batukaru, located downslope from the temple of Mount Batukaru. Supreme among them is the central temple of Pura Luhur Batu Karu, dedicated to the deity of the mountain. The other four temples define a sacred territory around it, which is regarded as the highest mandala (utama mandala) of the region. These temples are sacred to the subaks. Periodically, when the priests believe that the land needs cleansing and purification, the deities of the temples are taken on a pilgrimage to the sea temple, accompanied by representatives from all the subaks and villages.



As in the Tampaksiring site, the subaks of this sacred region of Catur Angga continue to grow native Balinese rice using traditional technology. For example, rice stalks are harvested with a blade concealed in the palm of the hand, called

ani-ani, to honor the Rice Goddess at the time of her sacrifice. This traditional technology is found today in only a few subaks, most prominently those that are included in the Tampaksiring and Batukaru sites. The most beautiful terraced landscapes in Bali are found in these two sites. The subaks enclosed within the sacred landscape of Catur Angga Batukaru acknowledge a special responsibility to sustain the purity of this landscape, and consequently have so far successfully resisted pressures to abandon traditional agricultural practices. They are now threatened by commercial development, lending urgency to their nomination as a World Heritage site.[7]

The criteria for the selection of these three sites include the archaeological and historical significance of their water temples and associated subaks; the receptiveness of local inhabitants to inclusion in the World Heritage nomination; the desire of the farmers to continue growing native Balinese rice; the ecological viability of each site, and the way each site exemplifies a particular manifestation of the diversity of the subak system. Indeed the selection committee unanimously agreed that the regions of Tampaksiring and Batukaru and the temple Pura Ulun Danu Batur are uniquely appropriate to represent the subak system of Bali. In the future, it is hoped that the boundaries of the World Heritage regions may be expanded when other subaks wish to join, and fulfill the necessary preconditions. The supreme water temple associated with the crater lake on Mount Batur was selected because of its unique historic and religious importance for all subaks. The sites chosen for the nomination also include three of the major Balinese crater lakes, which have great religious significance for the Balinese people, and the most sacred forests and springs.[8]

Relationship to the Philosophy of Tri Hita Karana

The philosophy which governs the establishment of *subak* and their daily activities is the Hindu-Balinese concept of *Tri Hita Karana* (three causes of

[7] J. Stephen Lansing and James N. Kremer, "A Socio-ecological Analysis of Balinese Water Temples", in Indigenous Knowledge Systems: The Cultural Dimension of Development, ed. D.M. Warren, L. Jan Slikkerveer and David Brokensha. London: Intermediate Technology Publications, 1995: New York: 258-268.

[8] The fourth mountain lake, Beratan, has experienced more commercial development and will need greater protection in future. It is the sacred source of water for the subaks of the former kingdoms of Mengwi and Badung.

goodness or prosperity).[9] According to this belief, prosperity and goodness can only be achieved through an harmonious relationship between humans and the gods (Parhyangan), their fellow men (Pawongan), and nature (Palemahan). Humans should maintain their harmony with the divine through mindful worship and prayer. Hence, ceremonies become an important part of the rice cultivation cycle and various temples associated with subak are erected, from a simple shrine at the water inlet to the large multi-subak temple of Lake Batur, which is considered to be the ultimate source of water in Bali (Pitana 2005). At the same time, humans are part of nature. Therefore, humans should live in harmony with one another as well as with other living creatures and the natural environment.

Thus, humans have a social responsibility to obey customary laws and regulations, especially those pertaining to public domains such as land and water use, legal transactions of land transfers, and collective religious ceremonies. Humans may benefit from nature, but should not over-exploit it. It is their responsibility to maintain the environment sustainably and conserve nature for future generations (Sutawan 2005; Lorenzen and Lorenzen 2005). It is this philosophy that has long been the driving principle for Balinese in creating and maintaining the spectacular landscape of the rice terraces with their various subak-temples and irrigation works.

The concept of Tri Hita Karana is expressed differently in different water temple networks, with regional and even local variation. There are nonetheless attributes common to all subaks. As Geertz and Geertz (1975: 32) observe, it is precisely these 'surface variations' of Balinese communities that ultimately exemplify and illuminate the underlying level of profound common agreement on fundamental values.

[9] *Tri* (three); *hita* (Skt ,benefit, advantage, profit, good, welfare etc), *karana* (Skt, the act of making, producing, affecting). P.J. Zoetmulder, Old Javanese English Dictionary. KITLV, s-Gravenhage, Martinus Nijhoff, 1982.

2.a Description of the Property

A. Supreme Water Temple Pura Ulun Danu Batur

Pura Ulun Danu Batur

Perched dramatically on the rim of Mount Batur overlooking the crater lake, the supreme water temple Pura Ulun Danu Batur is a collection of nested stone courtyards enclosing an array of towering shrines and pavilions dedicated to the worship of a pantheon of 45 deities, foremost among them the Goddess of the Lake, who is said to make the rivers flow and bring prosperity to the land. According to legend, in ancient times the supreme god who resides on Mount Meru broke apart the summit of the mountain and sent the pieces to Bali to become abodes for his son and daughter (Goris 1929, 1954). His son became the first male god of Bali and took up residence atop the larger fragment, which became the volcano Mount Agung. The smaller fragment, which became Mount Batur, contained a vast and deep crater lake. On the floor of the lake the daughter of the high god built a palace and took the name *Dewi Danu*, Goddess of the Lake.

The temple's supremacy reflects the structural logic of water temples.[10] In general, the congregation of a water temple consists of all the farmers who share water from a particular source, such as a weir or spring. Because the crater lake is regarded as the ultimate origin of every spring and river, its congregation

[10] J. Stephen Lansing, *Perfect Order: Recognizing Complexity in Bali.* Princeton University Press, 2006.

appropriately includes all subaks. As a water temple, the Pura *Ulun Danu* Batur temple is endowed with a unique collection of attributes: it is at once the most universal subak temple, the sacred summit of the cosmic mountain, the sole source of the most potent holy water and the only temple where the priesthood is selected by the gods themselves. These impressive symbolic associations combine with its spectacular location on the crater rim to endow the temple with an aura of other-worldliness, especially on the days when its greatest treasure, an ancient gamelan orchestra, plays stately music while the temple's vast courtyards become carpeted with flower offerings left behind by thousands of worshippers. This temple is a pilgrimage site and redistributive center for more than 250 Balinese subaks, which bring offerings each year during the festival of the Goddess of the Lake, held for ten days around the full moon of the tenth month on the Balinese sacred calender.[11] The temple also plays an important role in the practical affairs of the subaks, in two respects. First, if a community wishes to construct a new irrigation system and subak, they request advice and assistance from the Pura Ulun Danu Batur temple. The creation of such a new subak is shown in the ethnographic documentary film *The Goddess and The Computer* (Lansing and Singer 1988). Second, the priests of the temple are often called on for advice when there is a dispute among subaks over water rights (Lansing 2006).

This site consists of a core zone and a buffer zone (Map 001). The core zone consists of the main temple Pura Ulun Danu Batur, located on the crater rim in the village of Batur Selatan. The buffer zone consists of two areas. One consists of the villages of Batur Selatan, Tengah and Utara (South, Central and North Batur) which are responsible for the temple. The other buffer zone consisyts of an area on the lower slopes and floor of the caldera, extending to the lake to encompass some smaller temples such as Pura Jati and Pura Ulun Danu Batur Songan. This area is mostly volcanic lava, which is the collective property of the villages of Batur Utara, Tengah and Selatan. With the permission of these villages, local farmers are permitted to create small farms in this zone. This zone also includes the site of the village of Batur as it was before the volcanic eruption of 1926 buried the village and temples under lava. The buffer zone is ritually and symbolically associated with the main temple. Lake Batur is conserved by the

[11] J. Stephen Lansing, *Priests and Programmers: Technologies of Power in the Engineered Landscape of Bali.* Princeton University Press, 1991. Revised 2nd edition 2007.

Ministry of the Environment. The area of the entire protected site (including the lake) is 3459.329 hectares.

B. Ancient Water Temples and Subaks of Tampaksiring

This site will take in the lands and watercourses of four subaks, as well as three ancient water temples that are also major Classical sites (presently managed as distinct entities by the Directorate General of History and Archaeology), and a cluster of royal temples and monasteries associated with the development of irrigated rice agriculture at the dawn of Balinese civilization. The proposed World Heritage site, which administratively falls within District Tampaksiring in the Regency of Gianyar, will encompass the following features:

* The spring and associated ancient water temple Pura Tirtha Empul, which are regarded as the symbolic source of the Pakerisan river. One of the earliest royal inscriptions that refers to irrigation, dated 962 AD, mentions a dam at this site. Today, after more than a thousand years, the irrigation system that originates at the spring of Tirtha Empul continues to supply water to the subaks Pulagan and Kumba. Archaeologist John Schoenfelder (2003) argues that this was among the first canal irrigation structures in Bali. Tirtha Empul functions as both a subak temple and a regional pilgrimage destination.[12]

* The ancient water temple Pura Mengening, a restored free-standing *candi* temple of the 11th or 12th century AD. It is associated with a holy spring that is the water source for Subak Kulub.

* Pura Pegulingan, a 9th century Buddhist stupa found and restored in a temple that lies amidst rice fields at the top of a slope overlooking Pura Tirtha Empul, and the associate subaks. This temple is the origin-site for the subaks Subak Basangambu.

* The impressive rock-cut royal memorial *candi* monuments and monasteries located along the Pakerisan at Gunung Kawi, dating to the 11th century AD. These royal tombs and monastic retreats testify to the prosperity attained by early Balinese wet-rice kingdoms, thanks to the emergence of the subaks, water temples and ancient irrigation systems.

[12] Schoenfelder, John W. The Co-Evolution of Agricultural and Sociopolitical Systems in Bali. Bulletin of the Indo-Pacific Prehistory Association 20: 35-47.

Collectively, the sites of Tampaksiring constitute an ancient and still functioning water temple network that played a formative role as one of the cradles of Balinese kingship and religious traditions.[13] As a cultural landscape that bears witness to past as well as present practices, Tampaksiring is an exemplary manifestation of the Balinese reverence for water in both sacred and practical contexts.

B.1. Pura Pegulingan and Subak Basangambu

Situated amidst fertile, irrigated rice fields of Subak Basangambu, Pura Pegulingan overlooks Pura Tirtha Empul, which is 200 meters to the west. The primary monument at this site is a Buddhist stupa (12 m high and 3 m diameter at the base) dated to the 9th century. The present structure is a reconstruction built in the 1980s atop a foundation of archaeological significance, a large collection of masonry and statue fragments, and a remarkable model stupa. In total, there are 34 structures in the temple complex, mainly pelinggih shrines for ceremonial

[13] Vernon L. Scarborough, John W. Schoenfelder and J. Stephen Lansing. 2000. "Early Statecraft on Bali: The Water Temple Complex and the Decentralization of the Political Economy". *Research in Economic Anthropology*, Vol. 20: 299-330.

purposes, all of which face Mount Agung, in accordance with Balinese cosmology.

Like other temple structures in the Tampaksiring area, the stupa features a base, a central body, and a top section, which in turn reflect the three worlds or Tri Bhuana. The foot of the stupa is surrounded by a moat which is about one meter wide. It is octagonal in shape and the sides are connected by stones, arranged to form spokes. In the centre there is a small stupa, around 55 cm high, in which some artifacts were found, including a sheet of gold containing some mantras, a gold Buddha image, a stupika, and a stone fragment of a Buddha sculpture. The octagonal design with a single centre reflects the Nasamanga Mandala wisdom, which indicates that the centre be surrounded by eight wind directions, the essence of Balinese cosmology. On the body of the stupa (andha) is a niche that originally contained Buddha sculptures, but they have not been found again or remain only as fragments. On top is a yasti: a stone mast with rings around it that becomes smaller and pointed at the top.

This temple exemplifies the interconnection of villages and subaks in Bali. Pura Pegulingan is both a community temple for the village of Basangambu and a subak temple. During annual temple festivals, members of Subak Basangambu bring offerings of rice bundles to the Ulun Suwi subak temple in the middle courtyard of the complex and perform ceremonial rituals to assure the fertility of 25 hectares of rice fields (sawah) irrigated by springs.

The architectural symbolism of Pura Pegulingan is well suited to communicate the desire of the Balinese community to maintain harmonious relationships with God, with fellow human beings and with nature (tri hita karana). A harmonious relationship with God is centered in worship at the pura's stupa and pelinggih. Harmonious relationships with fellow human beings are reflected in the social relationship characterized by tolerance for fellow worshippers of different creeds (Buddhist and Hindu). Meanwhile, the harmonious relationship with nature is manifest by the ongoing rituals performed by the subak.

B.2. Pura Tirtha Empul and Subaks Pulagan and Kumba

This beautiful, ancient, and functional spring temple is an important pilgrimage destination for Balinese who revere it as the source of the Pakerisan River, which provides water for the extensive rice fields in the Pejeng area to the south.

Locally, this temple links together the villages of Manukayalet and Basangambu in worship, and it is also the head of a small water temple network supported by two subaks that receive their irrigation water from the dam immediately downstream from the temple spring. The temple is located in a rather steep-sided valley in the village of Manukayalet. At the top of the slope on the western side of the pura (temple) is Tampaksiring Palace, where the President of the Republic of Indonesia resides when in Bali.

Water Reservoir of Pura Tirtha Empul

Often referred to as Bali's holiest water spring, the spring itself originates in the most sacred section of the temple (the *jeroan*).[14] From there, the sacred water flows through spouts and ponds used for ritual bathing and for the collection of holy water to be used in ceremonies elsewhere. At a weir a short distance downstream from the temple, this water then passes into the channel that waters the fields of the 345 members of Subaks Pulagan and Kumba. In return, these two subaks contribute rice, eggs, and beautiful offerings made of flowers, palm leaves cut into origami-like shapes, gilt paper and figures formed from colored rice flour (*dangsil, jerimpen, daksina etc)* during annual festivals at the temple, on the full moon of the fourth Balinese month. Unlike most neighboring subaks, Subak Pulagan and Kumba do not consider themselves obligated to offer similar contributions (*suwinih)* to the supreme water temple Pura Ulun Danu Batur, because their water originates in the temple's springs rather than the lake. This

[14] Stutterheim, Willem F. 1927. Voorloopige Inventaris der Oudheden van Bali [II: Afdeeling Zuid-Bali; Onderafdeeling Gianjar]. *Oudheidkundig Verslag van de Oudheidkundige Dienst in Nederlandsch-Indië* 1927(3-4): 139-150.

assertion of self-sufficiency underscores the importance of the spring at Tirtha Empul, and also reflects the relative antiquity of the Subak Pulagan-Kumba irrigation system as well as the contemporary variation among Balinese subak referred to above.

Pura Tirtha Empul is divided into three courtyards: the outer yard called the *jaba sisi,* the middle yard or *jaba tengah*, and the inner yard or *jeroan*. The three yards represent the three realms of Balinese cosmology (*Tri Bhuana*), as well as the three philosophical elements of Tri Hita Karana. The relationship between humans and nature, called *palemahan*, is manifest in the gardens and community ablution facility in the *jaba sisi.* Social activities among parishoners conducted in a meeting pavilion (*wantilan*) in the *jaba tengah* embodies harmonious interpersonal relations among human beings, or *pawongan*. In a pond on the western side of the *jaba tengah*, visitors to the pura purify their souls to eliminate negative forces and restore positive power found in human beings. In the inner *jeroan*, the harmonious relationship between god and human beings, called *parhyangan*, is ritually celebrated.

The entrance to the inner courtyard (*jeroan*) is on the west side and marked with a *gapura bentar* (split gate). Behind the rana gapura at the entrance gate ancient objects such as a lingga yoni, a Ganesha statue, and a statue of Nandi are found. These ancient objects were presumably statues from a Hindu temple, worshipped at the beginning of the pura's establishment. The inner yard features pelinggih (shrines) engraved with beautiful carvings. All the pelinggih are arranged so that worshippers face Mount Agung, which is regarded as the center of parhyangan. The most sacred place in the Pura Tirtha Empul is the large altar at the far end of the inner yard called Tepesana. Made of stone terraces and square in form, the altar honors Dewa Indra, one of the most important deities in the Hindu religion. There is also a fenced pond containing the spring that emerges from the eastern side of the yard. This spring is large and produces a correspondingly large water output flow, which, as noted, supplies the Subak Pulagan-Kumba irrigation system and the Pakerisan River.

B.3. Pura Mengening and Subak Kulub

This active traditional water temple, situated between Pura Tirtha Empul and Pura Gunung Kawi, on the slope of the steep valley of the Pakerisan, is home to a stone-block temple building (prasada) similar in form to the candi reliefs at Pura

Gunung Kawi. This prasada owes its location to the presence of a holy spring, over which it towers. It is the water-origin temple for the subak of Kulub, where the farmers of Kulub give thanks for the waters that flow and receive blessings for bountiful harvests. As at Pura Tirtha Empul, the walled spring pond feeds into a channel that passes by Pura Gunung Kawi, irrigating smaller terraces in that area as well as the 40 hectares of rice grown by Subak Kulub farther to the south.

Architecture of Prasada Agung (Pura Mengening) represents a sacred mountain

To enter Pura Mengening, one has to climb steep stone steps along the sloping riverbank. The site features a 5.5 meter-high base, which represents one of Bali's best-preserved free-standing shrines of the Classical Period. This shrine was well preserved during temple restoration in the 1980s. Another central feature within the temple is a stone structure called Prasada Agung. The structure features three spatial components, which also symbolize the three worlds (Tri Bhuana) and reflect the principles of Tri Hita Karana. The base of the temple features objects called peripih representing natural elements (palemahan), while the roof features peripih symbolizing the gods (parhyangan). Within the body of the temple is a lingga yoni, the central place of worship, which represents the human world.

B.4. Pura Gunung Kawi (rock cut royal tombs, temple and monasteries)[15]

Bridge to Gunung Kawi temple

Downstream from Pura Tirtha Empul, the valley of the Pakerisan deepens into a gorge, the sides of which are shaped into narrow rice terraces irrigated by the waters of Pura Tirtha Empul's spring. The site of Pura Gunung Kawi lies about a kilometer to the south of Pura Tirtha Empul, at the bottom of this gorge. Beyond its significance as a feature of the landscape of the subaks of Tampaksiring, Pura Gunung Kawi possesses Outstanding Universal Value in that it bears witness to the antiquity of both reverence for water and skill in its management; both of these quintessentially Balinese traits are palpably demonstrated by the ancient rock-cut channels that lead to water spouts positioned in front of each candi. The uniqueness and integrity of the architecture also are important. Because they were cut into living basalt instead of built from stacked blocks, parts of Pura Gunung Kawi have survived the centuries in exceptional condition relative to the best-known free-standing monuments of Java. The candis' near-sameness in size and form suggests a connection to themes of alliance visible in present-day Bali (and enshrined in the interpersonal harmony tenet of Tri Hita Karana), even as their design shows a strong link to the Classical states of Java, and their siting and monumental size illustrate both the temporal power of the early Balinese dynasties and their dependence upon the irrigated landscape.

[15] Stutterheim, Willem F. 1925. Voorloopige Inventaris der Oudheden van Bali [Afdeeling Zuid-Bali: Onderafdeeling Gianjar; District Oeboed]. *Oudheidkundig Verslag van de Oudheidkundige Dienst in Nederlandsch-Indië* 1925(3-4): 150-170.

Rock cut temple of Gunung Kawi

To the north of the temple group are two rows of rock cut temples. One row on the north side of the Pakerisan River consists of four temple structures and some meditation rooms, which are chiseled into the breccia stone on the wall of the slope (named the Group C Temple). The structure of this chiseled temple is 7 m high. Other rows of chiseled temple are found on the east wall of the Pakerisan River (The Group A Temple), across from the row of temples on the west wall of the river bank. There are five temple and two meditation rooms in this row. Some temples are inscribed with Kadiri Quadrate characters. The inscription states that this structure is dedicated to the king who died in Jalu. The name 'Jalu' is synonymous with Keris and the name of the river that divides the groups of temple the Pakerisan River. In front of the row of temple, there is a batur (water receptacle) for water that is channeled to various fountains. In front of the batur approximately 10 m in the direction of the river, a rectangular pond parallel to the rows of temple is found. In the pond, there are fountains from which water still flows.

To the south of the rows of temple, niches and structures that resemble houses were chiseled into the stone of the sloping wall (Group B Temple). These spaces or rooms are believed to have been places of meditation for priests. The size of these monastic establishment and their close proximity to the great royal tombs show the close association between the ancient water temples and irrigation systems, and their links with the Balinese cosmological concepts of agama tirtha (religion of holy water) and Tri Hita Karana. While the monks and kings are gone, their unbroken legacy survives in the terraced landscape and the ongoing rites of the subaks. Today, these rites are performed in a temple situated directly in front of the ancient monastic niches.

Around 80 m downstream from this group, there is a group of structures carved from rock on the steep slopes of the riverbank on the eastern side of the Pakerisan River. These carved rooms are variously sized spaces, square with two windows, to the left and to the right of the entrance door. The top is carved to resemble a roof and gives the impression of a house, and local residents describe the niches as griya pedanda or priests' homes. Approximately 250 m southwest of the entrance gate to the temple complex, a rock cut temple and groups of meditation houses are carved into the stone walls on the west bank of the Pakerisan River. In the lower part of the rock cut temple roof, an ancient inscription was found but is indecipherable due to its deteriorated condition.

Architecturally, the rock cut temples in the Pura Gunung Kawi complex highlight the ritual connection to water illustrated by the proliferation of water channels, which are carved into the sloping river banks at the temple site. From the Classical period to the present, participants at temple ceremonies in Pura Gunung Kawi have purified themselves under the fountains and received blessings from the holy water for a successful harvest.

B.5. Subaks Basangambu, Pulagan, Kumba and Kulub

As mentioned above, the ancient and still-functioning subaks of the Tampaksiring site are defined by their relationship to water temples. The spring at Pura Tirtha Empul is the source of irrigation water for two subaks, Pulagan and Kumba, while a third subak, Kulub, receives its water from the spring at Pura Mengening. In

addition, Pura Pegulingan is the central site of worship for Subak Basangambu. As well as the major temples described above. the proposed Tampaksiring cluster site includes the lands, channels, and smaller field shrines and altars associated with these subaks. The approximate area of wet rice (sawah) cultivation for the three Pura Tirtha Empul subaks are 103 hectares (Subak Pulagan), 95 hectares (Subak Kumba), 40 hectares (Subak Kulub). Subak Basangambu maintain 25 hectares of irrigated rice terraces. While the narrow terraces on the western slope of the gorge containing Gunung Kawi are watered from the channels of both systems, the bulk of Subak Pulagan's fields lie south of Pura Gunung Kawi on flatter land immediately southeast of the houses of Tampaksiring, with the fields of Subak Kumba to their west and those of Subak Kulub to their south. In each case, the majority of the subak's fields lie over two kilometers from the source spring. Nonetheless, these springs are relatively accessible water sources when compared to the ravine-bottom river weirs that must be used by most subaks, with less tunneling and shorter channels required to bring the water to the fields. Historically, it appears that this site was among the first locations where wet-rice agriculture developed in Bali, due to the relative ease with which the flow of spring water could be captured and channeled to irrigate fields downslope (Scarborough et al. 2000).

Water temple of Pura Luhur Batukaru

The core zone of this site is a continuous area that encompasses all the subaks, temples and archaeological sites described above (Map 002). The buffer zone is a small fringe or border consisting of grasses and trees that border the irrigated rice terraces. The area of the entire site is 627.471 hectares.

C. Subaks and Water Temples of Batukaru (Catur Angga Batukaru)[16]

The expanse of terraced rice paddies, intact subak institutions, and corresponding temple network of the Batukaru area exemplify the interconnectedness of Bali's ecological and cultural landscapes. Situated around volcanic crater lakes that are regarded as the sacred source of water for all the subaks of Tabanan, this site extends from mountainous water catchment zones to highland rice terraces at the upper edge of Tabanan's irrigated rice paddies. It is historically and ritually defined by a cluster of temples, to be described below, as "Catur Angga Batukaru", a sacred region of mountain peaks, forests, lakes and the villages and rice terraces closest to them. The area encompasses the forests of Bali's second highest volcano, Mount Batukaru (2276 m), as well as Lakes Tamblingan and Buyan in Buleleng Regency, which are considered to be the source of water for the upland springs that feed Tabanan's irrigated terraces[17]. Tabanan is widely regarded as the "rice-barn" or *lumbung* of Bali, where fertile volcanic soils have long supported the cultivation of highly-valued local varieties of red, white, and black rice. Collectively, 32 subaks maintain the traditional farming and irrigation systems. A primary function of the subaks is to perform temple rituals where subak priests and members honor the gods and goddesses who ensure a fertile landscape and "make the waters flow". Irrigation and cultivation cycles are also pegged to the ritual calendars, and the water temples help facilitate communication and cooperation among dozens of subaks. The subaks of Batukaru, like subaks throughout Bali, regard the Lake Goddess (Dewi Danu) as bestowing the gift of water that feeds their terraces. Similarly, the subaks in the area maintain a strong connection with Pura Gubug Ulun Danu

[16] Catur Angga Batukaru or Catur Angga Batukaru is a region defined by four temples which constitute the four guardians (catur Angga) of Mount Batukaru. These temples are Pura Muncaksari, Pura Tamba Waras, Pura Luhur Pucak Petali and Pura Besikalung. Symbolically, they support the supreme deity of Mount Batukaru, whose principal shrine is the temple Pura Luhur Batukaru, which is also associated with the crater lakes of Tamblingan and Buyan.

[17] Traditonally, Lake Buyan is regarded as a component of Lake Tamblingan by the water temple priests of Catur Angga Batukaru.

Tamblingan, whose goddess Ida Batara Danu Tamblingan is believed to bestow water for fields throughout the Tabanan region.

Pura Ulun Danu Tamblingan

Within the site, the tranquil Pura Luhur Batukaru, nestled in the forest above the rice terraces defines the apex of the collection of major temples that define the sacred region of Batukaru (Catur Angga Batukaru). As one of Bali's eight (or 6 – see Geertz 1980: 52) cardinal Sad Kahyangan temples, Pura Luhur Batukaru is one of Bali's most important sacred sites and the preeminent temple in the region. Believed to have been built in the 11th century, the temple contains a shrine to the goddess of Lake Tamblingan, the mythological source of Batukaru's springs and rivers, and the mountain god of Gunung Batukaru, Ida Batara Batukaru. In the inner courtyard there are three meru tower-shrines to honor royal ancestors. The nearby pond is fed by the river Aa (pronounced "ehe"). In the center of the pond are two pavilions on a little isle, one for the goddess of Lake Tamblingan and one for the god of Mountt Batu Karu. As anthropologist Clifford Geertz observed, the subak planting cycle in Tabanan begins with a regional "water-opening" ritual at Pura Luhur Batukaru, attended by all pekaseh (heads of subaks) and all subak temple priests and a representative of the Tabanan royal family, as well as any subak member who makes the pilgrimage to join in this ceremony conducted to ensure "sufficient and 'effective' water for all terraces in the realm in the coming season."[18] With this, the annual irrigation and rice planting cycle for the region is set in motion. The ritual opening ceremony honoring the rice goddess Dewi Sri will then be replicated at subak temples and the smaller bedugul shrines that mark the entrance of irrigation water to each farmer's fields.

The annual water-opening rituals at the temples of the mountain lakes of Beratan (Pura Ulun Danu Beratan) and Tamblingan (Pura Ulun Danu Tamblingan) involve

[18] Clifford Geertz, Negara: The Balinese Theatre State in the Nineteenth Century. Princeton University Press, 1980: 81.

representatives of all the subaks and royal families of Tabanan and Mengwi. As will be explained below, holy water from these mountain lakes is distributed to the subaks at other temples located downslope. In addition to these region-wide water temple rites, the proposed site also includes a cluster of temples that are supported by nearby subaks which obtain irrigation from the high elevation springs and streams. These temples each have unique ritual and cosmological significance, and jointly define the "Catur Angga Batukaru" mountain landscape that is proposed for the World Heritage site.

For example, one of the four guardian temples, Pura Luhur Besikalung, is located in a forested valley just below the highest-elevation weir on the Ho river. Both sides of the valley are terraced and farmed by the subaks of Batukaru; they are among the most photographed rice terraces of Bali. But the significance of this temple is not widely appreciated by visitors. Here five subaks make annual offerings for the water they obtain from the Pura Luhur Besikalung weir. The subaks share responsibility for the maintenance and ritual cycle of the temple with three villages.[19] Until now, the temple and surrounding forest and streams are untouched by commercial development. The lands around the temple provide a refuge for wildlife (birds and monkeys) and a place for quiet meditation. The temple is undoubtedly very old and contains several menhirs and ancient stone statues. Twice a year, one of the oldest Balinese royal inscriptions (prasasti), dated 917 A.D., is placed in the innermost shrine of the temple for veneration. While only the five subaks that receive water from the Pura Ulun Besikalung weir have primary responsibility for offerings at this temple, twelve more subaks bring harvest offerings (ngusaba nini).

Temple Pura Luhur Besikalung. Shrines in the inner courtyard

[19] Subaks Jambelangu, Umadui, Umautuh, Kedamaian and Besikalung; villages (desa adat) Utu, Babahan and Bolangan, all of which are located in the proposed World Heritage core area.

Pura Luhur Pucak Petali

A second guardian temple, Pura Luhur Pucak Petali, is located to the east of Pura Luhur Besikalung and provides a venue for worship and the coordination of irrigation schedules for another cluster of subaks. Importantly, this temple does not merely duplicate the functions of the Pura Luhur Besikalung temple (providing a venue for subaks to manage –in both a practical and religious sense- their particular water source). In addition, the temple defines additional layers of meaning connecting the subaks and communities to the landscape. Thus the temple Pura Luhur Pucak Petali is the principal site for the worship of Ida Sesuhunan Petali, the God of Petali who is the chief minister to the God of Mount Batukaru. The temple is also the physical and spiritual manifestation of the connection between forest and field, situated at the edge of the forest above the villages and subaks of Batukaru and Gunung Sari. At all temple ceremonies, a priest leads offerings of thanks to the forest god. This forest deity appears to be unique in Bali's western mountain temples; he is not recognized elsewhere. Pura Luhur Pucak Petali is of primary importance to subak farmers in the region who come to honor the fertility gods and ask for assistance with irrigation canals or to cope with pests, water shortages, or other problems in the ricefields. In addition, Pura Luhur Pucak Petali is an important site for villagers throughout Bali, who make the pilgrimage to the temple to ask for assistance with various afflictions. Located in the nearby villages of Gunung Sari and Penatahan, three other "sister"

temples to Pura Luhur Pucak Petali exhibit a similarly strong link with Pura Gubug Ulun Danu Tamblingan and Pura Luhur Batukaru: Pura Ulun Danu Besikalung, Pura Luhur Tamba Waras, and Pura Luhur Muncak Sari.

Nested below Pura Luhur Pucak Petali, both physically and metaphysically, are four subak temples, called *Ulun Swi* (head of the ricefields): Cantik Kuning in subak Gunung Sari; Pejenengan in subak Umadui; and Jung Kook and Penaringan temples in Wangaya Betan. These temples in turn link with numerous smaller *bedugul* water temples that adorn the landscape, marking the sacred space where the Rice Goddess is honored at each farmer's field.

The Batukaru area also features numerous community temples, such as Pura Batu Panas. Surrounded by rice paddies farmed organically by the Subaks of Wangaya Betan and Peselatan in the district of Mengesta, this temple exemplifies the link between community and subak. Although primarily a community temple visited by parishioners throughout the Tabanan region, it is also an important temple for subak rituals. Temple ceremonies at Pura Batu Panas ritually symbolize the connection between the life of the "dry" village and the "wet" terraces of the subak (see Geertz 1980:76, *Pura Balai Agung*). Here subak members make semi-annual offerings of rice bundles, carried to the temple rice barn in honor of the Rice goddess Dewi Sri.

The third and fourth temples that define the Catur Angga region are Pura Tambawaras, which is associated with health, and Pura Muncaksari, associated with prosperity. All four temples possess their own congregations of subaks, and function as "ulun swi" (head of the ricefields) temples. Unlike other ulun swi temples, however, these temples are regarded as parts of a greater whole.

Space does not permit a full description of all the subak temples included in this site, although more will be said about their history below. With regard to the temples that define the sacred landscape of Catur Angga Batukaru the key points may be summarized thus:

- The "Batukaru" or Catur Angga Batukaru site is defined by a collection of temples, each with its own special history and functions, which are associated with the mountain peaks, lakes, forests, springs, rivers and terraces of the region.
- The lake temples in this region are supported by all of the subaks of Tabanan and Mengwi, as well as members of the royal families of the

former kingdoms, and play a key role in the annual irrigation schedule for the whole of western Bali. Within the Batukaru Catur Angga region, Lake Tamblingan is the water-source temple for Tabanan. It is also regarded as the female (pradhana) complement to the male (purusa) mountain.

- In addition to the lake and mountain-peak temples, another cluster of major temples jointly define the "Catur Angga Batukaru" region that is proposed as the core of this World Heritage site. These four guardian temples function as water-source temples (ulun swi and/or bedugul) for local clusters of subaks, all of which are located at the highest elevation where rice is grown. Each of these temples also possess unique shrines and symbolic attributes which define the meaning of local landscape features. Collectively they define the cosmological meaning of a geographical mandala (supreme or *utama* mandala Catur Angga), which gives the inhabitants of this region specific responsibilities as guardians of the peaks and mountain lakes. Today, descendants of the royal court of Tabanan continue to assist the subaks and villages in the performance of rituals at these temples. Each of the four Catur Angga temples defines a component of the Batu Karu deity: breath at Besikalung; health and strength at Tamba Waras; prosperity at Muncaksari, and the connections that bind all these qualities at Petali.

The last point leads to the question of the state of preservation of this landscape today. In the precolonial era, the responsibility of Balinese kings was not confined to religious rites in the temples, but extended to the physical landscape. Today, that function has passed to the government of Indonesia. Much of the impetus for this World Heritage proposal comes from recognition that the region is endangered by commercial development, which has already proliferated around Lake Beratan.

For the majority of families in the Catur Angga Batukaru site, farming continues to be their primary occupation, though landholdings tend to be small (~.2 ha). The people of this region are very cognizant of a religious duty to preserve their sacred landscape and to make good use of its pure water and fertile land. For this reason, they have largely resisted inducements to give up traditional farming of native Balinese rice. Elsewhere in Bali, there is a documented transition to off-farm employment and rapid land conversion that threaten to undermine the modern subak (Artha Wiguna et al. 2005). But in the Batukaru region, the pre-

eminence of rice farming livelihoods and emphasis on values of trust, cooperation, and mutual help (Sutawan 2000) both strengthen and are indicative of the integrity of the subak institution in the area. A 2006 survey on subak governance affirms this observation (Fox et al.,n.d). The survey asked a sample of 51 farmers in the Batukaru subaks about changes they had observed in the subak during their lifetime. All farmers indicated that the subak continues to be effective in managing water resources and maintaining the contoured rice terraces that typify the landscape; nearly all (49 of 51) agreed that participation among members and willingness to cooperate is as strong now as it was when their parents were farming their land. Looking to the future, three-quarters of the farmers interviewed stated their belief that the subak will continue to be a strong institution, due to the integrity of subak rules (*awig-awig)* and the importance of traditional farming as the appropriate livelihood in this landscape. The interconnectedness of the subak with rituals and temple offerings reinforce this institutional integrity; because the temples that define the sacred landscape require annual offerings from the subaks.

However, the process of land conversion documented in other areas of Bali is now beginning in the Batukaru area. Presently, rice terraces within the proposed site comprise a designated Green Zone, which protects the landscape from large scale tourism development (Pemerintah Kabupaten Tabanan, Nomor 9 Tahun 2005). Similarly, government regulations protect the forested areas from invasive timber extraction. Recent proposals to modify these existing land use regulations would allow the sale of large areas of intact rice paddies for tourism development. For those farmers who are alarmed by the prospect of the disintegration of their subaks, it is this changing function of the land that has the greatest potential to undermine the subak institution (Fox et al., in progress).

Preservation of Organic Farming of Balinese rice

In 2005, four farmers from the Subak Wangaya Betan subak of Batukaru and a research team from the Bureau of Agricultural Research and Technology Assessment of Bali's Department of Agriculture began to collaborate to promote sustainable organic farming of native Balinese rice varieties. This intervention was needed because the farmers were alarmed by pressure to plant non-native rice and use chemical fertilizers and pesticides. This led to the formation of an NGO called *Somya Pertiwi* (Gifts of the Earth Goddess) in the village of

Wangaya Betan, where some farmers had recently begun to plant non-native rice. The aims of *Somya Pertiwi* are both environmental and socioeconomic. First, the group promotes an alternative to intensive chemical-based agriculture based on enhanced modern techniques of organic farming. Local compost production is used to ameliorate the growing problem of agricultural waste products, primarily from chicken and cattle production, and to promote organic rice farming. Second, the project seeks to improve farmers' livelihoods and strengthen subak institutions. Somya Pertiwi works to *increase* rice yields, growing local rice varieties organically. Compared with conventional "Green Revolution" farming of hybrid white rice varieties that relies on chemical inputs, farmers with Somya Pertiwi can earn greater income from local, organic rice.

Since the project began, rice yields have indeed increased as much as ten percent (Artha Wiguna et al. 2007). Although still quite new, the project has also realized success in the area of environmental conservation. Soil fertility has increased, with the percentage of soil organic mater doubling from less than one percent to two percent. There has also been an increase of biodiversity in the rice fields, evidenced by growing populations of mollusks, eels, worms and beneficial insects. As well, recent analyses of rice samples from the Batukaru area detected no pesticide residues of any kind (Sucofindo, September 15, 2008).

What began with a small group of farmers from a single subak in the Batukaru area to address environmental and livelihood concerns has rapidly expanded. Today, all 90 farmers of the Subak Wangaya Betan subak grow organic rice. As well, the majority of farmers from neighboring subaks throughout the Batukaru area continue organic rice production, recognizing both the environmental and economic benefits. Somya Pertiwi has established a field training center, where farmers and agricultural extension agents from Bali and throughout Indonesia have begun to come to obtain seeds of native Balinese rice, and learn how to produce organic compost and begin organic rice farming on their own fields. Thus Somya Pertiwi and the training centre provide a model to support scientific organic rice production. This activity will be supported and expanded in the proposed World Heritage Cultural Landscape program, mandated by the Governor of Bali.

The Batukaru site includes both core and buffer zones (Map 003). As explained above, the boundaries of the site are based on the ancient region "Catur Angga

Batukaru" (Four Components of Batukaru), defined by the four ancient water temples and Pura Batukaru. The region is bounded to the north by lakes Tamblingan and Buyan and surrounding forests. The lakes are managed by the Dept of Public Works, and the forests are managed by the Dept of Forestry. To the east the region is bounded by the Yeh Ho river, and to the west by the Ngigih river. The southern boundary is defined by the downstream limits of the subaks that form the congregation of the Catur Angga temple system. Within this region, the core zone consists of the temples, lakes, forests and rice terraces (subak territories). The buffer zone consists of the villages and gardens not included in the core zone. The area is 6690 hectares.

2.b History and Development

A. Overview of the Subaks of Bali

The oldest direct evidence for rice on Bali is a radiocarbon date of 2660 +/- 100 BP at the site of Sembiran on the north coast. However, this date is from rice husk used as temper in a pottery sherd of probable Indian origin, and thus does not prove that rice was consumed on Bali at that time (Bellwood et al 1992). More useful are the rice phytoliths found in the sediments at the same site, indicating likely cultivation by 1 AD. The earliest of all the dated Balinese royal inscriptions (Sukawana A I, from AD 882) mentions irrigated rice fields (*huma* in Old Balinese), and the third dated inscription (Bebetin A I, from AD 896) mentions irrigation tunnel engineers (*undagi aungan*). The reference to tunnelers is found in a list of professional artisans who worked for pay, suggesting that at this early date there already was enough demand for irrigation system construction to support them as independent specialists, since no evidence connects them with elite courts or village administrations (Christie 1992: 16; 2007: 250; Ardika 1994: 9-10; Ardika and Beratha 1996: 23, 27, 49; 1998: 13). Tunnel experts are mentioned again in the AD 1022 inscription of Batuan, which also contains the first of many mentions of the word sawah, the usual term for irrigated rice fields in Old Javanese (Ardika 1994: 9; Ardika and Beratha 1998: 66, 73; Setiawan 1995: 101-102). The same inscription also refers to the water allocation role of an official called the *makaser* of Air Gajah (Ardika and Beratha 1998: 74, Christie 1992: 15, 2007; Sukarto 1986: 59-60).

The first appearance of the term "subak" is as the root of the word *kasuwakan* in the Pandak Bandung inscription of 1071 AD (No. 436; Ardika 1994: 27, Ardika

and Beratha 1998: 313; see also Sukarto 1986: 32-33, Setiawan 1995: 104-105), but it is difficult to tease out much information on the productive and religious roles of the institution from the text. The following year (1072 AD), the terms kasuwakan and kasubakan are used interchangeably in the inscription Klungkung C (No. 438, also known as the charter of Er Rara I; Sukarto 1986: 35-36, 51). This inscription discusses a royal order calling for the remeasurement of the rice fields of the kasubakan of Rawas, and lists the irrigated areas that belonged to this subak, which were located in at least 18 communities. As Christie notes, this suggests that subaks were boundary-crossing entities by the 11th century. She also examines the list of nineteen kasuwakans given in the 1181 AD charter of Udanapatya (No. 628, Pengotan C II), pointing out that, in her words "the kasuwakan names are different from the names of the villages referred to in the same charter, so it does appear that their areas of jurisdiction cross-cut those of the villages" (Christie 1992: 15; 2007; Sukarto 1986: 33- 51). She further observes that the dissected nature of the Balinese landscape requires that irrigation systems frequently tap rivers and springs at points that lie within the lands of villages located well upstream from those that benefit from the water. The construction of boundary-crossing channels and tunnels could provide an impetus for the development of irrigation societies that are largely autonomous from other social institutions. In addition to the 1072 and 1181 AD cases just noted, in this context it is also significant that the 1022 Batuan inscription describes an irrigation system that brought water to "Bataran" from "Pujung Ngaji" and "Air Gajah." These three place-names are usually associated, respectively, with the modern village of Batuan where the inscription was found, the neighborhood of Pejengaji 14 km to the north of Batuan in the village of Tegallalang, and the monumental site of Goa Gajah in Bedulu, 6 km north of Batuan (Setiawan 1995: 111, 133; Ardika and Beratha 1998: 74). If these place-names are correctly interpreted, the distances involved make this an almost certain case of another boundary-crossing irrigation channel.

The terracing of fields following mountain contours allows for the irrigation and flooding of the fields and reduces the risks associated to soil erosion. Soil cores taken in the Sebatu rice terrraces in 1997 showed that the landscape is quite dynamic with some of the terraces being reengineered nearly every decade (Lansing, et al. 2006: 343, 345).

Studies of the functional significance of the subak date from the nineteenth and early twentieth century. The earliest detailed accounts are from Liefrinck (1886-

1887), Korn (1923), Wilk (1929), and Grader (1938). Later accounts of scholars who undertook studies of pre-colonial times are from Lansing, Schulte Nordholt, Geertz, as well as archaeological studies carried out by Schoenfelder and others. Geertz's extended studies and several publications on the subak rely mainly on fieldwork undertaken in 1957-58 (except for his book 'Negara'). Others who have looked at post-colonial Balinese subak are Stingl (1969), Birkelbach (1973), Poffenberger and Zurbuchen (1977-78), Foley (1987), Ramseyer (1988), and Lansing. Scholars who studied the subak of the early 1980s and onwards are foremost but not exclusively Lansing, Bundschu, Jha, MacRae, and Lorenzen. Balinese scholars who have intensively studied the subak in the last couple of decades include Pitana, Sutawan, Windia, Suyadna, Arifin and Arthawiguna and many more.

Dutch colonial authorities arrived on Southern Bali in 1908 and built concrete dams in the river and upgrade primary canals in the 1920s and 1930s (Foley 1987: 86; Horst 1996: 39-40; Schulte Nordholt 1996: 285). Before this time, construction material for the weir or dam at the river was either clay, wood (logs of coconut trees) and/or stone. Canals are usually mud-lined wit the primaries sometimes cemented. Diversion weirs are made of bamboo or more recently cemented. The Indonesian Government continued the Dutch rehabilitation work after independence (Arga and Sudana 1994). Even today, traditional engineering methods are still used to construct new irrigation tunnels, terrraces and weirs.

B. Supreme Water Temple Pura Ulun Danu Batur

This temple possesses a library with a collection of traditional lontar manuscripts, which include many passages that provide information on its historic role. Many of the most important manuscripts have been transcribed and printed in Latin script.[20] In one manuscript, the borders of the region ("central Bali") containing 45 communities that supported the temple were defined by river boundaries: on the north coast it reaches from today's border between Buleleng and Karangasem to Singaraja, in the southwest and the south to the Yeh Somi river that constitutes today's border between Tabanan and Badung; to the east to Klungkung and the Yeh Unda river (Pratekaning Usana Siwasasana,§ 14b).

[20] Budiastra, P. 1975. Rajapurana Pura Ulun Danu Batur, Kintamani, Bangli. vol. 1 (1975), 2 (1979). Denpasar: Museum Bali.

The importance of this temple is also well attested in written records from the colonial era. For example, in 1917 a major earthquake destroyed many temples and palaces in Bali. Some months later, a well-known Dutch architect, P.A.J. Moojen, was employed by the Governor General of the Netherlands Indies to undertake the first survey of major temples in the newly-conquered principalities of south Bali. One of the temples that was severely damaged in the earthquake was Pura Ulun Danu Batur. In his first report to the Governor General, Moojen wrote:

> There are six temples which are superior to the many village temples, which are most sacred to the Balinese and are honored outside the borders of the little kingdoms in which they are situated. Several authors on Bali give various names for these six, and Frederich mentions that in the Oesana Bali itself there are different temples mentioned. However, it is certain that the Temple of Besakih is the most holy, followed by the Temple of Batur, also called Temple of Mount Lebah. Further information given to me by knowledgeable sources also points to this, and I even received a written request to start quickly on the repairs to the Batur temple.

The letter to which he refers to in this passage, urging the immediate repair of Batur, is preserved among Moojen's papers in the archives of the Royal Institute for Anthropology and Linguistics (KITLV) in Leiden. The letter was written by the Sedahan Agung (royal tax collector) of the kingdom of Klungkung on the 27th of November 1918, addressed to a Balinese court official in Bangli and to the Dutch Controleur of Klungkung. The letter is written in Malay, and reflects the struggle of the Sedahan Agung to convey the importance of Pura Ulun Danu Batur to a foreign official. The key passage is as follows:

> …I hope that you will advise the (Dutch) Regent in Bangli, so that he will assist with the temple at Batur at the Ulun Danu, the home of the Deity called the Goddess of the Lake who has the power of control over water, the male has power over fire, this is very important according to Balinese religious custom, because the Deities of Mount Batur and Mount Agung are the children of the Deity of Mahameru who were given power over Bali… therefore it is extremely important that the two aspects of this, Mount Batur and Mount Agung, receive worship, as your servant advised earlier in

> Badung, and because it is easy to make things right at Batur if the people at Batur are assisted by their father.

Architect Moojen wrote enthusiastically that

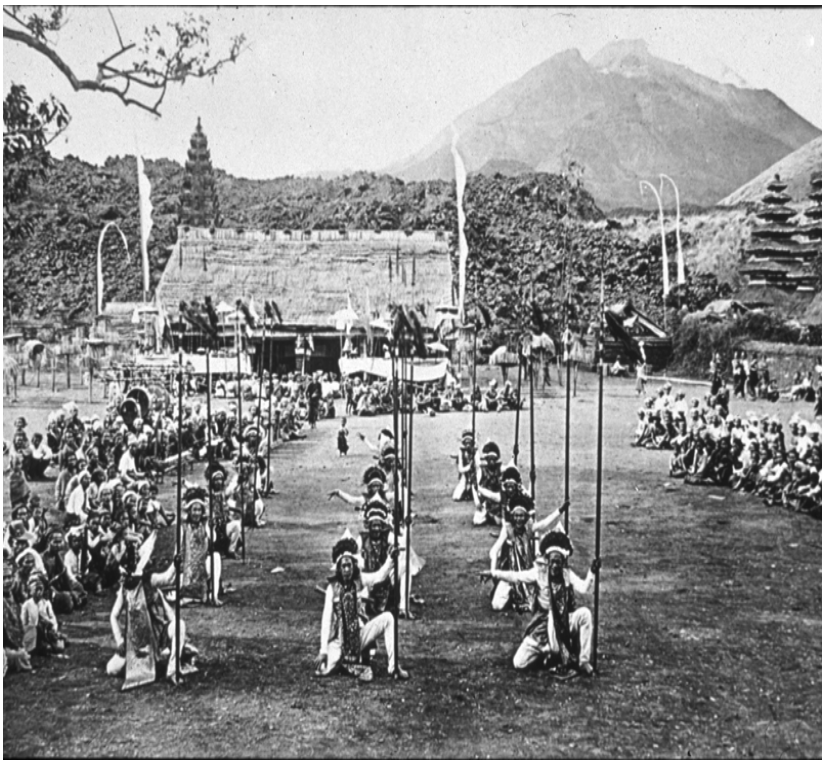
> The fame of holiness, coming from this temple, has risen after the last eruption of Batoer in 1905 even more by the miraculous way by which it was then saved from total destruction. The glowing lava stream was stopped just at the main entrance in an inexplicable way![1]

This description is confirmed by the sketches of Nieuwenhuis, who visited the Temple shortly after the eruption. Moojen estimated the cost of restoration of the Batur temple at fl. 30,000, a large sum in 1918. This included a sizeable budget for labor. Batur was the only temple for which Moojen requested funding for labor, for a very interesting reason. As he explained in his report,

> "wages for labor are not budgeted (for other temples) since among the people it is the custom and tradition to supply this. But for one budget I have made an exception and that is for the temple of Batoer...(Like Besakih), Batoer is of importance to the population of the whole of Bali, and from almost all parts of the island smaller or larger shrines have been built there, or the people have paid a share in their construction. [1]

Thus according to Moojen's report, the importance of the Batur temple transcended the boundaries of the former kingdoms. Unlike other temples, support for Batur came not only from nearby villages, but from the whole island. These reports indicate that in the immediate precolonial era the temple of Batur functioned as the supreme water temple, much as it does today.

View of the village of Batur circa 1920 when it was located on the floor of the caldera. The meru shrine with stacked pyramidal roofs, dedicated to the Goddess of the Lake, is visible on the left. From the archives of the Koninklijk Institut voor Taal, Land en Volkenkunde, Leiden.



Baris dancers in front of the temple Pura Ulun Danu Batur, circa 1920. The 1916 lava flow that stopped just in front of the temple's main gate is visible in the background. From the archives of the Koninklijk Institut voor Taal, Land en Volkenkunde, Leiden.

At the time of Moojen's report (1918), the Batur temple was located in the village of Batur, in the bowl of the volcano near the lake. In 1926 another volcanic eruption led to the abandonment of this site, and the relocation of the temple and the village to the rim of the crater, overlooking the caldera and lake. These events are thoroughly documented in an administrative report by the senior Dutch official then resident in Bangli:[1]

> ...The village of Batur was situated before August 1926 at the foot of the volcano Batur. It was a neat, well kept village, which could be seen clearly from the crater...
>
> On the third of August 1926, at 1 a.m., Mount Batur began to erupt. Along the north-western slope a long crevice appeared with a lot of noise and thunder, from which fires and many lava fountains spewed forth. I was informed of this and went to Kintamani, and descended to the village of Batur. It was impossible to get an overview of the situation: the inhabitants were not worried, and trusted in the power and will of the gods, and in the temple which already once before had stopped the lava- stream. From above you could see that the lava-stream was not moving towards the village. However, it seemed to me that the continuous eruptions would eventually fill the hollow in which the village was nestled. In the afternoon of the first day a new source of lava came into being at about 1200 meters distance from the village. With the sound of a diesel engine, it regularly emitted large waves of blood-red glowing lava. A lava stream started to move towards the village...[1]

This report goes on to describe the abandonment of the village and the Temple, which were buried under a great tide of lava. The people of Batur had time to gather their possessions, including the orchestras and ceremonial objects stored in the temple, and climbed to the crater rim where they were invited to take refuge in the nearby village of Bayung Gde, where they remained as guests for three years. Soon after their arrival they began to solicit land and financial support from the colonial government in order to rebuild the temple and the village on the crater rim. This triggered another assessment of the importance of the temple by the colonial administration. A 1927 report by Controleur Haar describes the mobilization of funds and labor for the reconstruction of the Temple from the whole population of Bali:

> At this moment the members of the new village of Batoer are busy preparing the terrain for a new temple. A request to have the whole of Bali participate in this new construction by means of handing over contributions was already made, but will later be prepared more closely by the Anak Agoeng (ruler) of Bangli and proposed again. It was thought to request a contribution of 5 cents per family head. If you count the number of people at around 1 million (in 1920 the census says that most families consist of 5 people), then approximately 200,000 people would bring in an amount of 10,000 guilders.[21]
>
> With this support, a new temple was constructed at its present site, in the village of South Batur on the crater rim. The congregation of subaks that support the temple has grown in recent years, and now numbers more than 250.

Moojen's interest in the Batur Temple was primarily architectural, and he wrote very little about its cosmological role. But the importance of the Batur Temple to the subaks is confirmed by other reports. For example, the final report (memorie van overgave) of G.A.W.Ch. de Haze Winkelman, Resident of Bali and Lombok, dated April 1937, contains the following remarks:

> In several areas the custom exists that the inhabitants of a watershed by sending deputations participate in the worship in the sanctuaries dedicated to the goddesses of the mountain lakes (Batoer, Bratan, Boejan and Tamblingan). Holy water is obtained during temple feasts by the representatives of the subaks. The subak members meet the delegations and ceremoniously share out the holy water, and the subak members then sprinkle their fields with it. In this way, they can participate in the blessing which the Goddess of the lake- as keeper of the irrigation waters- shares out to the farmers.
>
> Let it also be mentioned that the festival calendar of the subak has no (or at the most only an incidental) relation with the organization of the religious ceremonies which are in the charge of the village community.[22]

[21] Lansing, J. Stephen, Chapter Five, Priests and Programmers: Technologies of Power in the Engineered Landscape of Bali. Princeton University Press, 1991. Revised 2nd edition 2007.

[22] A.R.A. Den Haag: Memoire van overgave van G.A.W. Ch. de Haze Winkelman, Resident van Bali en Lombok, April 1937.

Thus this colonial official acknowledges "the lake goddess as the keeper of irrigation waters", as well as the distinctive calendar of the subaks, the pilgrimages to the lakes to obtain holy water to sprinkle on their fields, the temple festivals, and the Goddess not merely as mistress of lakes or holy water, but irrigation water *(bevloeiingswater)* itself. There are similar references in other documents of the colonial era. For example, V.E. Korn observed that :

> From several village regulations from Karangasem, this opinion appears without doubt, that the water of the central Balinese lakes-Bratan, Batur, Buyung and Tamblingan- is in the hands of the gods, on whose good will it depends if the rivers will receive enough water through underground canals (a widespread belief).[23]

Further details on the history and functions of this temple are published in Budiastra (1975, 1979), Lansing (1991, 2006, 2007), and Reuter (2002).

C. Ancient Water Temples and Subaks of Tampaksiring

There is a story about this site that is a perennial favorite among those who study Bali—a story that has been published numerous times (Stutterheim 1935: 28-29,Bernet Kempers 1991: 157-158, Dalton 1992: 282, Lansing 1983b: 148, Barth 1993:335, Zurbuchen 1987: 42). It is a story about a stone. Today, this stone sits wrapped in white cloth in a small shrine in a temple in the village of Manukaya in the district (*kecamatan*) of Tampaksiring. Some locals have said that it fell from the sky. Every decade or so, on the full moon of the fourth month, it is taken down the hill from its home in Sakenan Temple to a major ceremony at the temple of Pura Tirtha Empul a kilometer away. There the rock joins other meaningful sacred relics and they are ritually washed in the spring-fed pools that are the focal features of the temple.

Upon this rock there is an inscription in Old Balinese, a language no longer remembered. In the 1920s, the Dutch archaeologist Wilhelm Stutterheim deciphered the inscription and reported his findings to the local Balinese, who had no knowledge of its contents. The inscription proved to bear a date equivalent to 962 A.D., and to tell of King Chandrabhayasingha Warmmadewa's construction or improvement of a bathing place at Pura Tirtha Empul, complete with a dam and two pools (Ardika and Beratha 1996: 112- 113; Goris 1954: 197,

[23] V.E. Korn, Het Adatrecht van Bali. (The Hague: G. Naeff, 1932).

Stutterheim 1929-30: 68-69). The translation was incomplete because because some parts of the inscription had been worn away, quite likely by the effects of hundreds of years of regular ritual washings carried out on the day of the full moon of the fourth month—*the very day memorialized in the inscription.*

The proposed Tampaksiring World Heritage site contains the water temple mentioned in the inscription, and a collection of downstream subaks and temples which continue to receive water from the springs of Tirtha Empul and neighboring water temples. This valley includes the largest and most physically imposing stone temples that exist in Bali, and was undoubtedly one of the cradles of early Balinese civilization. The Subaks of Pulagan, Kumba and Kulub continue to grow native Balinese rice varieties, which is cultivated in the traditional way. Archaeological evidence suggests that they have been in existence for nearly a millenium.

C.1. Pura Pegulingan and Subak Basangambu

The Pura Pegulingan is an ancient temple that has become a place of worship for the Subak Basangambu for generations. However, the antiquity of the site was only revealed in 1983, when debris of a large stone stupa was found in the "jeroan" (inner sanctum) of this pura. Intensive research that followed in 1984 succeeded in unearthing the stupa's foundation. At the base of the stupa was found an octagonal structure with spokes. At the center of this structure is a miniature stupa which then serves as a model for reconstructing the big stupa. One of the important findings was a stone box containing a thin gold sheet and clay tablets inscribed with Buddha mantras. Judging from the style of writing, it is evident that the finding dated back from the ninth or the tenth century, which was the period of the reign of King Udayana and his spouse Gunapryadharmapadmi. Apparently, at the time, Pura Pegulingan served as a Buddhist place of worship. It is not known for certain when the pura became a place where Hindus came to pray. By agreement with the local community, in 1985 the large Pegulingan stupa began to be restored and was completed in 1991.

C.2. Pura Tirtha Empul

The site is clearly mentioned in the stone inscription describe above, dating to 962 A.D., in which a king commands the building or rebuilding of baths and a

dam. This stone remains ritually significant at the temple, demonstrating extraordinary cultural continuity. It is kept at the village temple of Pura Puseh in the village of Manukaya. It is dated 884 in the Saka calendar (962 AD), and states that King Chandrabhaya Singhawarmadewa ordered that the pethirtaan Tirtha Empul be restored. The inscription is the oldest written record about Pura Tirtha Empul which in the inscription was mentioned as "...tirtha di Mpul..." (the holy water at Mpul). The inscription is discussed by W.F. Stutterheim in his book: "Oudheden van Bali" (1929) and by R. Goris (1954) and L.C. Damais (1957).

In 1972, part of Pura Tirtha Empul was damaged by a strong earthquake in Bali. Restoration was made by the community, but no detailed record was available to tell this. Since 1983, the Office for Heritage Conservation in Bali and Lesser Sunda (based in Gianyar, Bali) assisted in the restoration of some damaged parts of the pura and the restoration was completed in 1990.

Pura Tirtha Empul also has an important place in current myths. When asked about the origin of Pura Tirtha Empul, locals usually refer to variants of the Usana Bali legend. By doing so, they in effect attribute the site to a king of gods rather than to a godly king. The story in question concerns a war between the god Indra and the demonic king Mayadenawa. As usually reported, at one point Mayadenawa creates a poison spring, and Indra's army is killed upon drinking its waters. Indra then plunges a kris (sword) or a banner into the earth to create a new spring of holy water (Tirtha Empul) and uses this water to revive his followers. The version of the myth current in Manukaya elaborates on this incident to emphasize the power of Tirtha Empul by telling us that Indra only created the spring after his own priest (analogous to the padandas discussed below) failed to create holy water with the desired effect.

C.3. Pura Mengening

The history and the development of Pura Mengening are difficult to trace due to a lack of historical sources that mention this pura. It is included in the site nomination because of its continuing importance as a water temple. From the architecture of the main temple, one can estimate that this building was erected in the 11th century during the reign of King Anak Wungsu. Through the beginning of the twentieth century, no records exist describing the condition of the temple (prasada) and the Pura Mengening.

Based on oral history from the local community, when Bali was hit by a huge earthquake in 1917, some buildings in this pura collapsed. The collapse of the temple at Pura Mengening was mentioned by W.F. Stutterheim in 1925. The story of the collapse was reiterated by A.J. Bernet-Kempers in his book: “Ancient Bali” (1960). In this book, only the remains of a temple and some statues were found on a hill near Tampaksiring.

It was only in 1982 that research began on the temple by the Office for Heritage Conservation in Bali and Lesser Sunda (based in Gianyar) to further study the temple. Research and excavation have been done at the site. Based on the results of the research, the temple was reconstructed and completed in 1983. At present, this temple has become the main building of the pura and is called Prasundan Agung. The garden surrounding the pura was planted in 1985 and the following year “zoning” was designed to protect in the site. In 1986, a more specific mapping of the site was completed. Up to the present, Pura Mengening is used and maintained by the community of Saraseda.

C.4. Pura Gunung Kawi (Rock Cut Temple)

The history of the establishment of the Pura Gunung Kawi (Rock Cut Temple) is known from several ancient inscriptions found on the walls. A short inscription stated that: “... haji lumah ing jalu...rwa anak ira” meaning “....the King who passed away in the Jalu...and his two children”. The word “Jalu” means “Keris” (Kris=dagger) which leads to the name “Sungai Pakerisan” (River of the Dagger). The king referred to in the inscription (inscription) is King Udayana who reigned in Bali from 989 to 1021. The two sons are King Marakata (1022-1026 M) and (King) Raja Anak Wungsu (1050-1078 M). In one of the inscription published by King Marakata, Pura Gunung Kawi is mentioned as a sacred Amawawati structure found along the Pakerisan River (“... mangswaya ri sanghyang katyagan ing pakrisan mangaran ring amarawati”). Based on the data, it is presumed that the Pura Gunung Kawi (rock cut temple) was built in the 11th century. Some scholars attribute the founding of the site to Udayana in the early 11th century; others to Anak Wungsu in the latter half of the same century, based on a paleographic match to a dated inscription on a statue at Gunung Penulisan,

There is no record of how the development of the Pura Gunung Kawi (rock cut temple) proceeded after it was constructed. Although the local community was aaware of the existence of these candi (temples), it was only in 1920 that its

existence became widely known after Resident H.T. Damste reported on their cultural heritage. In the beginning, only temples A, B, and C were known. When Nieuwenkamp visited the site a few years later, he reported that the curved niches on the east side of the rock cut, which were later known as Temple Sepuluh, were still crowned by foliage growth. In 1949, J.C. Krijjamen succeeded in restoring some rock cut niches. He also discovered some other rock cut temples around the area of Pura Gunung Kawi.

Since the findings were made public, the complex of the Pura Gunung Kawi (rock cut temple) has become an object of tourism. The complex is often visited by foreign as well as local tourists. The local community has set up kiosks to sell souvenirs along the road leading to the temple complex. As noted in the Management Plan, it is anticipated that a participatory approach will improve the profitability and suitability of these commercial establishments in the proposed World Heritage site.

The maintenance of the Pura Gunung Kawi (rock cut temple) and other temples at the site is sustained by the local community and the office of Archaeological Heritage Conservation in Bali and Lesser Sunda (based in Gianyar). Presently, conservation activities consist mainly of cleaning moss and plants that flourish around the sloping riverbanks. In order to prevent overflow of water during the rainy season, canals on the slope were built, as they were for cluster IV of the temple on the South Western Site. In front of cluster C of the temple, places for worship made of wood were built for visitors. However, ceremonies are held mainly in the temple located in cluster B of the temple premises.

C.5. Subaks Basangambu, Pulagan, Kumba and Kulub.

The water from the springs enclosed by the temple Pura Tirtha Empul now flows into a large canal that delivers it to the rice paddies of Subaks Pulagan and Kumba, located in a valley immediately downstream. In the midst of these terraces are found the largest royal tombs and hermitages ever constructed in Bali, which were completed by the 12th century. The flows from two other nearby springs provide water for the subaks Basangambu and Kulub.

With regard to the antiquity of these subaks, an as-yet uncorroborated radiocarbon date of 635 to 685 (calibrated AD) has been obtained from a test pit located in a rice field close to the canal and about 2 kilometers downstream from the spring, at a level above bilobe rice phytoliths. While the excavator does not

have great confidence in this date because it was taken on fine particulate matter that may have been transported up or down the soil column (John Schoenfelder, pers. comm.), it nonetheless hints at the likely antiquity of the system. Thus it appears that Pura Tirtha Empul was one of the oldest and most successful water control projects of Balinese kings.[24] The valley forms a concave microwatershed, utilizing a natural spring with very simple technology: the stone weir described in the tenth century inscription, and a short canal. The history and archaeology of canal irrigation in this region of Bali are discussed in Scarborough et al 1999, 2000; Schoenfelder 2003; Lansing 2006; Lansing et al 2008.

D. Subaks and Water Temples of Batukaru

As noted above, the earliest documented wet rice kingdoms in Bali originated in the Tampaksiring region. Later on, more kingdoms emerged in western Bali, which eventually became Bali's "ricebowl", where the subak system reached its greatest geographic extent. However, most of this development occurred after the end of the Classical era in the fourteenth century. Post-Classical Balinese kings stopped issuing royal edicts (prasasti) on copper plates; consequently the early history of these subaks, temples and kingdoms is not as well documented as those of the Classical sites around Tampaksiring and Sebatu. However, other kinds of evidence have been used to reconstruct the history of these institutions. Thus molecular genetic evidence sheds light on the population history of the region, and historical records in both Balinese and European languages are available beginning in the eighteenth century for the water temples. Here we briefly summarize the results of these studies.

Neutral genetic markers can be used to reconstruct migration and settlement histories. Lansing et al (2008) analyzed patterns of variation in the non-recombining Y chromosome for 587 Balinese men to gain insight into the history of subaks in Bali.[25] Genetic samples were obtained from eight subaks located along the Sungi river in west Bali, as well as thirteen subaks located near

[24] M.M. Soekarto K. Atmodjo, "Some short notes on agricultural data from ancient Balinese inscriptions", in Sartono Kartodirdjo, ed., Papers of the Fourth Indonesian-Dutch History Conference, Yogyakarta 24-29 July 1983), Vol. I: Agrarian History. Yogyakarta: Gadjah Mada University Press, 1986.

25 Lansing, J. S., Karafet, T. M., Schoenfelder, J. W. and Hammer, M. F. (2008). A DNA signature for the expansion of irrigation in Bali? In *Past Human Migrations in East Asia and Taiwan: Matching Archaeology, Linguistics and Genetics* (eds A. Sanchez-Mazas, R. Blench, M. Ross, I. Peiros and M. Lin). London: Routledge, pp 356-375.

Tampaksiring in the Sebatu region (to be described below as a proposed serial nomination site). One hundred random samples were also collected from the administrative districts of Bali, to provide context for the samples from the subaks. The results of genetic analyses on these subaks are fully explored in Lansing et al. (2008). Relevant results may be summarized as follows: the pattern of genetic diversity in all of the genetic systems included in that study are consistent with an historical scenario in which irrigation development began around the springs and rivers located highest upstream, which would have been the easiest sites to develop using traditional technology. Subaks located at the furthest positions upstream on both rivers demonstrate greater levels of genetic differentiation and diversity, indicating that they came into existence before their downstream neighbors. The oldest and most permanent communities are located in the Sebatu region adjacent to Tampaksiring. (The antiquity of the Tampaksiring subaks is known from prasasti inscriptions, as noted above). Small patrilocal communities with low migration rates, typical of traditional wet-rice farming villages, are subject to high rates of drift on the Y chromosome. If population growth eventually leads to downstream migrations of male kinsmen, the result is a budding deme model.[26] This pattern is observed in the Sebatu region.[27]

The second highest levels of NRY STR diversity in the study were found in the two farming villages located furthest upstream along the Sungi river in the region of Batukaru.[28] In the other six subaks located further downstream along the Sungi river, this pattern vanishes and the levels of genetic diversity are indistinguishable from the all-Bali sample. Altogether, these results are consistent with several inferences:[29]

- The subaks of Tampaksiring and Sebatu are probably among the oldest in Bali, and originated before the 12th century AD.

[26] Fix, A.G. (2004) 'Kin-structured migration: causes and consequences', *American Journal of Human Biology*, 16: 387–94.

[27] Short tandem repeats on the non-recombining Y chromosome; neutral markers which are frequently used to reconstruct population genetic history.

[28] Subaks Apit Yeh and P. Akitan, located approximately 1.5 km due east of Batukaru. A third upland subak, Uma Poh, is located immediately downstream from Apit Yeh. This subak is said to have been founded by farmers from Apit Yeh, a conclusion supported by its higher STR diversity.

[29] Lansing, J.S., M. P. Cox, S. S. Downey, M. A. Jannsen, J. W. Schoenfelder. (2009). A robust budding model of Balinese water temple networks. *World Archaeology* 41(1):110-131

- Later on, the subak system expanded to the high elevation springs and rivers to the west, downslope from the mountain lakes of Beratan and Tamblingan (i.e. the Batukaru region).
- The subaks located immediately downslope from the volcanic lakes of Tamblingan and Beratan (i.e. the Catur Angga Batukaru region) are likely to be the oldest subaks in western Bali

The oldest reference to the temples of the Catur Angga Batukaru site is contained in the royal copper-plate inscription Babahan 1 dated 947 A.D., issued by the Balinese king Sri Ugrasena (Goris 1929:64-5). This inscription describes the visit of the king to Buwunan and is still preserved in the nearby village temple Pura Puseh Jambelangu of Babahan. It fixes the borders of a temple or asrama Petung Bang Hyang Sidhi, which is believed to be the precursor to the temple Pura Luhur Besikalung. This inscription also refers to local streams and wet-rice agriculture, which supports the genetic evidence that this region was one of the earliest sites in Bali for irrigated rice cultivation.[30] Like the inscription of 962 A.D. at Pura Tirtha Empul described above, this prasasti dates the farming community of Babahan (and its responsibility to the temple) to the earliest period of Balinese kingdoms. Subsequently, references to the lake temples are abundant in the later lontar literature of Bali, including major religious texts such as the Purwwa A

Cili, Cau (harvest offering) dedicated to goddess Sri, placed in the field during harvest time

Rice granaries; the higher called gelebeg, and the smaller one klumpu. Wongaya-Gede, on the slope of the Watukaru Mountain,

[30] The passage which refers to wet-rice (*huma* in Old Javanese) extends privileges to persons in the region of Catuspatha, which may correspond to Catur Angga, who labor in rice fields and those who support religious establishments: “paniungsungyan di catuspatha, anada tu anak dharmmana, tumaku marhuma”. Prasasti Babahan 1, #102:4. Roelof Goris, Prasasti Bali: Inscripties voor Anak Wungcu. (Bandung: N.V. Masa Baru, 1954),page 64.

gama. [31] References to the vital role of the major lake temples are also prominent in early European descriptions of Bali and continue in the colonial era, as attested by the reports of de Haze Winkelman and Korn quoted above. An important theme in these descriptions is the unique importance of the subak system in Bali. In 1811 Sir Stamford Raffles visited Bali and was surprised to discover that the Balinese rajahs did not lay claim to all of the productive lands: "the soil is almost invariably considered as the private property of the subject."[32] Similarly in 1887 the Dutch administrator of north Bali carried out a detailed study of land tenure. He concluded that the subak system is the key to the prosperity of Balinese kingdoms: "The explanation for the amazingly high standard of rice cultivation in Bali", he wrote, "is to be found in Montesquieu's observation that 'the yield of the soil depends less on its richness than on the degree of freedom enjoyed by those who till it.'"[33]

Technologically, the small-scale irrigation works of the Batukaru region used only traditional materials until around 1960. Dams were constructed by piling up stones, dikes between rice fields were made of raised soil, and bamboo served as water pipes. After 1960, the government provided aid in building dams and made water networks more permanent by using cement. Water channels as long as 6 km were built by farmers from the village of Gunungsari to reach the village of Kasembahan. Tunnels as long as 160 m were also constructed in order to enhance the flow of water. In 1975, local farmers built a concrete dam on the River *Yeh Baat*. Thereafter, no new irrigation facilities were built, although some improvements were made. The waterworks in *Gunungsari* were improved by "*gotong royong*" or mutual cooperation in stages from 1977 to 1981, and the dam was repaired in 1980. Otherwise, the terraced rice fields and the *subak* organization in Batukaru have not undergone any significant changes. In 2005, this region was proclaimed a natural and cultural conservation area by the Governor of Bali.

[31] Helen Creese, "Balinese Babad as historical sources: A Reinterpretation of the fall of Gelgel." BKI 147 (1991):236-60.

[32] T.S. Raffles, The History of Java, vol. 2. London: Black, Parbury and Allen, 1817:234.

[33] F.A. Liefrinck, "Rice Cultivation in northern Bali", in J. W. Swellengrebel, ed., Bali: Further Studies in Life, Thought, Ritual. The Hague: [1886-7] 1969:3.

2.c. Site Under Consideration for Serial Nomination

In addition to the three sites described above, another site is under consideration for serial nomination: Pura Taman Ayun (Royal Water Temple) in western Bali, and associated subak Batan Badung. This site consists of the temple and rice terraces, in area 40 hectares.

Subak Batan Badung Meeting Place – Mengwi District

Shrine to the Deity of Lake Beratan in the temple Pura Taman Ayun. Here over a period of three days each year, after the "Water-Opening" ceremonies at Lake Beratan, holy water from the lake temple receives additional blessings from the gods of the temple, and is then distributed to twenty subaks of the former kingdom of Mengwi.

The head of the Subak Batan Badung stands beside the altar where his subak gives thanks for the waters from the moat of the temple Pura Taman Ayun, which irrigated their fields. The moat is visible in the background.

Serial Nomination Site: Pura Taman Ayun and Subak Batan Badung

The Tampaksiring and Catur Angga Batukaru sites described above are located at high elevation, and date from the time of the formation of the subak system. Later on, as rice cultivation spread and new kingdoms appeared, more complex relationships developed linking the subaks and water temples to Balinese kings. The largest and most architecturally distinguished example of this relationship is the great temple of Taman Ayun (Pura Taman Ayun), located in the heart of Mengwi, the largest Balinese kingdom of the nineteenth century. This site exemplifies the fullest expansion of the subak system, achieved in the eighteenth and nineteenth centuries. From a technical perspective, the hallmark of this system is the extension of ritualized water control to encompass entire rivers. Once a year, delegations of subak leaders, water temple priests and princes of the former kingdoms of Mengwi initiate a "Water-Opening" ceremony at the mountain lakes of Beratan (adjacent to the Batukaru site). Subsequently, cycles of irrigation and rice cultivation continue at staggered intervals. The subaks are divided into three groups, based on their geographic location. Those located at high elevation plant first, followed by subaks in the central region and then by the subaks furthest downstream, which by virtue of their location are the largest in

terms of both water flows and terraced areas. The level of cooperation achieved by this system is so successful that downstream subaks frequently arrange to "borrow" water from subaks located far upstream. The augmented flow is allowed to pass through the weirs of the intermediary subaks (Geertz 1985, Schulte Nordholt 1996). Thus a parcel of borrowed water may pass undiverted through several weirs before arriving at its downsteam target, thanks to the cooperation of all the intermediate subaks as well as the original donor.

The role of the temple Pura Taman Ayun in this system can be summarized as follows. First, the physical distance and rugged topography separating the large low elevation subaks from the mountain lakes meant that it was difficult for all the subaks to undertake annual pilgrimages to the mountain lakes for the "water-opening" rites. A solution emerged in the form of special "visiting" or "way-station" shrines (*penyawangan*) at the Pura Taman Ayun temple where the subaks could make offerings to the lake deities. Thus in any given year, only a small subak delegation needs to make the pilgrimage to the lakes. A prince of the royal family of Mengwi always accompanies this delegation. After offerings are made at the lake temple, holy water is brought to the Pura Taman Ayun temple to the shrine of the deity of the mountain. For three days, prayers are offered to augment the blessings of the mountain gods with those of other fertility gods and the ancestors of the royal family. All twenty subaks of the Mengwi region then obtain the holy water for their fields from the Pura Taman Ayun temple.

A second major feature of the Pura Taman Ayun temple is the role of the rajah in the control of agricultural pests. As noted above, the traditional solution for pest infestations is the imposition of a large coordinated fallow period, which temporarily deprives the pests of their habitat. In the former kingdom of Mengwi, responsibility for the rituals associated with pest control at this scale (nangluk merana) belongs to the king of Mengwi. The leading colonial ethnographer of Bali, V.E. Korn, describes these rites in detail, and today the prince of Mengwi continues to perform this function.[34]

[34] V.E. Korn, Het Adatrecht van Bali. See also Korn's papers on "Pengabenan Tikus" in the Korn Collection at the Royal Institute of Ethnography in Leiden.

Flooded paddy fields, where rice pests are deprived of their habitat. Photo by J.S. Lansing

A third feature of the Pura Taman Ayun temple is the relationship with the Subak Batan Badung (62 hectares). This subak owes its existence to the water from the temple's large moat, and shares responsibility for the temple with the Mengwi royal family. The Pura Taman Ayun temple thus functions as the chief water temple for the Subak Batan Badung.

A fourth aspect of the relationship of this temple to the subaks is visible in the shrines to two deities worshipped by the subaks, in addition to the major shrine to the deity of Lake Beratan. These three shrines are dedicated to Ida Batara Tengahing ring Segara, the sea god who is associated with seasonal pestilence at the temple of Peti Tenget, and the deity of the Ulun Swi (head of the ricefields) temple at Jembaran. These three temples- for the Lake Goddess, the Sea God and the Head of the Ricefields- are known as penyawangan or "way-station" shrines, where a distant deity may receive offerings from a local congregation. They provide a way for the farmers to make offerings to these gods without making annual long-distance pilgrimages to their home temples. The subaks also routinely request holy water blessings from the ancestral shrine of the Mengwi royal family, to augment the holy water obtained from these shrines. Representatives of the royal family assist and accompany the subaks in their annual cycle of rituals at these shrines and temples.

Finally, the Pura Taman Ayun temple exemplifies the supportive role of the princes of western Bali in the later physical expansion of the subak system. In the second half of the second millennium C.E., under royal patronage the subak system expanded with the creation of larger dams at downstream locations,

where river flows are larger than at the older high elevation sites like Tampaksiring and Batukaru. However, the later Balinese kings did not assume direct control of irrigation, or attempt to displace the subaks. Instead, they provided support for both the practical and ritual activities of the subaks. For example, the kingdom of Mengwi came into existence early in the eighteenth century. According to historian H. Schulte Nordholt, at that time Mengwi was largely forested. The first king built a dam in the Sungi river, and subsequently played an important role in irrigation management (Schulte Nordholt 1996: 58). Schulte Nordholt writes that, although 'there is no accurate information' on the villages that existed in Mengwi at the time the dam was built, circa 1750, the picture that emerged from attempts to reconstruct the demography 'is that of a thoroughly fragmented settlement . . . [these villages] would not have been able to clear large tracts of woodlands or to construct irrigation works miles from home' (Schulte Nordholt 1996: 57).

> In the course of the eighteenth century the sawah area probably expanded under the encouragement of the Mengwi dynasty. But this did not mean that the king centrally controlled the whole. If his control of manpower in the region was limited, his say in the matter of irrigation was no less so. The example of Sibang shows that the larger satellites each managed their own irrigation works and the concomitant taxes and servitude. The effect of this was that the position of the satellites in relation to the centre was quite strong. The satellites were micro kingdoms (Schulte Nordholt 1996: 61).

Thus, according to Schulte Nordholt, the mobilization of labor to expand irrigation into previously forested regions of western Bali was accomplished by the lords of these 'micro kingdoms'. Eventually, local water temple clusters merged into the region-wide system of ritualized water control depicted by the annual rites of the temple Pura Taman Ayun.

The creation of large dams by groups of subaks was documented in the early twentieth century by engineers working for the Dutch colonial government. The Dutch completed their conquest of south Bali in 1908, and in 1912 the colonial government began to map the subaks and irrigation systems of south Bali. An irrigation engineer, O.W. Sörensen, described the construction of large storage dams by the subaks in a 1921 engineering report:

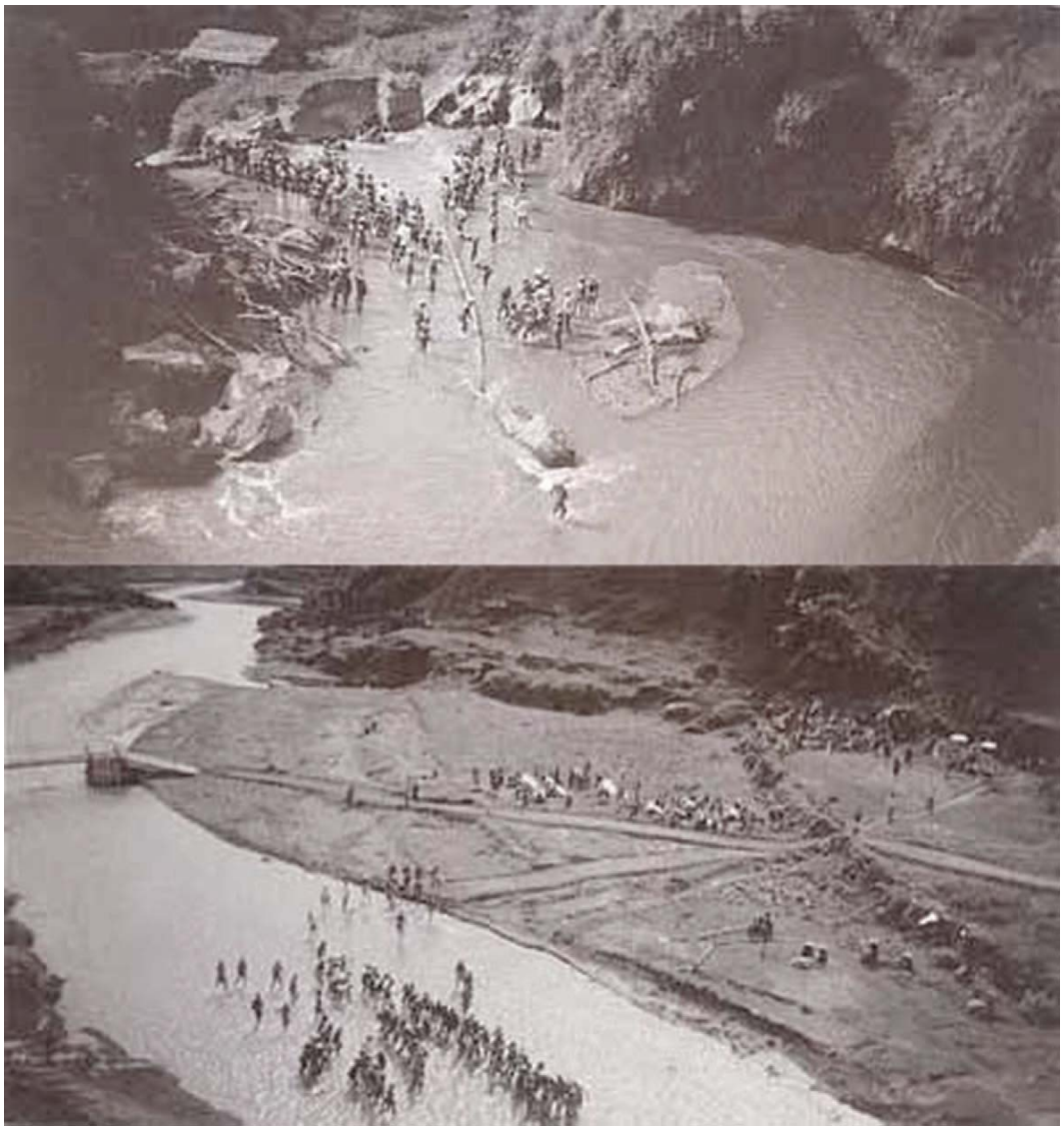
> Because of the deep ravines, dams that hold the water up high are necessary to make irrigation possible. Especially in the district of Gianyar, we find dams of great height (up to 35 meters). In most cases as a result of the irregular terrain the digging of tunnels is necessary, often of respectable length. From there the water follows an open canal to reach the sawahs. The maintenance and repairs of the dams and canals rests with the subak members, who at the charge of the pangloerah, the head of one or more waterschaps [water districts], and under the supervision of the heads of the subaks, the pekasehs, must execute the necessary labor. The same with the construction of new dams: the execution and the costs are borne by those who later will profit from the dam…The best tunnel builders are found in Klungkung and they enjoy a very good reputation all over Bali, so the help of these specialists is always invoked for that kind of work.
>
> (Sörensen 1921: 116; translated by J.S. Lansing)

Sörensen provided diagrams, photos and descriptions of some of the large dams constructed by the subaks. Dam construction began in the dry season when flows are low, with the construction of a row of baffles or obstacles in the river where sediment would build up. Larger tunnels were dug on one or both sides of the dam, and the flow diverted so that the dam could be raised and strengthened. These dams were vulnerable to the high flow volumes of the rainy season. Sörensen comments:

> The normal principle followed by the Balinese in the construction of a prise d'eau is an earthen blocking dam in the river; the dam in general is built up quite a bit above the banjir (flood) height and the top is planted with coconuts, alang grass etc. To be able to get rid of the banjir (flood) water, on one of the banks a canal is dug that serves as an overflow duct. The dams that are built rather solidly hardly ever suffer from overflow since they are sufficiently high above the height of the banjir; the weak point of the Balinese waterworks lies in the overflow canals.
>
> (1921: 116)

These large dams could retain a large quantity of water to be released in the dry season. A small water temple was placed atop the larger dams. Sörensen provides sketch maps and photos of some of the most impressive dams:

> The old indigenous dam of Badoeng consisted of a broad approximately 40 meter high earthen dam with two canals for overflow, one on the right and another on the left bank of the river, and a water outlet which delivered water for about 478 bouw sawahs.
>
> (1921: 118)



Photos of the construction of the large dam of Pejeng by local subaks, taken during a visit by the Governor General of Netherlands Indie in 1925. Source: archives of the KITLV.

Thus the proposed serial nomination Pura Taman Ayun temple site reflects the largest historic expansion of the subak system, in which large multi-subak dams

were constructed at lower elevations and the rajahs assisted in subak rites which extended along entire watersheds, from the mountain lakes to the sea. According to the royal chronicle of the kingdom, the Babad Mengwi, the temple Pura Taman Ayun was dedicated in 1634 A.D.[35] In 1890, war between the Kingdoms of Mengwi and Badung compelled the Royal Family of Mengwi to abandon the temple grounds, leaving the area in a state of neglect. Upon the return of the royal family in 1911, the temple grounds were restored and returned to their original function. Subsequently, in 1917, an earthquake caused the collapse of some temple structures. Nearly 40 *adat* villages and the *subak* Batan Badung contributed to the restoration.

[35] A.J. van der Heijden, "Het Waterschaps Wezen in het voormalige Zuid-Balische Rijks Badoeng en Mengwi", Koloniale Studien 9: 431 (1925). H. Schulte Nordholt, Een Balisches Dynastie, Hierarchie en Conflict in de Negara Mengwi 1700-1940. (Amsterdam: Dissertation in the Vrije Universiteit , 1988). V.E. Korn, Het Adatrecht van Bali, 2nd uitgave. (The Hague: Martinus Nijhoff, 1932).

CHAPTER THREE

JUSTIFICATION FOR INSCRIPTION

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JUSTIFICATION FOR INSCRIPTION

3.a. Criteria Under Which Inscription is Proposed (and Justification for the Inscription Under These Criteria)

(iii) *Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared*

The *subaks* and water temple networks of Bali reflect the Balinese philosophical principle ***Tri Hita Karana*** ("three causes of goodness"), which promotes an harmonious relationship between the individual and the realms of the spirit (*parhyangan*), the human world (*pawongan*) and nature (*palemahan*). This abstract idea is given concrete realization in the lives of the Balinese through the institutions of *subaks* (ancient, democratic self-governing farmer's associations) and water temples, which give spiritual meaning to the governance of the rice terrace ecology. Since the twelfth century, water temple networks have expanded to manage the ecology of rice terraces at the scale of whole watersheds, transforming the volcanic

landscape into faceted terraces whose jewel-like perfection creates general prosperity.

The origin of the concept of *Tri Hita Karana* can be traced to the oldest temples built by Javanese kings on the volcanoes of central Java, in the first millennium A.D. Physically these monuments show evidence of contact with South Asian religious and architectural traditions, but in their written charters they are not described as sites for the worship of Indian gods or Boddhisattvas. Rather, following an older Austronesian tradition they are depicted as ancestor temples; burial places for Javanese kings whose spirits were invoked, along with the spirits of the gods who dwell on the volcanoes, to protect the royal palace and if necessary to act upon a curse. Syncretism is also apparent in the association of many mountain temples with springs. From the 9th century onwards, most temples were located beside natural springs in order to create sacred bathing pools (*tirtha, patirthan*).[1] Later Javanese temples incorporated symbolic references associating the holy springs (*patirthan*) of the mountain temples with *amrta*, the water of immortality described in Hindu myths, and to the goddesses of fertility. Later on, when kings began to fill the plains and valleys of East Java with temples, wherever possible temples enclosed sacred springs and bathing pools.

[1] In Sanskrit, *tirtha* is "a passage, way, road, ford, stairs for landing or for descent into a river, bathing place, place of pilgrimage on the banks of sacred streams; also "one of the ten orders of ascetics founded by *Samkaracarya*", and in a more general sense, a sacred preceptor or guru (Monier Monier-Williams, A Sanskrit-English Dictionary, Motilal Banarsidass Publishers, Delhi 1993 [1899]:449). In Old Javanese, these primary meanings are retained, but to them is added a secondary meaning: holy water in general (P.J. Zoetmulder, Old Javanese-English Dictionary, Part II, Martinus Nijhoff,'s-Gravenhage 1982:2019). In modern Balinese, only the meaning of *tirtha* as holy water is retained (*Kamus Bali-Indonesia, Dinas Pendidikan Dasar Propopinsi DATI I Bali,* 1990:732). Van der Tuuk's Kawi-Balineesch-Nederlandsch Woordenboek offers tentative translations of several compounds derived from *tirtha*, including holy river, possibly pilgrimage, and the performance of a religious purification consisting of bathing for a month and seven days, but does not clearly distinguish between the Old Javanese and modern Balinese meanings (Batavia: Landsdrukkerij, 1899, Vol. III:599).

Tirtha Empul

In Bali, the term *tirtha* came to refer not to the spring itself but to the holy water that flowed from it. A ritual performed inside the temple could transform ordinary water into *tirtha,* imbued with the essence of the temple's God. Eventually, the primary sacrament of Balinese religion became an exchange in which worshippers offered the fruits of their labors to a temple's God in return for a blessing of *tirtha* that could be sprinkled on them and also on their offerings, children, houses, fields, tools and livestock. By obtaining *tirtha* from several temples, one could combine the blessings of several gods. Particular temples came to be associated with specific functions or purposes, and also with the human congregations that supported them. *Tirtha* from these temples could be used to express not only the functional blessings of the gods, but relationships between the human groups that comprised each temple's congregation.

In a similar way, the metaphor of water flowing from a sacred origin was used to define relationships among *subaks*. *Subak* temples are built to commemorate the sites where water originates, such as springs, crater lakes and the weirs where irrigation systems begin. All of the farmers who benefit from a particular flow of water share an obligation to provide offerings in return for *tirtha* at the temple where their water originates. If six *subak*s obtain water from a given weir, all six belong to the congregation of the water temple associated with that weir. Thus the larger the water source, the larger the congregation of the water temple.

Eventually, the religion of Bali came to be known as the religion of *tirtha*. The metaphor of water flowing from a sacred source was joined to the ancient Austronesian concept of descent from a sacred origin. When this symbolism was applied to the physical landscape of Bali, the summits of the volcanoes became doubly sacred. Already populated by both Hindu Gods and the deified ancestors of kings and lineage founders, the summits with their crater lakes became the ultimate source of *tirtha.* In this way, the island itself became a metonym for a concept of the sacred that drew from both Indic and Austronesian sources.

Thus it is possible to trace both the origins of the concept of *Tri Hita Karana*, and the physical expression of that idea in the landscape and social institutions of Bali, to the very beginnings of Balinese civilization. The magnificent rice terraces, water temples, rituals and ceremonies performed by the farmers testify to the unique power of this idea to shape a cultural landscape that Jawaharlal Nehru called "the morning of the world."

The water temples, *subaks*, forests, lakes and rice terraces of Bali are living expressions of the ancient philosophical concept of *Tri hita karana.* Each year, the congregations of the water temples perform an intricate series of rituals, offerings and artistic performances that are intended to sustain a harmonious relationship with their natural and spiritual existence. Over the centuries, the physical landscape of Bali has been reshaped in conformity with these philosophical ideas. Some of the *subaks* and water temples included in this nomination appear to have been in existence since the twelfth century.

Piodalan ceremony at Pura Taman Ayun, 1950

Although '*subak*'-like organizations may have existed on Java for a few centuries beginning in the 9th Century AD, at present they only survive in

Bali. The water temples built and maintained by the *subaks* include ancient monuments as well as more modern structures. Today, the water temples are still actively used and maintained by the local populations. The core concept of tri hita karana, the responsibility of human communities to a landscape regarded as sacred, is most strongly and visibly expressed in the intense desire of the subak members in the Tampaksiring and Batukaru sites to protect the landscape while benefiting from its fertility, and express their gratitude to the gods in the annual cycle of subak rituals. The same intense feeling of responsibility for a sacred landscape inspires the priests and villagers of Batur village in their support of the supreme subak temple of Bali.

(v) ***Exhibit an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change***

Balinese water temple networks represent a unique response to the challenge of supporting a dense population on a rugged volcanic island in a monsoonal area. The mountainous nature of the island with deep ravines and seasonal rains has created an ecosystem that is prone to water scarcity and threats of disease and pests. Water temple networks traditionally cope with these problems by enabling clusters of *subaks* to adjust irrigation schedules at the watershed scale, controlling pests by inducing synchronized fallow cycles. Although each *subak* focuses on the management of its own rice terraces, a global solution to water allocation emerges from the temple networks, optimizing irrigation flows for all (Lansing 2006). This thousand-year-old system is now threatened with collapse, due to development pressure, fragmentation of the landscape, and pollution from agricultural chemicals.

The democratic and egalitarian farming practices of the *subaks* enabled the Balinese to become the most successful rice farmers in the archipelago. But today the very survival of the *subaks* is in question. There are four major threats. The first is the cumulative effect of the over-use of agrochemicals, leading to loss of soil fertility (Lansing et al 1991: 383-390; Marion et al 2005). The second is the difficult-to-control expansion of

tourism, which leads to the sale and fragmentation of the rice terraces. The third is the loss of forest cover and consequent water shortages. On this issue, the Governor of Bali, I Made Mangku Pastika, was quoted as follows on October 4, 2008 in the *Bali Times*:

> *"We are very concerned about the environmental problems in Bali, because our forests now are only 22% of the whole area in Bali — according to our laws there should be at least 30% — and of this 22% only 59% is in good condition and can function as a real forest." Demand for wood was three times what legal logging could supply, so that even young trees are cut down, eating into the remaining forest, Pastika says. "The next problem this creates is water. Now from 400 rivers there are 260 dry. We have 140 left, but they are in the process of drying." Bali's environmental balance is under threat, he says. "First we have to talk about the environment; that is the most important thing. This is the relationship of our life. First is water, forests needs water, water needs forests. Water is the source of life. "Water levels are decreasing. People are exploiting water, taking deep water. There is a massive exploitation of our underground water by hotels and big companies like Coca-Cola. The process of drying is destroying our environment."*

The fourth major threat to the survival of the *subaks* and rice terraces is the low price of hybrid Green Revolution rice grown with chemical fertilizers. Organically grown native Balinese rice sells for a much higher price, but decades of support for chemical fertilizers and Green Revolution plants have made it hard for farmers to return to organic production of Balinese rice. As long as farmers can only grow cheap hybrid rice, rising land prices and increasing living costs tempt them to sell their land and seek alternative professions (Lorenzen and Lorenzen 2005).

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

Balinese water temples are unique institutions, which for more than a thousand years have drawn inspiration from several ancient religious traditions including Saivasiddhanta and Samkya Hinduism, Vajrayana Buddhism and Austronesian cosmology. The focus of water temple rites is the maintenance of harmonious relationships between humans and the natural world. This is achieved through active engagement with spiritual

concepts, emphasizing the dependence of the human community on the life-sustaining forces of the natural world. These ideas are expressed through the musical traditions of various types of orchestra; dramatic performances such as *topeng*, *gambuh*, *wayang*, *rejang,* and *baris*; the reading of poetry in four languages (Sanskrit, Balinese, Old, and Middle Javanese); the creation and dedication of offerings made of flowers, fruits and rice; and the performance of rituals by priests and the congregation. The temples themselves are continually repaired and embellished by stone masons, sculptors, woodcarvers, and painters.

The traditions sustained in the rites of the water temples are a direct and tangible reflection of Balinese original ideas and beliefs which crystallize the *Tri Hita Karana* philosophy. The significance of this philosophy is not only locally and nationally recognized, but also internationally appreciated. The World Tourism Organization in its meeting in Madrid (2004) admitted *Tri Hita Karana* as an example of proper conduct in accordance with the WTO Global Code of Ethics for Tourism.

Importantly, the concept of *Tri Hita Karana* is not only a religious principle. As many scholars and artists have observed, one of the most extraordinary aspects of Balinese culture is the role of the arts in Balinese villages. The annual cycle of rites in the temples provides a venue for an outstanding variety of artistic performances, including many forms of *gamelan* music, dramatic performances such as *topeng*, *gambuh*, *wayang*, *Calon Arang*, and poetry readings in several languages (Old Javanese, Middle Javanese, Balinese).[2]

3.b. Proposed Statement of Outstanding Universal Value

The *subaks* and water temple networks of Bali reflect the Balinese philosophical principle ***Tri Hita Karana*** ("three causes of goodness"), which promotes a harmonious relationship between the individual and the realms of the spirit (*parhyangan*), the human world (*pawongan*), and nature

[2] Cf. Artaud, Antonin. The Theatre and Its Double, Trans. Mary Caroline Richards. New York: Grove Weidenfeld, 1958; Hildred Geertz, Images of Power: Balinese Paintings Made for Gregory Bateson and Margaret Mead, University of Hawaii Press (1994); Urs Ramseyer, The Art and Culture of Bali, Oxford University Press, 1987.

(*palemahan*). This abstract idea is given concrete realization in the lives of the Balinese through the institutions of *subaks* (ancient, democratic self-governing farmer's associations) and water temples, which give spiritual meaning to the governance of the rice terrace ecology as well as the forests and lakes on which the farming system depends. Each year, the congregations of the water temples perform an intricate series of rituals, offerings, and artistic performances that are intended to sustain a harmonious relationship with their natural and spiritual existence. Over the centuries, the physical landscape of Bali has been reshaped in conformity with these philosophical ideas. Water temple networks have expanded to manage the ecology of rice terraces at the scale of whole watersheds, transforming the volcanic landscape into faceted terraces whose jewel-like perfection creates general prosperity.

Balinese water temples are unique institutions, which for more than a thousand years have drawn inspiration from several ancient religious traditions including Saivasiddhanta and Samkya Hinduism, Vajrayana Buddhism, and Austronesian cosmology. The focus of water temple rites is the maintenance of harmonious relationships between humans and the natural world. This is achieved through active engagement with spiritual concepts, emphasizing the dependence of the human community on the life-sustaining forces of the natural world. These ideas are expressed through the musical traditions of various types of orchestra; dramatic performances such as *topeng*, *gambuh*, *wayang*, *rejang,* and *baris*; the reading of poetry in four languages (Sanskrit, Balinese, Old, and Middle Javanese); the creation and dedication of offerings made of flowers, fruits and rice; and the performance of rituals by priests and the congregation. The temples themselves are continually repaired and embellished by stone masons, sculptors, woodcarvers, and painters.

The temple networks represent a unique response to the challenge of supporting a dense population on a rugged volcanic island in a monsoonal area. The mountainous nature of the island with deep ravines and seasonal rains has created an ecosystem that is prone to water scarcity and threats of disease and pests. Water temple networks traditionally cope with these problems by enabling clusters of *subaks* to adjust irrigation schedules at

the watershed scale, controlling pests by inducing synchronized fallow cycles. Although each *subak* focuses on the management of its own rice terraces, a global solution to water allocation emerges from the temple networks, optimizing irrigation flows for all. This thousand-year-old system is now threatened with collapse, due to development pressure, fragmentation of the landscape, and pollution from agricultural chemicals.

Aerial photograph of Pura Gunung Kawi Rock Cut Temple

3.c. Comparative Analysis (Including State of Conservation of Similar Properties)

Thorough research has been carried out seeking possible comparisons for the Cultural Landscape of Bali Province. Within the Indonesian archipelago, a comparable cultural landscape is not found. Although some rice field terraces exist in Sumatra and Sulawesi, there is no elaborate irrigation organization comparable to the *Subak* in Bali. The rice-field terraces of Sumatra and Sulawesi have no specific temples or rituals similar to the *subak*s and water temple networks of Bali. Furthermore, the formation of rice field terraces on Sumatra and Sulawesi is designed to meet technical considerations, while in Bali, the landscape was created as a manifestation of the *Tri Hita Karana* philosophy.

Outside Indonesia, the rice terraces of the Philippines Cordilleras in Luzon, the Philippines, may be compared to the rice field terraces of Balinese

subaks. The former were established around 2000 years ago and fed by an ancient irrigation system. The water flows from the rainforests above the Ifugao Mountains. In 1995, the Banaue rice terrace was declared a World Heritage Site. As in Bali, the Banaue irrigation system is supported by a traditional organization, agricultural engineering, rituals and a belief system. However, the rituals and belief systems as well as the organization behind the system are quite different from those in Bali. Ifugao rituals and their belief system have no Hindu or Buddhist influence, while the Balinese rituals and belief system have been influenced considerably by Hinduism and Buddhism. Further, the Balinese terraces are managed at the watershed scale by a hierarchy of water temples that has no equivalent in the simpler managerial system of Banaue. In particular, the Balinese subaks have sustained an extraordinary level of cooperation among dozens of communities spanning large watersheds over a period of centuries. This achievement, the effective management of a productive mosaic landscape by cooperative democratic institutions over a period of many centuries, has no parallel elsewhere.

Regarding the water temples associated with the *subaks*, nothing like them is known to exist elsewhere in South or Southeast Asia. Unlike Indian temples, a Balinese temple is reminiscent of a megalithic ritual site dedicated to a divine king or prominent culture hero rather than certain gods (Ramseyer, 2002). What is more, all the temples included in the Cultural Landscape of Bali are always related to water which is regarded as the most important substance in maintaining a harmonious relationship among God, humans, and the environment (*Tri Hita Karana*). Such a philosophy does not exist in relation to the Indian rock-cut temples.

Looking further afield, the Cultural Landscape of Bali may be compared with the Agave landscape and ancient industrial facilities of Tequila, a World Heritage site in rural Mexico that was inscribed in 2006. The Agave Landscape was deemed worthy of inscription based upon similar criteria to those that form the basis for the Bali nomination. Three specific criteria are common to both sites:

(ii) ***Exhibit an important interchange of human values, over a span of time or within a cultural area of the world, or developments in***

architecture or technology, monumental arts, town-planning or landscape design

In the Agave site, this criterion was fulfilled by the observation that the cultivation of agave and its distillation have produced a distinctive landscape. This is also the case for Bali, where the expansion of the *subaks* and water temple networks dramatically transformed the forested volcanic landscape over a time span of over a millennium.

(v) ***Exhibit an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change***

In the Agave site, it was noted that "The agave landscape exemplified the continuous link between ancient Mesoamerican culture of the agave and today…" In Bali, the ancient landscape shaped by the *subaks* and water temples is now vulnerable to irreversible change, with the loss of approximately a thousand hectares of rice terraces each year.

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

In the Agave site, "The Tequila landscape has generated literary works, films, music, art and dance, all celebrating the links between Mexico and Tequila and its heartland in Jalisco." In Bali, there is a continuous tradition of artistic traditions in the farming villages such as music, theatre, painting, sculpture, and poetry, all of which are described in the letters of Balinese rulers to villages within their domains (*prasasti* or royal epigraphs), as early as the tenth century AD.

The two sites differ in the fourth proposed criterion: the Mexican site also refers to criterion 4, architecture, while the Balinese nomination includes criterion 3, because it bears unique testimony to a living civilization and cultural tradition. While tequila and other spirits are cultivated in many places, the democratic and egalitarian *subaks* and water temples of Bali are unique.

3.d. Authenticity and Integrity

It is clearly stated in the 1994 Nara Document that the authenticity of cultural heritage should be considered and judged within the cultural context to which it belongs. For the Balinese, it is not the material aspects of culture which determine the authenticity of their cultural heritage, but the on-going spiritual traditions. Much of Balinese material culture is comprised of degradable materials. Therefore, it is common practice for the Balinese to renew and replace the material aspects of their temples and other structures as the materials become worn and climatological circumstances warrant. Periodically, they will renew deteriorated parts of temples or traditional *subak* irrigation facilities, normally with the same traditionally used materials.

Indeed it is apparent that the intangible aspects of Balinese culture have changed but little in the modern era, despite the encroachments of mass tourism. The Hindu-Balinese cosmology that underlies modern ritual practice is well documented in the royal inscriptions of the ninth to fourteenth centuries.[3] Traditional art forms that are part of the ritual cycle of water temples, such as *wayang* (shadow puppets), *topeng*, *baris*, and *gambuh* (dance) are attested in thousand year old inscriptions.[4] The antiquity and historical continuity of the *subak* system are described by Geertz (1980) and Lansing (2005). External interventions dating from the early years of the colonial era did induce changes in *subak* organization and affected the irrigation facilities. This is evident in the construction of large concrete irrigation works by the government. However, there have been no fundamental changes to the social, religious and ecological aspects of the *subak* system (Lorenzen and Lorenzen, 2005).

[3] The largest collection of inscriptions from this period are translated in Roelof Goris, Prasasti Bali: Inscripties voor Anak Wungcu. (Bandung: N.V. Masa Baru, 1954).
[4] "The Indianization of Bali", Journal of Southeast Asian Studies, Vol. XIV, No. 2:409-421.

CHAPTER FOUR

STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY

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STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY

4.a. Present State of Conservation

4.a.1. Overview

This nomination encompasses two clusters of Balinese *subak*s and the supreme *subak* temple Pura Ulun Danu Batur. Each of the *subak* clusters includes rice terraces, irrigation works, water temples, forests and lakes. All of the *subak*s and water temples are presently functioning. But all the *subak*s are experiencing varying levels of threats to their environmental and economic viability. Here we briefly outline the nature of those threats. Later sections of this chapter provide information about specific vulnerabilities in each of the nominated sites.

The major threats to the *subak*s fall into these categories:

1. Loss of soil fertility and paddy ecology
2. Low income from rice farming
3. Reduction of forest cover and spring flow
4. Commercial development and land conversion

To explain why these problems have developed, it is necessary to provide some background information about changes to the ecology and economics of wet rice farming in Bali since the 1970's. Before that time, traditional farming methods practiced by the *subak*s took advantage of natural ecological processes. Tropical rains leach minerals from the glassy and pumiceous ignimbrite rock, and canal irrigation systems capture the flow from streams, rivers and springs, transporting dissolved minerals directly to the rice paddies. Nutrient-rich volcanic soils combined with microbial nitrogen fixation and traditional harvest methods that left much of the plants in the fields meant that farmers growing traditional slow-maturing rice varieties could escape the need to fertilize their rice paddies. The paddies develop hard bottoms called plough pans that reduce seepage and create pond-like aquatic ecosystems where the loss of nutrients is minimized.[1]

Major changes began in the 1970's with the introduction of the "Green Revolution" in rice agriculture. The Green Revolution replaced native rice varieties with hybrid seeds engineered to grow faster, to produce more grain and to make efficient use of inorganic chemical fertilizers. Dozens of warehouse complexes were built in rural Bali, in order to make hybrid rice seeds and agrochemicals (bundled into "technology packets") available to the farmers on credit. The cost of the technology packets was recouped by deducting it from the farmer's profits when they returned to the warehouses to sell their harvests.

[1] G.E. Wheller, R. Varne, J.D. Foden and M.J. Abbot, "Geochemistry of Quaternary Volcanism in the Sunda-Banda Arc, Indonesia, and Three-component Genesis of Island-Arc Basaltic Magmas", *Journal of Volcanology and Geothermal Research* 32 (1987), 137-160.

The application of inorganic fertilizers to high-yielding hybrid rice varieties increased average grain yield from 1.53 ton in the 1960's to 4.2 ton ha–1 in 2000 (Wiguna 2002:14).[2] But the use of large quantities of inorganic fertilizer had unexpected consequences. Since the 1970's the maximum retail prices of nitrogen, phosphate and potassium fertilizer to Balinese farmers were never more than half the world price. Prices were annually adjusted according to the "farmer formula" (*rumus tani),* a ratio of the price of urea fertilizer to the support price for dry rice paddy (*gabah*). These fertilizer subsidies "constitute a significant financial burden to the government," observes economist Frederick C. Roche (1994:59).[3]

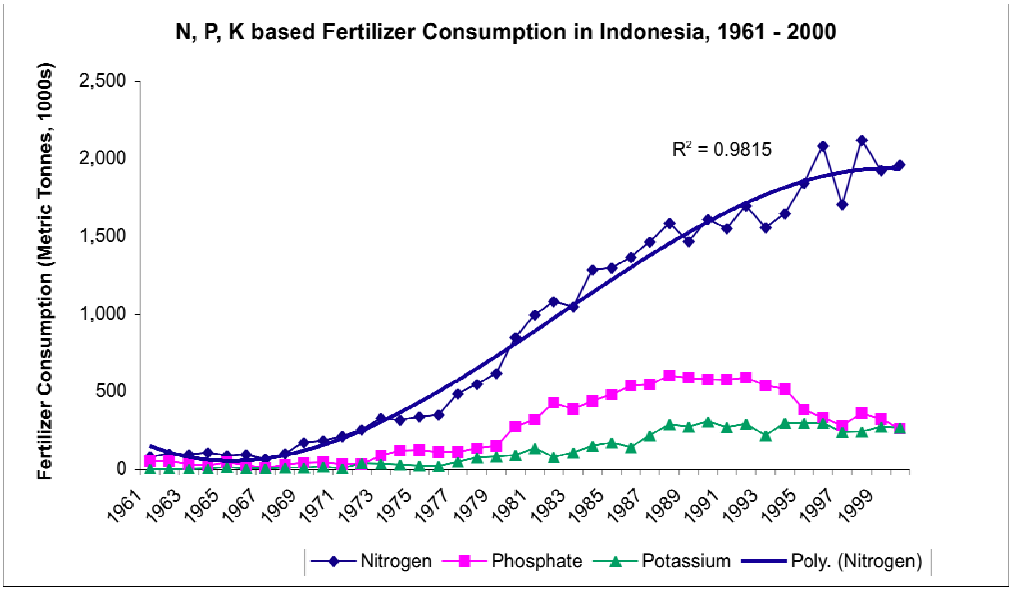

Fig:4.1 Fertilizer consumption in Indonesia, 1961-2000. The rate of growth over the past 15 years was about 16% per annum. Indonesia achieved self-sufficiency in rice in 1984. Since then most of the fertilizer used in Indonesia (72%) has been used for lowland rice, and only 13% for non-rice food crops. Source: Indonesian Ministry of Agriculture.

[2] Wiguna, I.W.A.A. 2002. Kontribusi sisetm usaha tani padi sawah terhadap pengkayaan hara nitrogen, fosfor dan kalium aliran permukaan pada ekosistem *subak* di Bali. Doctoral dissertation, Environmental Sciences, Bogor Technical University, Indonesia.

[3] Frederick C. Roche , "The Technical and Price Efficiency of Fertilizer Use in Irrigated Rice Production", *Bull. Indo. Econ. Stud.* Vol 30 No 1, April 1994, pp. 59-83; James J. Fox, "Managing the Ecology of Rice Production in Indonesia", in Joan Hardjono, ed., Indonesia: Resources, Ecology and Environment. Oxford University Press, 1991:61-84.

In the past two decades, research by ecologists indicates that two hitherto neglected pathways exist for the continuous natural replenishment of phosphate and potassium in rice paddies: the frequent deposition of volcanic ash; and the transportation of leached minerals in irrigation water. Together these effects provide more than enough phosphate and potassium for high yielding rice. The superfluous fertilizer applied by the farmers washes directly into the rivers, where concentrations increase steadily until entering the coastal zone, threatening the coral reefs that encircle the island.[4]

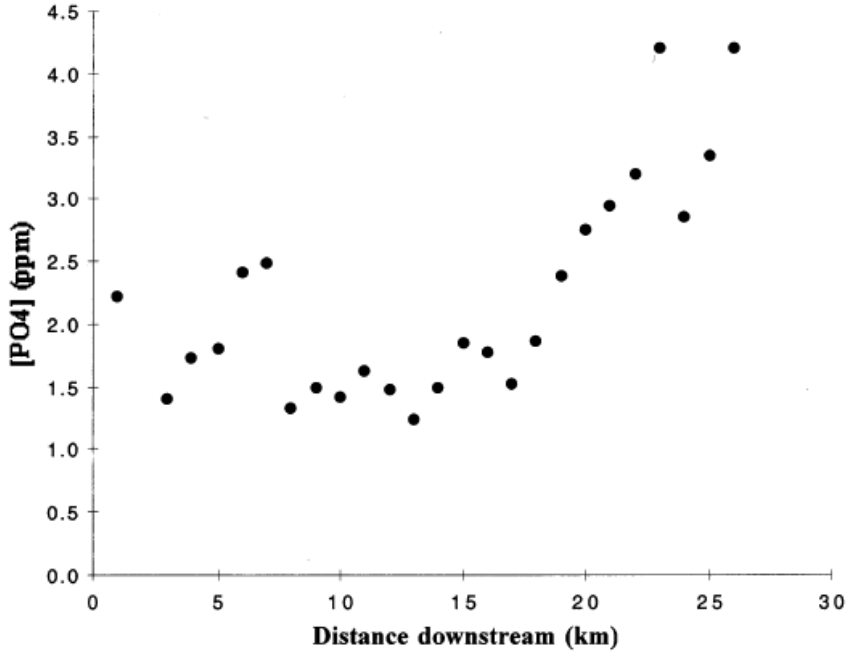

Fig. 4.2: Dissolved reactive phosphate (PO_4) measured in spring and river water showing a pattern of increasing concentration downstream from river headwaters in the Bangli and Gianyar regencies of southeastern Bali, July 1997. Source: Lansing et al. 2001.

A recent study of nitrogen isotopes in the coral reefs identified excess nitrogen fertilizer as responsible for the growth of destructive macroalgae on the reefs:

> *We suggest that the d15N of residual organic nitrogen in long-lived Porites skeletons serves as a historical environmental proxy for water quality by aiding in the identification of past variability in*

[4] Guy S. Marion et al. Coral skeletal [15] reveals isotopic traces of an agricultural revolution. Marine Pollution Bulletin 50:9 (Sept 2005):931-944.

nitrogen provenance. This isotopic tracer of chemical fertilizers in coral skeletons suggests that the intensification of Western style agricultural practices since 1970 are contributing to the degradation of coastal coral reefs in Bali.[5]

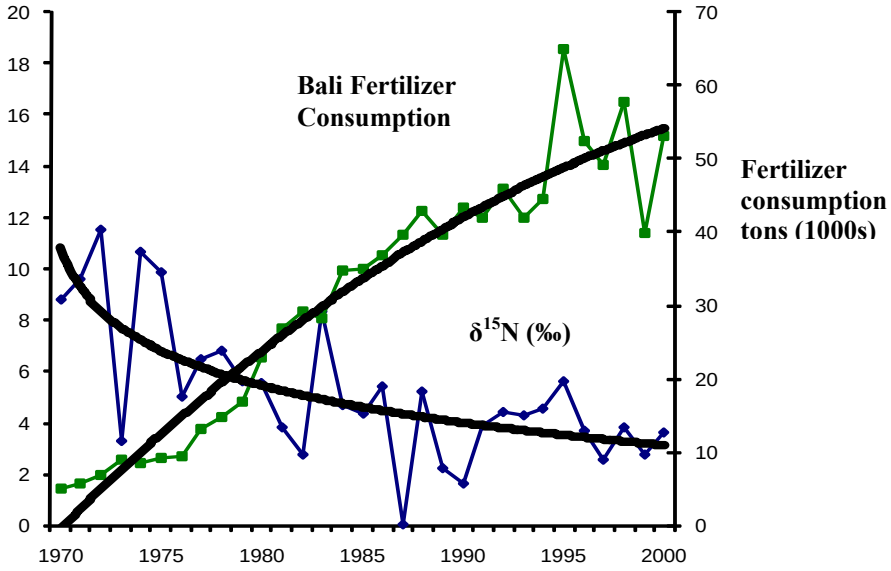

Fig.4.3 Nitrogenous synthetic fertilizer consumption in Bali (metric tons, 1000s) is significantly and inversely correlated (R^2 = 0.40) to the long-term logarithmic decline in the $\delta^{15}N$ of organic matter in the Porites skeleton obtained from a reef in the agricultural drainage near the agricultural area of Amed, east Bali. The decline of the $\delta^{15}N$ is clearly evident, and reflects the increase in fertilizer application.

The over-fertilization of Balinese rice paddies added excess quantities of chemical inputs to an island ecology that had already been damaged by the application of chemical pesticides, as noted in a 1988 World Bank study.[6] The introduction of pesticides bypassed a more effective and relatively cost-free traditional method of pest control based on the control of irrigation flows: by synchronizing irrigation schedules and planting the same rice varieties over large areas, Balinese farmers deliberately induce region-wide fallow periods. The paddies are dried for harvest, left fallow and then flooded for the next planting cycle, depriving most pests (rats,

[5] Guy S. Marion et al. 2005. Coral skeletal d15N reveals isotopic traces of an agricultural revolution. Marine Pollution Bulletin.

[6] Badruddin Machbub, H.F. Ludwig and D. Gunaratnam, "Environmental Impact from Agrochemicals in Bali (Indonesia)"; Environmental Monitoring and Assessment 11 (1988): 1-23.

insects and insect-borne diseases) of their habitat. Computer simulation modeling indicates that this system of region-wide pest control is self-organizing if left unperturbed.[7]

On a time scale of decades, these chemicals induce changes in the physical and biological composition of agricultural soils, leading inexorably to a gradual loss of soil fertility. For Balinese farmers, the high cost of chemical inputs combined with the low market price of Green Revolution rice and the gradual decline in soil fertility all threaten the long-term economic and ecological viability of rice farming.

A second set of issues affecting the present state of conservation of Balinese *subak*s is related to the expansion of the tourist industry. Ironically, the beauty of the Balinese terraced landscape draws increasing numbers of visitors, whose very presence creates hazards to the landscape features that attracts them to Bali. This problem is common to many World Heritage sites, from Venice to the lake district of England. With respect to the cultural landscape of Bali, there are two major drivers of destructive change. The first is the outright sale and conversion of wet rice paddies into buildings connected to the tourist trade. The most scenic roads in Bali are now lined with endless rows of shops selling handicrafts. This creates a “tragedy of the commons” dilemma: as shops proliferate they block the view, and competition increases among vendors selling identical products, leading to declining revenues. Eventually, visitors are no longer attracted to the area.

The second hazard is the loss of forest cover as settlements expand, which is already causing a reduction in the flow of water to rivers and springs. To this is added the pressure to divert water from agriculture for use in tourist hotels and facilities. Most recently, a building boom in tourist “villas” has recently accelerated. These

[7] J. Stephen Lansing and James N. Kremer, “Emergent Properties of Balinese Water Temples”, American Anthropologist 95 (1) [March 1993]:97-114; J. Stephen Lansing, James N. Kremer and Barbara B. Smuts, "System-dependent selection, ecological feedback and the emergence of functional structure in ecosystems", Journal of Theoretical Biology **192** (1998), 377-391.

residences are no longer confined to the traditional areas of tourist development along the coast. Instead, there are plans for large numbers of villas in the upland rice paddies. This creates another "tragedy of the commons" dilemma for the farmers. The sale of farm land to create a few luxury villas or hotels can enrich a few land owners at the expense of the continued viability of the *subak* as a whole. We conclude this brief overview of the present state of conservation of the cultural landscape of *subak*s, by noting that news stories about these problems have recently become a major theme in Bali's newspapers and television news. There is a widespread belief that the cultural landscape of Bali is approaching a tipping point, as emphasized by the Governor of Bali in the newspaper interview quoted in the conclusion to the preceding chapter. We turn now to the state of conservation of the five sites included in this nomination.

4.a.1. State of Conservation

A. Supreme Water Temple Pura Ulun Danu Batur

This temple is renowned throughout Bali for the excellence of its management, which is firmly in the hands of the village of Batur. Architectural features of the temple are continually renewed, thanks to voluntary contributions of funds, materials and labor.

B. Ancient Water Temples and *Subak*s of Tampaksiring

B.1. Pura Tirtha Empul

The character of this site, a bathing pool located in a narrow dale, causes the site to be very damp. The biotic decomposition process in this site is dominated by *moss*. These plants thrive in the pool and fountains because their position is nearest to the water. In the slits between the stones it is very damp and in clean condition, so it is difficult for *pterydophyta* to grow. *Lichens* and *fungi* also grow along the fence where the rock condition is drier.

The site is formed from *andesite* stone and *tuffaceous* stone. The part made from *andesite* stone, is in better condition than the part made from *tuffaceous* stone. On the pool fence made from

tuffaceous stone, the condition deteriorates easily and besides the deterioration process, there is also mechanical defacement because of the rocks' characteristics. Because the fountain and pool fencing are made from *andesite* stone, their condition is better, but on the other hand, the force of the water stream through the small holes in the fountains has eroded some parts of the pool and caused leaks. The water flow has also caused the fence construction of the pool to tilt.

The location of the site on a base dale has the potential for landslides given that the slope steepness is above 45º. The river slope represents lava flow with *andesite* stone. The number of plant with high coronet which grow on the river slope helps to maintain site security.

Handling Percentage	
Complete Handling	**Handling Plan**
1. Restoration of sanctuary reservoir 2. Dry cleaning and manual treatment of the monument 3. Continuous technical monitoring of climate and weather, and their influence on the monument	1. Restoration of the temple, using a donation from former President Megawati Sukarnoputri 2. Stabilization of *pethirtaan* fence 3. Repairing *pethirtaan* wall

B.2. Pura Gunung Kawi (Rock Cut Temple)

The whole condition of this property is well protected by cooperation among the local government, the community and the Archaeological Office for Bali-NTB-NTT Province.

Handling Percentage	
Complete Handling	**Handling Plan**
1. Re-arranging and removing the river stream 2. Turning the river stream to decrease landslide danger 3. Cutting the tree with roots damaging the river slope 4. Strengthening construction of the meditation shelter with a new structure 5. Dry cleaning and manual treatment of the building 6. Continuous environmental cleaning to stabilize site humidity 7. Continuous technical monitoring of the climate and weather and their influence on the building	

Retail shops along the path to the Gunung Kawi Temple

B.3. Pura Mengening

The deterioration process of *Prasada Agung* in *Pura* Mengening includes *moss* growing on the foot of the temple. The salting process and the growth of *lichen* in the slits between the stones on the foot and body of the temple are present. *Fungi* grow on some

antefix on the roof of the temple. Other plants, *pterydophyta* and grass grow in the slits because these areas are damp and very difficult to clean. The condition of the sanctuary reservoir in the *jaba* (outer yard) is very damp because it is located under a big tree and *moss* and *pterydophyta* grow very quickly here.

Mechanical damage process in *Prasada Agung* occurs on the *tuffaceous* stones as part of the deterioration process. Although the land formation condition of the site is stable, the building is located on a steep slope (>45º) and that is a dangerous position.

Handling Percentage	
Complete Handling	**Handling Plan**
1. Restoration of *Prasada Agung* 2. Building a dike in the river 3. Building a pool and fountain to control the river stream 4. Dry cleaning and manual treatment of the monument 5. Continuous environmental cleaning to stabilize site humidity 6. Continuous technical monitoring of the climate and weather and their influence on the monument	

Restoration work in the temple, 1983

B.4. *Subaks* Pulagan, Kumba, Kulub, and Basangambu

These *subak*s are fully intact, functioning social institutions. The rice terraces are in excellent condition, thanks to the continuation of traditional farming methods cultivating native Balinese rice.

C. *Subak*s and Water Temples of Batukaru

Care for the lands within the Catur Lokapala Batukaru site is the historic responsibility of the villages and subaks that lie within this region, bounded by the four temples as described in chapter two. The subaks actively promote conservation and eagerly cooperate with government agencies such as the Forestry and Agriculture departments in conservation measures. For this reason, this landscape is exceptionally well cared for. The local government also protects the Batukaru *subak* irrigation systems by identifying the area as a green belt area and making it illegal to build there. Small repairs which might hinder the rice fields remain the responsibility of *subak* organization members.

Main Road within the Jatiluwih area

Handling Percentage	
Complete Handling	**Handling Plan**
1. Repairing the aqueduct 2. Building a dam and water tunnel 3. Re-arranging the river stream 4. Re-organizing the *subak* organization system	

4.b. Factors Affecting the Property

4.b.1 Development Pressures

A. Supreme Water Temple Pura Ulun Danu Batur

In a 2005 article on "Pura Besakih: A World Heritage Site Contested",[8] Darma Putra and Hitchcock describe the deterioration of the temple that most closely resembles Pura Ulun Danu Batur, namely Pura Besakih, as a result of increasing tourism and ambiguity in responsibility for the protection and management of the site. Clearly, there are major development pressures on these temples because of their attractiveness to the tourist industry. While the temple Pura Ulun Danu Batur is subject to similar pressure from visitors, responsibility for this temple is firmly in the hands of the village of Batur and the governing priests and Elders of the temple (Lansing 2006). World Heritage status for the temple will help to clarify and strengthen this local control, and help sustain the temple in the face of continuing tourist development in Bali. The priests and Elders do not regard current levels of tourism and commercial development in the vicinity as threatening.

Ulun Danu Batur located by the main street in Bangli Regency

[8] Indonesia and the Malay World, Vol. 33, No. 96, July 2005

B. Ancient Water Temples and *Subaks* of Tampaksiring

Busloads of visitors arrive daily at Tirtha Empul and the Gunung Kawi Rock Cut Temple. At Tirtha Empul, a large area adjacent to the parking lot for buses and cars is devoted to retail shops and small restaurants. These are well situated to avoid disturbing the temple and springs. However, development pressures at the Gunung Kawi site have led to the proliferation of small retail stores lining both sides of the path all the way from the parking area to the temples on the valley floor, blocking the view but producing little revenue for the vendors.

These sites are pressured by the building of tourist facilities around the sites. There is a need to publish regulations warning about building near the archaeological sites on the Pakerisan River and affecting the continuity of the sites with their environment. Buffer zones need to be arranged for some sites, for example: Pura Pegulingan. Pura Tirtha Empul, *Pura* Mengening, and Pura Gunung Kawi (Rock Cut Temple).

C. *Subak*s and Water Temples of Batukaru

1. There is development pressure from houses and buildings developed for tourism near the property.

2. There is development pressure on the property as a whole caused by changes in land ownership, changes in the function of the agriculture farm and building construction.

3. There is an electrical cable strung from a pole in the middle of the rice field, disturbing both the view and the security of the property.

4. Restaurants and shops that are beginning to appear in the area diminish the visual integrity of the landscape.

4.b.2 Environmental Pressures

Major environmental threats to the *subak*s, as noted above, are caused by the application of very large quantities of nitrogen and phosphate to the rice paddies. These are common to *subak*s in all areas except some *subak*s in Catur Lokapala Batukaru, where farmers practice organic agriculture.

In addition, there are some environmental issues with regard to the water temples. The microclimate of these regions of Bali is damp with high rainfall; this leads to the development of various harmful organisms such as: *moss, lichen, algae, fungi, pteridophyta* and various types of grass. The areas located near the rivers also have high humidity and dampness.

At the rock cut temple of Gunung Kawi and meditation shelter sites, there are large trees, hundreds of years old, on the slope of the riverbank. Their roots cause the collapse of the riverbank, yet the roots also arrest the erosion of the riverbank wall.

The trees also influence the humidity of the temple building and meditation shelter because their branches and leaves provide shade. The resulting dampness leads to the appearance of plant organisms on the surface of the stone.

4.b.3 Natural Disaster Preparedness

Bali is geographically located in an earthquake zone, an area with volcanic activity and tectonic plate movement. There is also a danger from landslides. Earthquake disasters in 1917 and 1972 affected some structures, but they remain in stable condition. Pura Ulun Danu is vulnerable to earthquakes or volcanic eruptions from the nearby caldera of Mount Batur, an active volcano. Some temples are located on a sharply sloping riverbanks with the possibility of landslides, for example: Pura Mengening, and the Pura Gunung Kawi. With regard to the *subak*s, there is the possibility of natural disasters, such as floods and landslides, if the dams, tunnels and protected forests are not taken care of properly.

Condition of Tirtha Empul after earthquake disaster, 1972

4.b.4 Visitor Pressure

In an interview on 6/9/2008 for the newspaper Business Bali, the head of the Bali Tourism Board (BTB) observed that ""What's most pressing is the repair of tourism sites not the building of villas and hotels." BTB statistics show that in 2007 some 4.7 million tourist visitors came to Bali, composed of 3 million domestic visitors and 1.7 million foreign visitors. "The repair of tourism sites must become a priority," Wijaya warned.

Visitors in the area of Tampaksiring, which includes two of the most visited sites within this region Pura Tirtha Empul and Pura Gunung Kawi have registered more than 63,000 domestic visitors and 60,000 foreign visitors during 2004.

Large groups of visitors in Pura Tirtha Empul

The region of Batukaru is threatened by rapid expansion as a new tourism development area with specific threats to existing conservation zones, such as construction of new villas and exploitation of water resources for tourist development. Already, 25 hectares of land within the so called ¨Green Belt" has been sold for the proposed development of up to 250 villas on rice paddy terraces (Traditional World Healing World Centre, Jl. Raya Seminyak 504 Kuta-Bali, March 2006). Approximately 2,500 visitors per month enter the Batukaru area to see the famed rice terraces. In addition, 1,500 people per month visit the hot springs and temple complex of Pura Batu Panas in Mengesta.

4.b.5 Inhabitant Pressure

The steady growth of Bali's population creates continuous pressure on the rice terraces, *subak*s and forests. Forests are subject to unplanned exploitation. The conversion of *sawah* to other uses leads to the fragmentation of the paddy ecosystem, which can render

governance by *subak*s difficult or impossible. In the major urban areas of south Bali, some water temples stand empty, surrounded not by rice fields but by commercial development. Altogether, it is clear that the continuity of the properties requires long-term planning.

CHAPTER FIVE

PROTECTION AND MANAGEMENT OF THE PROPERTY

CHAPTER FIVE

PROTECTION AND MANAGEMENT OF THE PROPERTY

5.a.1 Introduction

The *subaks* of Bali are well known to social scientists as one the most ancient and successful examples of the adaptive, democratic management of irrigation and agro-ecology. However, as described in previous chapters, the *subaks* now face formidable obstacles to their continued existence. Loss of soil fertility, declining revenues from rice farming, the conversion of rice terraces to other uses, reduction in forest cover and in irrigation flows have all contributed to a crisis of unparalleled scope. This crisis threatens not only the survival of the *subaks* as the primary traditional institution involved in the management of the Balinese landscape, but the celebrated terraced landscape of Bali, which draws over a million visitors to the island each year. The need for new approaches to support the *subaks* has recently become a major topic in Bali's newspapers, radio, and television.

The key issue is how to adapt the existing framework of *subak* and governmental institutions to enable the *subaks* to flourish now as in the past. To that end, a management plan has been developed, based on principles of adaptive co-management by diverse stakeholders of a complex socio-ecological landscape (Folke et al., 2002a, 2005; Berkes and Folke, 1998; Adger, 2006). This system of adaptive governance will connect individuals, organizations, agencies, and institutions at multiple organizational levels (Young, 2002; Pretty, 2003; Galaz, 2005; Hahn et al., 2006). By strengthening the control of the *subaks* over their local environments, the survival of several important clusters of *subaks* and water temples will be assured. In addition, the programs developed for these World Heritage sites will provide models for emulation in neighboring communities. In this way, the value of the World Heritage program in Bali may extend beyond the core areas of the project.

Balinese *subaks* manage irrigation water as a common or shared resource, and also share responsibility for the performance of water temple rituals that are intended to promote the fertility and productivity of their terraced fields. But as the profitability of farming and the fertility of the soil decline, there is increasing temptation to convert the land to other uses; "planting concrete" instead of crops,

as the Balinese saying goes. The protection and management plan for the World Heritage sites is designed to tip the balance back in favor of continued cooperative rice farming. In broad terms, the principal planned outcomes of the management plan are:

1. Establishment of legal, institutional, and administrative structures to coordinate the adaptive co-management of the site among inter-sectoral policy makers and diverse stakeholders. These policies and structures will guarantee that *subaks* and water temple congregrations will retain control of their own institutions and resources. This point needs to be made clear because prior discussions of World Heritage status for Balinese sites led to confusion and mis-information on this issue (Darma Putra and Hitchcock, 2005).

2. Comprehensive and participatory assessment of the social and ecological components of the property, involving the broad spectrum of stakeholders and resource users, and with due regard for the full range of essential ecosystem services. Assessments will consider the vulnerability and response capacities of local communities to potential internal or external threats (e.g. climate change consequences, land use change due to economic development) (Wisner et al., 2004; Folke et al., 2005; Adger, 2006).

3. Participatory planning and design of master plans for each of three individual sites within the broader cluster of World Heritage properties. This includes land-use conservation strategies in the relevant core and buffer areas, in consultation with stakeholders across scales (local communities, governmental agencies, international organization, etc). (Young, 2002; Pretty, 2003; Galaz, 2005; Hahn et al., 2006).

4. Implementation of activities to support Strategic Priorities for comprehensive and effective social-ecological conservation and livelihood enhancement within the proposed World Heritage site. Strategic priorities for implementation are:
    - Livelihood protection and enhancement
    - Conservation and promotion of ecosystem services
    - Conservation of material culture
    - Appropriate tourism development
    - Infrastructure and facility development

These proposed activities include effective and comprehensive support for a return to organic farming of native Balinese rice for all participating *subaks*. This will help reduce costs and increase revenues from farming, reverse the decline in soil fertility, and reduce environmental pollution. The model for this phase of the project is the ongoing successful return to organic farming in the Batukaru region in the *Somya Pertiwi* projects described above in Chapter 2.

The plan also proposes, among other activities, a land tax subsidy for rice paddy land; support for health care services and education for participating communities; assistance to communities that rely on and maintain forested areas, particularly for sustainable non-timber forest production; enforcement of restrictions on deep well construction; incentives to *subaks* and local communities to restore and maintain traditional architecture; and development of facilities and interpretation to enhance the experience of visitors to the proposed World Heritage site.

5. Establishment of a research and reporting system for coherent and integrated monitoring and evaluation to ensure implementation that is sensitive to social and ecological feedback (Young, 2002; Dietz et al., 2003 ; Hahn et al., 2006).
6. Capacity building for adaptive co-management of Bali's complex social-ecological system, among diverse stakeholders.
7. Identification of serial sites to extend the conservation and livelihood objectives of the Cultural Landscape of Bali Province to other rice terraces and water temple networks in Bali that are currently threatened by development pressure.

In November 2008, the Governor of Bali met with the Director General of Antiquities and agreed to pursue these goals and incentives in support of the World Heritage process. In particular, he urged the Coordinating Committee for the Nomination Dossier to begin implementation immediately in 2009, while the nomination to UNESCO is still being reviewed.

5.a.2 Legal, Institutional, and Administrative Policies and Structures

Presently, the government of the Republic of Indonesia restricts the activities of each Ministry or government department to its respective mandate. Coherent management of Bali's complex social and ecological landscape requires

expertise and effective collaboration from multiple government offices and departments, as well as traditional *subak* and community management institutions. Thus, the new structure establishes a cross-sectoral coordinating body, with clear budgetary and reporting lines.

The legal framework for the management and coordination of the World Heritage Cultural Landscape of Bali is established by Provincial Decree in the Agreement between the Government of Bali Province and Regencies of Bali for the Establishment of the Strategic Area of Bali Province. This Agreement legally codifies conservation and spatial planning for the proposed World Heritage sites named above, including tangible and intangible heritage and agricultural and forest ecosystems within the site boundaries. The Provincial Decree is based on National Law No. 26/2007, and National Government Decree No. 26/2008, concerning spatial planning and the establishment of National Strategic Areas for conservation of critical cultural landscapes.

The management of the property will be coordinated by a newly established Coordinating Board, which links together government and non-government entities at the national, provincial, and local levels (Figure 5.1). The Governor of Bali appoints the head of the Board and all members. Board members represent each of the relevant Government departments: Culture and Tourism, Agriculture, Forestry, Environment, and Public Works. The Coordinating Board will be housed within the leading sector, the Department of Culture and Tourism at the provincial level. The Department has already allocated office space and administrative support to manage the day-to-day coordination of the property. The Department of History and Archaeology, Bali Province, will have a lead advisory role.

Figure 5.1. Coordinating Structure for Cultural Landscape of Bali Province

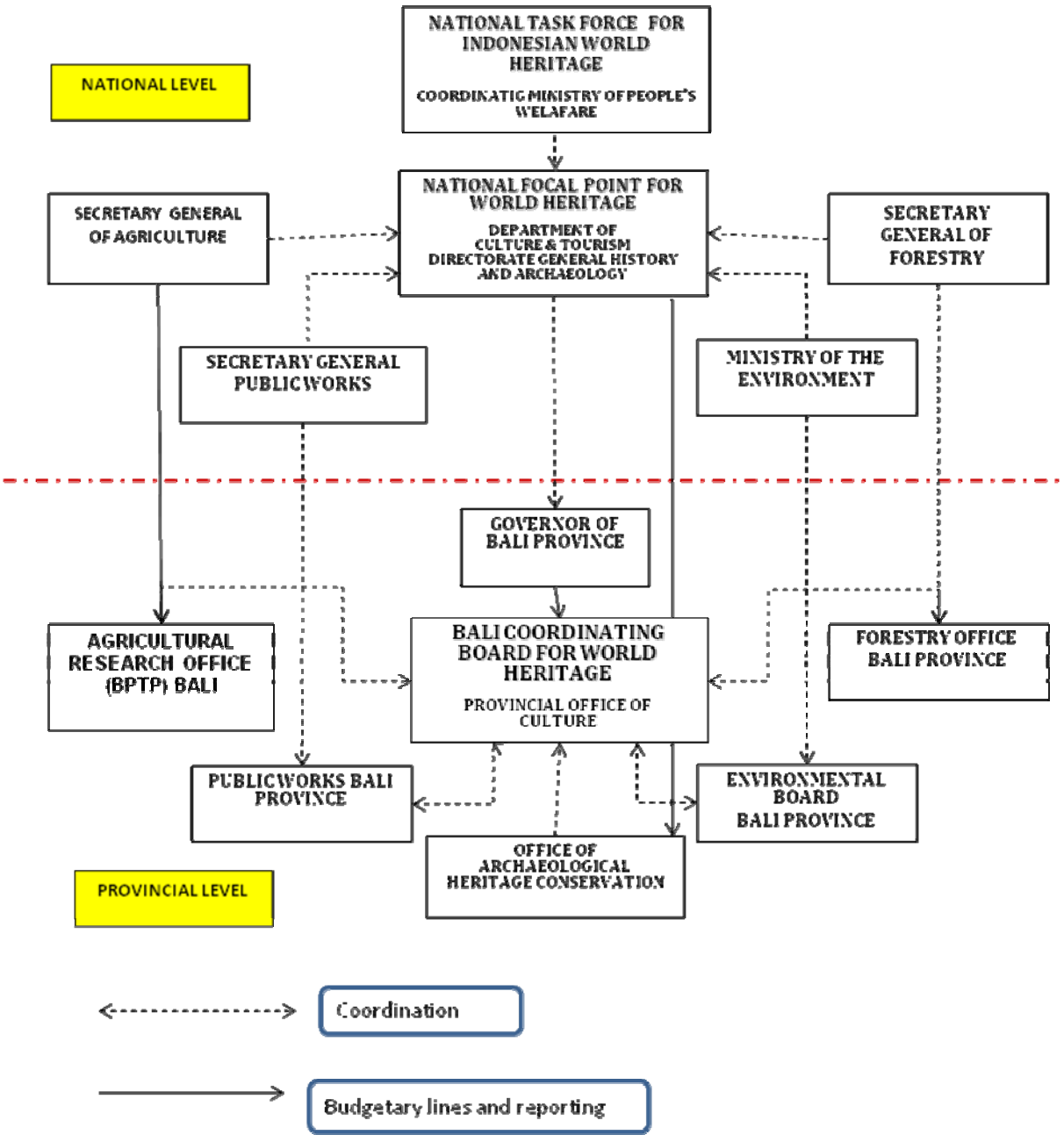

Figure 5.1 Shows the organizational structure for coordinating the Cultural Landscape Program. The National Coordinating Board for World Heritage, housed as an independent institution within the Department of Culture and Tourism, will liaise directly with the Coordinating Board at the provincial level. There is a parallel structure among the relevant ministries and departments at the national and provincial levels. This ensures that each government agency involved in implementing the project can dedicate the staff and resources necessary for the multi-sectoral management of the Cultural Landscape program.

The Coordinating Board will facilitate coordination among relevant departments so that the goals of adaptive ecosystem governance can be realized. The structure of the Board clearly situates responsibility for the management of the World Heritage program in a well-defined organization, which is entrusted with implementation and monitoring and evaluation. Futher, the internal structure of the Coordinating Board explicitly integrates participation from a broad forum of stakeholders, representing government institutions, *subak* and community organizations, and academic and research institutes (*Figure* 5.2). It is anticipated that external collaborators such as the Stockholm Resilience Center will provide technical assistance. The Center, a premier institution for environmental research and adaptive governance of social-ecological systems at Stockholm University, will support research, capacity building, and policy development (per MOU Stockholm Resilience Center-Ministry of Culture and Tourism, Republic of Indonesia). *Subak*s and local communities will retain responsibility for the day-to-day site maintenance and conservation, based on existing institutional and legal structures of *subak awig-awig* and customary *adat* law. The Board will ensure effective communication among the local communities and *subak*s, government agencies and other stakeholders. It will also be responsible for implementing the principal project components outlined in this plan.

Figure 5.2. Cultural Landscape of Bali Province Coordinating Board Structure

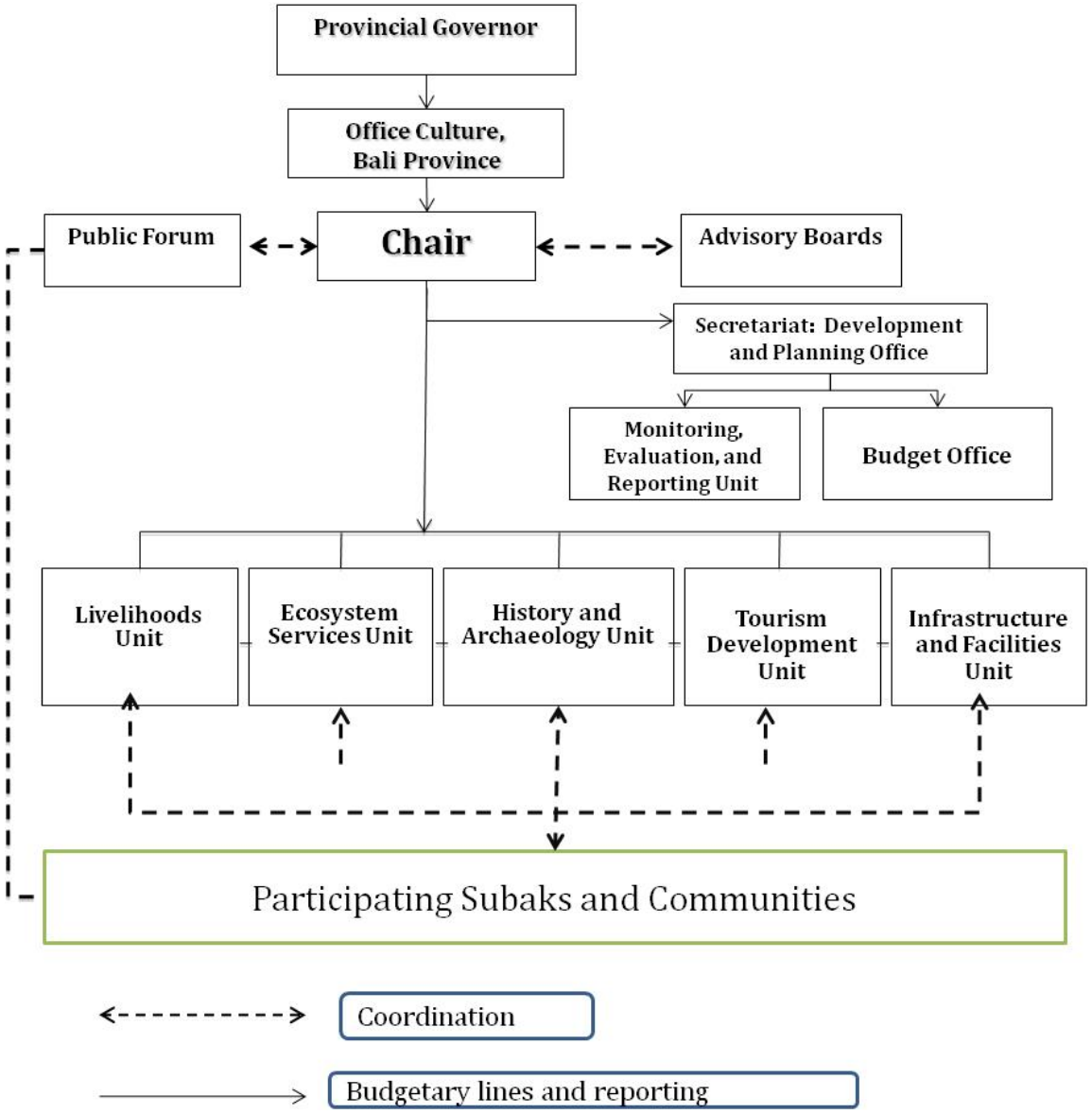

Figure 5.2 presents the internal structure of the Coordinating Board for Bali Province. The Board will be appointed by the Governor and housed in the Ministry of Culture. The Chair of the Board will organize three working units that will be responsible for implementing the activities presented in detail in the attached Management Plan: livelihoods, ecosystem services, history and archaeology, tourism, and infrastructure and facilities. These units will draw on the expertise of their home department or ministry (see Figure 5.1). The structure of the Board will facilitate close communication and collaboration among the units in light of the interrelated nature of the Cultural Landscape initiative. To enhance the communication and decision-making role of participating *subak*s and communities, the Chair will establish a Public Forum with representatives from each site. Advisory Boards from Bali's Udayana University and the Stockholm Resilience Center will provide expert advice on community-based research and development, social-ecological resilience, and adaptive governance.

5.a.3 Ongoing Participatory Site Mapping

Bali's Departments of Agriculture (BPTP) and Culture, the Regional Planning Board (*Bappeda*), and the Office of Archaeological Heritage Conservation at the provincial and national levels, have initiated compilation of detailed site maps, in consultation with *subak*s and local community leaders. These maps will supplement and enhance those included in this nomination dossier, which were prepared by the Indonesian National Survey and Mapping Agency, BAKOSURTANAL. Participatory mapping as a management tool will be extended in the future in two ways. First, the Coordinating Board will consult with *subak*s, community leaders, and government authorities to review appropriate zoning laws for each site, refining the delineation of core and buffer zones. (A core zone is a minimum protection area needed to guarantee the protection of the site. A buffer zone is a reserved area around each site, which gives an additional layer of protection to the property). The buffer zone is established to anticipate possible changes due to future development so that the original setting of each site is maintained and that potential changes do not intrude upon the enjoyment of the cultural landscape. The designation of core and buffer zones will be refined to the greatest extent possible following existing conservation and development regulations at each site, to ensure the maximum level of protection in core and buffer zones, and allow for sustainable livelihood development that respects traditional land use practices and architectural design. The Provincial Decree of 2008 establishes the legal basis for conservation zoning of Bali's proposed World Heritage landscape, including rice terraces, forests, and lake regions. For temple monuments, the designation of core and buffer zones will be based on National Law No.5/1992 concerning The Conservation of Cultural Property. The process of delineating and mapping core and buffer zones will continue to draw on the experience of similar processes at other World Heritage properties in Indonesia (e.g., Borobudur and Prambanan).

Second, an appropriate legal statutory framework will be developed for the core and buffer zones for better management and enforcement of the property. Such legal status and regulations implemented within the zones will be determined through consultative discussions involving property owners, *subak* representatives, community leaders, local foundations, government agencies, and the Coordinating Board of the Cultural Landscape Bali Province.

5.a.4 Comprehensive and Participatory Assessment

Sustainable resource management depends on a process of learning and adaptation. A core component of successful adaptive management is integrated social-ecological assessment. Such assessment involves participation from the broad spectrum of stakeholders and resource users and considers the full range of essential ecosystem services. Management of the Bali World Heritage property will be built upon a foundation of comprehensive and participatory assessment. Preparation of the nomination dossier and this plan has involved numerous consultative meetings with government and non-government stakeholders, including *subak* and community representatives.

Figure 5.3. Cultural Landscape of Bali Adaptive Management Framework

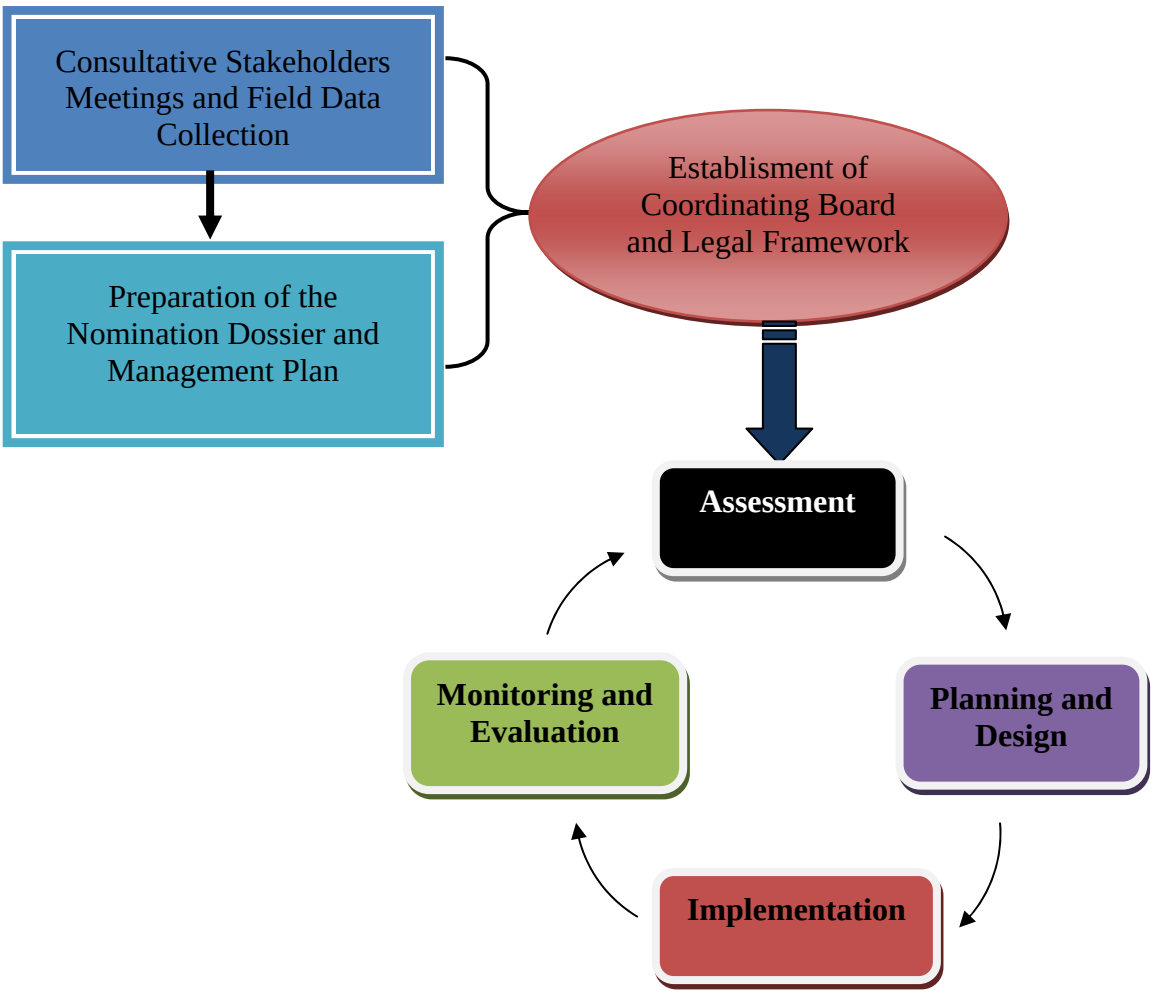

Figure 5.3 displays the iterative phases of program implementation presented in Chapter Four. Establishing the Coordinating Board as an adaptive institution and the necessary legal framework for social and ecological protection and enhancement are central to the success of the initiative. The Coordinating Board will draw on the nomination document and management plan to guide an ongoing process of comprehensive and participatory assessment (see section 4.2 of the attached Management Plan); participatory planning and design of activities (section 4.3); implementation of those activities (section 4.4); and establish a monitoring and evaluation system to assess and utilize social and ecological feedbacks (section 4.5 of the attached Management Plan).

The Coordinating Board for the Bali World Heritage sites will extend this consultative approach to comprehensive and systematic assessments of livelihood status, vulnerability to social and environmental threats, coping and management capacities, and the state of the environment across target areas. These assessments will be linked to a participatory planning process at each site, as well as the design, implementation and ongoing monitoring and evaluation of

specific activities at each site (Figure 5.3). In designing and implementing the assessments, the Board will draw on best practices in adaptive governance assessment methodologies, in consultation with relevant experts from the Stockholm Resilience Center.

5.a.5 Participatory Planning and Design

A participatory planning approach will be implemented to support the strategic priorities (described in detail below) and achieve an integrated approach to managing the three proposed sites as a cluster. Findings from integrated assessments will provide a foundation for this on-going process. Planning and design will involve the broad range of stakeholders as well as experience and ideas from other adaptive governance processes. Importantly, it will respect and strengthen existing *subak* and community planning processes. It will also ensure coherent harmonization of conservation and livelihood enhancement initiatives at various levels of government authority. The principal outputs from this process will be (1) individual site management plans (Master Plans) that feed into and reflect the cluster-wide policies and strategies and (2) annual work plans to guide day-to-day site management. Plans will reflect the strategic priorities and capacities at each site, to promote social-ecological resilience. To navigate the complexities of the social and ecological systems and facilitate an adaptive management approach, the planning process must be flexible and responsive to institutional learning and contextual changes. In this way, the planning and design process will be closely linked with policy priorities and feedbacks from the monitoring and evaluation system.[1]

5.a.6 Strategic Priorities for Implementation

Managing the World Heritage site will require implementation at two principal levels. First, the Coordinating Board in Bali will be responsible for implementing the policy and institutional components discussed in this chapter. These components establish a solid legal framework, organizational structure, and programmatic elements for effective and integrated World Heritage site

[1] Thomas Elmqvist et al. (2003). Response diversity, ecosystem change, and resilience. *Front Ecol Environ* 1(9): 488–494; Carl Folke et al. (2005). Adaptive governance of socio-ecological systems. *Annual Review of Environmental Resources* 30:441–73.

management. Second, the Board will oversee implementation of activities within each strategic priority area presented in Chapter 5 of the attached management plan. These activities are proposed to strengthen the capacity of *subak*s as the primary institution involved in the management of the rice terraces and guardians of ecosystem services and the temple hierarchy. While the specific activities and means of implementation will vary at each of the three individual sites (per participatory planning processes discussed above), key strategic priorities for the cluster of sites are:

1. Livelihood protection and enhancement
2. Conservation and promotion of ecosystem services
3. Conservation of material culture
4. Appropriate tourism development
5. Infrastructure and facility development

The composition of the Coordinating Board reflects the collective expertise necessary to implement activities in each of these programmatic areas. However, these areas are inextricably linked and successful implementation will require multi-sectoral partnership, guided by the Board in collaboration with respective government agencies and local communities. Selection and implementation of specific activities at each site will strengthen *subak*s and existing management schemes to promote resilient social and ecological systems.

5.a.7 Adaptive Monitoring and Evaluation System

Effective co-management of Bali's proposed World Heritage property requires a consistent and comprehensive flow of information that can be readily synthesized and utilized—for both the short-term implementation of the program and for longer term planning. The Monitoring, Evaluation, and Reporting Unit housed within Bali's proposed World Heritage Coordinating Board will work with the Governor's appointed Chair of the Coordinating Board to design a dynamic and adaptive monitoring system to collect and manage data on social and ecological variables, as well as contextual changes that potentially affect the conservation and enhancement of the World Heritage site. The system will include baseline data on key social and ecological indicators, and the state of conservation of the World Heritage properties. Baseline data on livelihoods, *subak* institutional

capacity, and environmental factors such as soil and water quality and environmental change have been collected to varying degrees in Batukaru and Tampaksiring areas (2006-2008). This baseline data will be reviewed to identify core indicators of sustainability and identify current knowledge gaps. Data will be collected to fill these gaps and the baseline study extended to any future serial sites such as Pura Taman Ayun.

The system will also include a participatory monitoring component involving *subak*s and other stakeholders. It will be important to monitor and report on regular program outputs (i.e., the provision of goods and services such as distribution of organic fertilizer and training in organic farming). Periodic evaluations will be conducted to assess the overall social and ecological impacts of the program, against baseline data.

Because the property includes a diverse cluster of sites, each with different attributes, it will be necessary to establish a small set of core social-ecological variables for overall program monitoring. Output level indicators will be tailored to each individual site, to monitor the site-specific activities. The system will be closely linked to the participatory planning process and implementation of specific activities at each of the three sites in the proposed cluster. To develop a system that effectively integrates and responds to social and ecological feedback, the Coordinating Board and the Monitoring, Evaluation, and Reporting Unit may seek guidance from the Stockholm Resilience Center. In addition, the official State Party may request expert advice from the World Heritage Advisory Bodies and the Secretariat. Periodic reports will be submitted to the UNESCO World Heritage Centre.

5.a.8 Capacity Building for Adaptive Co-Management of Complex Social-Ecological Systems

Effective and adaptive management of the proposed World Heritage Cultural Landscape of Bali will require the ability to observe and interpret social and ecosystem dynamics and develop the social capacity to respond to feedback and change.[2] The Coordinating Board endeavors to function as a learning institution,

[2] See Folke, C. et al. (2005) Adaptive Governance of Social-Ecological Systems. *Annual Review of Environmental Resources* 30:441-73.

with the capacity to mobilize, synthesize, and make decisions based on different knowledge and operational systems, ranging from the traditional management systems of the *subak* to recent and successful work by Bali's Department of Agriculture to promote organic rice farming and monitor the social and ecological outcomes of these efforts. This requires fostering a dynamic learning environment that recognizes policy decisions and implementation of World Heritage programs are "ongoing learning experiments" that will be monitored, evaluated, and adapted over time.[3]

Developing the knowledge, skills, and expertise to adaptively co-manage Bali's World Heritage property as a complex and dynamic social-ecological landscape is a critical priority of the Coordinating Board. Already, the Department of History and Archaeology, through the Ministry of Culture and Tourism, plans to submit a proposal to the UNESCO International Assistance Program under the World Heritage Fund for training in adaptive social-ecological management of Indonesia's World Heritage sites. This proposal has been developed in collaboration with institutional partners in Bali and the Stockholm Resilience Center as a first step in an ongoing initiative to develop expertise in adaptive, sustainable management of the unique social and ecological systems in Bali and elsewhere in Indonesia. It is proposed that the Stockholm Resilience Center, the premier research institute in ecosystem management and adaptive governance, will join regional World Heritage program staff for training in conceptual approaches and management practices at field sites in Bali. The Coordinating Board will also seek training and capacity building in management of World Heritage properties, including risk management, climate change, and site conservation from relevant agencies, such as International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM). It is envisaged that Bali's World Heritage site can become a learning center in adaptive co-management for the Indo-Pacific region.

[3] Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.

5.a.9 Identification of Serial Sites to Extend Ecosystem Conservation and Livelihood Objective

The selection of sites proposed for inscription as the Cultural Landscape of Bali World Heritage Sites is based on their representative outstanding universal value. There are, however, hundreds of functioning *subak*s in Bali that display the social, spiritual, and ecological characteristics described in the nomination dossier. Throughout Bali, the *subak*s face imminent threats from the rapid pace of tourism development, urbanization, and ecological deterioration. Presently, it is not possible to provide the institutional support and resources necessary to effectively manage such a vast island-wide cluster. Thus, the sites proposed for inscription as a World Heritage property in 2009 are also those with a history of consultation with *subak*s, local communities, and government authorities at the district level. This long-term engagement of local communities and government officials has developed social networks among stakeholders that are essential for successful adaptive co-management of the cluster of sites. The parties involved in the preparation of Bali's World Heritage nomination have a strong commitment to extending the initial World Heritage property to include other threatened *subak*s, water temple hierarchies, and corresponding forests and terraced landscapes as serial nominations.

Preliminary work toward future inscription of the *subak*s and water temples of the temple of Taman Ayun and *subak* Batan Badung have already been undertaken, as described in detail in chapter two. The ongoing process in Taman Ayun and in other important cultural landscapes in Bali will build on the lessons of consultative engagement and the experience of the Coordinating Board, *subak*s, and other stakeholders in management of the initial property.

5.b.1 Ownership

No	Name of Property	Core Zone		Buffer Zone	
		Land	Building	Land	Building
1.	Supreme Water Temple *Pura* Ulun Danu Batur	Customary community of Batur	Community of Bali	*Desa Adat* Batur	Customary community of Batur
Ancient water temples Tampaksiring					
2.	Pura Pegulingan	*Desa Adat* Basangambu	OAHC, *Desa Adat* Basangambu	*Desa Adat* Basangambu	Tourism Agency of Gianyar Regency
3.	Pura Tirtha Empul	*Desa Adat* Manukaya, OAHC	OAHC, *Desa Adat* of Manukaya, Water Management of Gianyar Regency, Tourism Agency of Gianyar Regency	Tampaksiring State Palace, *Desa Adat* of Manukaya, Private owner	Tourism Agency of Gianyar Regency
4.	Pura Mengening	*Desa Adat* Saraseda, OAHC	OAHC, *Desa Adat* of Saraseda	*Desa Adat* Saraseda, private owner	Private owners
5.	Pura Gunung Kawi (Rock Cut Temple)	*Desa Adat* Penaka, OAHC, Private owner	OAHC, *Desa Adat* Penaka, Tourism Agency of Gianyar Regency	*Desa Adat* Penaka, private owners	Private owners Tourism Agency of Gianyar Regency
Water Temples in Batukaru					
6.	Pura Luhur Batukaru	Customary community of Wangaya Gede	Community of Bali	State, community of Bali	Community of Bali
7.	Pura Luhur Pucak Petali	Customary community of Utu	Community of Bali	*Desa Adat* Yutu	Customary community of Utu
8.	Pura Luhur Besikalung	Customary community of Babahan	Community of Bali	*Desa Adat* Babahan	Customary community of Utu
9.	Pura Luhur Muncaksari	Customary community of Sangketan	Community of Bali	*Desa Adat* Sangketan	Customary community of Sangketan
10.	Pura Luhur Tamba Waras	Customary community of Sangketan	Community of Bali	*Desa Adat* Sangketan	Customary community of Sangketan
Pura Taman Ayun (Royal Water Temple)					
11.	Pura Taman Ayun	*Puri Agung* Mengwi	*Puri* Agung Mengwi	*Desa Adat* Mengwi	Customary community of Mengwi

No	Name of Property	Conservation Zone	
		Land	Building
Subaks of Tampaksiring			
1.	Basangambu	*Desa Adat* Tampaksiring	Customary community of Tampaksiring
2.	Pulagan	*Desa Adat* Tampaksiring	Customary community of Tampaksiring
3.	Kumba	*Desa Adat* Tampaksiring	Customary community of Tampaksiring

4.	Kulub	*Desa Adat* Tampaksiring	Customary community of Tampaksiring
Subaks of Batukaru			
1.	Jatiluwih	Desa Adat Jatiluwih	Customary community of Jatiluwih
2.	Gunung Sari	*Desa Adat* Gunung Sari	Customary community of Gunung Sari
3.	Umadui	*Desa Adat* Babahan	Customary community of Babahan
4.	Kedamaian	*Desa Adat* Utu	Customary community of Utu
5.	Kesambi	*Desa Adat* Kesambi	Customary community of Kesambi
6.	Soka	*Desa Adat* Soka	Customary community of Soka
7.	Gelaga Tabal	*Desa Adat* Wangaya Gede	Customary community of Wangaya Gede
8.	Wangaya Betan	*Desa Adat* Mangesta	Customary community of Mangesta
9.	Peselatan	*Desa Adat* Mangesta	Customary community of Mangesta
10.	Piling	*Desa Adat* Piling	Customary community of Piling
11.	Telaga	*Desa Adat* Telaga	Customary community of Telaga
12.	Puring	*Desa Adat* Puring	Customary community of Puring
13.	Anyar	*Desa Adat* Anyar	Customary community of Anyar
14.	Babakan	*Desa Adat* Babakan	Customary community of Babakan
15.	Klembang	*Desa Adat* Klembang	Customary community of Klembang
16.	Pesagi	*Desa Adat* Pesagi	Customary community of Pesagi
17.	Kuwum Keladi	*Desa Adat* Kuwum Keladi	Customary community of Kuwum Keladi
18.	Puluk-puluk	*Desa Adat* Puluk-puluk	Customary community of Puluk-puluk
19.	Deman	*Desa Adat* Deman	Customary community of Deman
20.	Puakan	*Desa Adat* Puakan	Customary community of Puakan
21.	Rejasa	*Desa Adat* Rejasa	Customary community of Rejasa
22.	Tegal Linggah	*Desa Adat* Tegal Linggah	Customary community of Tegal Linggah
23.	Darma	*Desa Adat* Darma	Customary community of Darma
24.	Buruan	*Desa Adat* Buruan	Customary community of Buruan
25.	Poh Gending	*Desa Adat* Poh Gending	Customary community of Poh Gending
26.	Lebah	*Desa Adat* Lebah	Customary community of Lebah
27.	Merta Sari	*Desa Adat* Merta Sari	Customary community of Merta Sari
28.	Pangkung Petung	*Desa Adat* Pangkung Petung	Customary community of Pangkung Petung
29.	Pal	*Desa Adat* Pal	Customary community of Pal
30.	Sandan Amplas	*Desa Adat* Sandan Amplas	Customary community of Sandan Amplas
31.	Baru	*Desa Adat* Baru	Customary community of Baru
Subak of Mengwi			
32.	Batan Badung	*Desa Adat* Mengwi	Customary community of Mengwi

Notes : *Desa Adat* : Customary village
Puri Agung : Royal Palace
OAHC : Office for Archaeological Heritage Conservation in Gianyar

5.b. 2 Protective Designation

Legal statuses of the properties established by government regulation and traditional custom, as follows:

No	Name of Property	Legal Status	
		Custom	Government
1.	Pura Ulun Danu Batur	Pura Kahyangan Jagat	2/14-06/b/3
2.	Pura Pegulingan	Pura Kahyangan Jagat	No: 131/M/1995
3.	Pura Tirtha Empul	Pura Kahyangan Jagat	2/14-04/TB/105b
4.	Pura Mengening	Pura Kahyangan Jagat	No: 131/M/1995
5.	Pura Gunung Kawi (Rock Cut Temple)	Pura Kahyangan Jagat	2/14-04/TB/15
6.	Pura Luhur Batukaru	Pura Kahyangan Jagat	2/14-02/B/8
7.	Pura Luhur Pucak Petali	Pura Kahyangan Desa/Subak	In process
8.	Pura Luhur Besikalung	Pura Kahyangan Desa/Subak	In process
9.	Pura Luhur Muncaksari	Pura Kahyangan Desa/Subak	In process
10.	Pura Luhur Tamba Waras	Pura Kahyangan Desa/Subak	In process
11.	Pura Taman Ayun	Royal Family of Mengwi	2/14-03/TB/4
12.	*Subaks*	Member of *Subak* organization	Regulation of the Government of Bali No. 02/DPRD/1972

5.c.1 Means of Implementing Protective Measures

The legal framework for the management of the World Heritage property is established by Provincial Decree of 2008 for conservation and spatial planning for the proposed sites named above. The Provincial Decree is based on National Law No. 26/2007, and National Government Decree No. 26/2008, concerning spatial planning and the establishment of National Strategic Areas for conservation of critical cultural landscapes. The legal framework and management plan demonstrate a strong commitment among stakeholders at the national, provincial, and regency levels to ensure the conservation and enhancement of the nominated sites. Measures for legal protection, conservation,

and management of the properties include traditional custom, local, provincial, and central government. These include:

1. The Republic of Indonesia Act No.5 of 1992, concerning Cultural Properties.
2. The Republic of Indonesia Government Regulation No. 10 of 1993, concerning Implementation of the Republic of Indonesia Act No.5 of 1992 (see above).
3. Decree of Ministry of Education and Culture of the Republic of Indonesia No. 087/P/1993, concerning Registration of Cultural Properties, which includes regulation on:
   (a) the collection of data concerning culture heritage properties owned by private
   (b) obligation for heritage owner to take measures on conservation and management of cultural properties owned
4. Decree of Ministry of Education and Culture of the Republic of Indonesia No. 062/P/1995, concerning Ownership, Authority, Removal, and Eliminate Status of Cultural Properties.
5. Decree of Ministry of Education and Culture of the Republic of Indonesia No. 063/P/1995, concerning Protection and Conservation of Cultural Properties, especially for education purposes and national character building.
6. Decree of Ministry of Education and Culture of the Republic of Indonesia No. 064/P/1995, concerning Research and Justification of Cultural Properties which includes the procedures to arrange research on cultural properties, to save cultural properties from danger, and to mitigate the impacts of infrastructure development on cultural properties.
7. Decree of the Head Office for Archaeological Heritage Conservation of Bali-NTB-NTT on the Implementation of Protection and Management of Sites and Cultural Properties within its Command Area.
8. Indonesian Charter for Heritage Conservation of 2003, as moral foundation on the heritage conservation activities within the Indonesian archipelago which appeals to advocates and practitioners of Indonesian heritage conservation to work hard together in healthy partnership for a holistic, systemic, and sustainable heritage conservation through fair,

democratic and harmonious processes and mechanisms supported by clear and consistent laws.

9. The Republic of Indonesia Act No.24, 1992, concerning Landscape Arrangement Regulation for Settlement, Agriculture, Livestock, Industry, and Others under the Territory of the Republic of Indonesia.
10. The Republic of Indonesia Act No.22 of 1999, concerning the Autonomy of Provincial Government which gives the right for the provincial government to manage cultural resource under their territory.
11. The Republic of Indonesia Government Regulation No. 16, 2004, concerning the Arrangement of Land-use in Order to Provide a Healthy Environment.
12. Presidential Decree of the Republic of Indonesia No. 32, 1993 concerning Management of Special Conservation Zone.
13. Presidential Decree of the Republic of Indonesia No. 75, 1993 concerning Coordination of Management of Landscape.
14. Regulation of the Government of Bali Province No. 6, 1989, concerning Guideline for the Planning of Landscape Arrangement within the Bali Province.
15. Regulation of the Government of Tabanan Regency No. 9, 2005 concerning Detail Plan for the Conservation of *Subak* Batukaru and Its Surrounding Areas Including the Conservation of Batukaru Mountain.
16. Provincial Decree of 2008 for Conservation and Spatial Planning for the proposed World Heritage sites named in this nomination document.
17. National Law No. 26/2007 and National Government Decree No. 26/2008, concerning spatial planning and the establishment of National Strategic Areas for conservation of critical cultural landscapes.
18. *Awig-awig* or traditional customary laws and regulations, including *subak* management and the traditional protection and conservation of cultural properties

The following table lists different parties involved in the protection and management of the properties included in the Cultural Landscape of Bali Province, each designation, and the legal basis.

No	Name of Property	Agency	Authority	Regulation
1.	Pura Ulun Danu Batur	*Desa Adat* Batur	1. Management of ritual ceremony 2. Management of traditional irrigation 3. Management of tourism	1. *Awig-awig* of *Desa Adat* Batur 2. Decree of Bangli Regency
2.	Pura Pegulingan	1. *Desa Adat* Basangambu 2. OAHC 3. *Subak* Basangambu 4. Tourism Agency of Gianyar Regency	1. Management of ritual ceremony 2. Management of archaeological conservation 3. Management of traditional irrigation 4. Management of tourism	1. *Awig-awig* of *Desa Adat* Basangambu 2. Act No.5, 1992 3. *Awig-awig subak* 4. Decree of Gianyar Regency
3.	Pura Tirtha Empul	*1. Desa Adat* Manukaya *2.* OAHC *3. Subak* Pulagan *4.* Tourism Agency of Gianyar Regency	1. Management of ritual ceremony 2. Management of archaeological conservation 3. Management of traditional irrigation 4. Management of tourism	1. *Awig-awig* of *Desa Adat* Manukaya 2. Act No.5, 1992 3. *Awig-awig subak* 4. Decree of Gianyar Regency
4.	Pura Mengening	1. Desa Adat Saraseda 2. OAHC 3. Subak Kulub	1. Management of ritual ceremony 2. Management of archaeological conservation 3. Management of traditional irrigation	*1. Awig-awig* of *Desa Adat* Saraseda *2.* Act no. 5, 1992 *3. Awig-awig subak*
5.	Gunung Kawi Rock Cut Temple	1. Desa Adat Manukaya 2. OAHC 3. Tourism Agency of Gianyar Regency	1. Management of ritual ceremony 2. Management of archaeological conservation 3. Management of tourism	1. *Awig-awig* of *Desa Adat* Manukaya 2. Act no. 5, 1992 3. Decree of local government
6.	Pura Luhur Batukaru	*Desa Adat* Wangaya Gede	Management of ritual ceremony	*Awig-awig* of *Desa Adat* Wangaya Gede
7.	Pura Luhur Pucak Petali	*Desa Adat* Yutu	Management of ritual ceremony	*Awig-awig* of *Desa Adat* Yutu
8.	Pura Luhur Besikalung	*Desa Adat* Babahan	Management of ritual ceremony	*Awig-awig* of *Desa Adat* Babahan
9.	Pura Luhur Muncaksari	*Desa Adat* Sangketan	Management of ritual ceremony	*Awig-awig* of *Desa Adat* Sangketan
10.	Pura Luhur Tamba Waras	*Desa Adat* Sangketan	Management of ritual ceremony	*Awig-awig* of *Desa Adat* Sangketan
11.	Pura Taman Ayun	*Desa Adat* Mengwi	Management of ritual ceremony of the Royal Family of Mengwi	*1. Awig-awig* of *Desa Adat* Mengwi *2.* Act no.5, 1992 *3.* Decree of Badung Regency *4.* Customary law of *Puri Agung* Mengwi
12.	Batukaru Rice Field Terraces	*1. Desa Adat* 2. *Subaks* 3. OAHC 4. Agency for Tourism of Tabanan Regency 5. Agriculture Agency of Tabanan Regency 6. Agency for Public Works of Tabanan Regency	1. Management of ritual ceremony 2. Management of traditional irrigation 3. Management of archaeological conservation 4. Management of tourism 5. Management of agriculture 6. Management of	*1. Awig-awig* of *Desa Adat* *2. Awig-awig Subak* *3.* Act no.5, 1992 *4.* Decree of Tabanan Regency no.9/2005

			infrastructure development and modern irrigation	

Desa Adat : Customary village
Awig-awig : Customary laws or regulations
OAHC : Office for Archaeological Heritage Conservation in Gianyar
Subak : Balinese traditional irrigation organization
Awig-awig Subak : Customary laws relating to the management of *subak* organization
Puri Agung : Royal Palace

5.d. Existing plans related to municipality and region in which the proposed properties is located (e.g. regional or local plan, conservation plan, tourism development plan)

No	Name of Property	Existing Plans of Local Community
1.	Pura Ulun Danu Batur	n/a
2.	Pura Pegulingan	n/a
3.	Pura Tirtha Empul	Buffer zone: Construction of public bathing place and working place for ceremonial preparation Outside buffer zone: Build a restaurant
4.	Pura Mengening	Core zone: Build a *Bale Pengaruman*, *Bale Pawedan*, *Bale Pitasan*, *Gedong-gedong*, *Bale Pengenteb* (all of this building are shrines in *Jeroan*), Build *Candi Bentar* (Gate) and *penyengker* (wall) in *Jaba Tengah*, Build a *Bale Paebatan* and *Bale Penandingan* (both this building are shrines in *Jaba*) Buffer zone: Repairing and consolidation of street and stairs leading to the *Pura* Mengening, consolidation of track towards *Pura* Pucak and *Pura* Mertasari.; Build a footstep leading to public bathing place.
5.	Gunung Kawi Rock Cut Temple	Core zone: Construction of a *Bale Wantilan* (hall) in front of *Bale Lantang* (shrine)
6.	Pura Luhur Batukaru	n/a
7.	Pura Luhur Pucak Petali	n/a
8.	Pura Luhur Besikalung	n/a
9.	Pura Luhur Muncaksari	n/a
10.	Pura Luhur Tamba Waras	n/a
11.	*Subaks* in Tampaksiring	Highlight and extend their traditional roles in adaptive management
12.	*Subaks* in Batukaru	Highlight and extend their traditional roles in adaptive management
13.	*Subaks* in Mengwi	Highlight and extend their traditional roles in adaptive management

The Office of Archaeological Heritage Conservation in Gianyar which is in charge as the Coordinating Body for conservation has arranged a comprehensive plan for the protection and conservation of the ancient temples. The table below lists the planned activities:

No	Sites	Existing Plans of the Office of Archaeological Heritage Conservation In Gianyar				
		Rescue	Protection	Restoration	Conservation	Development
1.	Pura Ulun Danu Batur	-	-	-	-	-
2.	Pura Pegulingan	-	-	-	-	-
3.	Pura Tirtha Empul	-	Protection of buffer zone by regulation to protect the landscape of its object.	Restoration and consolidation the structure of bathing pool and its wall.	Manual dry cleaning and chemistry conservation on the bathing place, its wall, *tapasana* and the gateway.	Socialization about health lives. Arrangement on the public bathing place.
4.	Pura Mengening	Building a dike for preserve from land slide danger.	Protection of buffer zone by regulation to protect the landscape of its object.	Restoration and consolidation of wall structure.	Manual dry cleaning and chemistry conservation on the *Prasada Agung*, wall and gate.	Socialization about health lives. Arrangement on the public bathing place.
5.	Pura Gunung Kawi (Rock Cut Temple)	Drainage arrangement above the rock cut temple and meditation shelter	Land free around the rock cut temple to protect the landscape of its object. Protection of buffer zone by regulation.	Restoration and consolidation the structure *gapura* and footstep into the *candi sepuluh* complex.	Manual dry cleaning and chemistry conservation on the rock cut temple and meditation shelter.	Controlling of the art shop around the stairs into the rock cut temple (Zone I).
6.	Pura Luhur Batukaru	-	Protection of buffer zone by regulation to protect the landscape of its object.	Restoration of the historical temple on the Batukaru area.	Conservation of the historical temple on the Batukaru area.	Plan arrangement and development of tourism infrastructure
7.	Pura Luhur Pucak Petali	-	Site inventory	-	-	-
8.	Pura Luhur Besikalung	-	-	-	-	-
8.	Pura Luhur Muncaksari	-	-	-	-	-
9.	Pura Luhur Tamba Waras	-	-	-	-	-
10	Pura Taman Ayun	-	Daily maintenance	-	-	-

5.e. Property management plan other management system

The detailed property management plan is available in Annex 2 of this dossier. Section 5 above describes the principal components of the plan. In addition, the main aims of the management plan are to:

1. ensure that all the cultural and natural assets included in the Cultural Landscape of Bali Province are preserved for future generations through appropriate social and ecological conservation and support schemes;
2. enhance public awareness, appreciation, and participation in conservation of the Cultural Landscape of Bali Province through education and improved site presentation;

3. help bring together interests of diverse stakeholders in the conservation and enhancement of the Cultural Landscape of Bali Province;
4. establish specific management guidelines that can be used by stakeholders for participation in the conservation and enhancement of the outstanding significance and values of the Cultural Landscape of Bali Province;
5. identify priorities for the allocation of available resources in order to protect and conserve the Cultural Landscape of Bali Province;
6. guarantee that the cultural landscapes are continuously monitored and regularly evaluated; and
7. provide a basis for future plans so that all changes within the nominated heritage can be managed.

5.f. Sources and levels of finance

Sources of finance for conservation work at the properties in every year for example are:

1. Legal retribution and entrance fee
2. Self- funding (by the traditional Customary Village)
3. Financial Support from Provincial and Local Government Agencies
4. Central Government through the Office of Archaeological Heritage Conservation Province of Bali-NTB-NTT in Gianyar
5. Private donations

No.	Budget Allocation of the Office of Archaeological Heritage Conservation in Gianyar - Bali	Amount in Rupiah (Rp)
1.	Archaeological research, sites environment, documentation and mapping, architectural and technical conservation of historical and archaeological properties	76.539.000,00
2.	Cultural research and development	59.311.000,00
	Total	135.850.000,00

5.g. Sources of expertise and training in conservation and management techniques

Subaks and local communities will retain responsibility for the day-to-day site maintenance and conservation, based on existing institutional and legal structures of *subak awig-awig* and customary *adat* law. Daily maintenance utilizes traditional management systems and techniques to protect and maintain

the landscape and its properties. Physical properties are maintained through traditional craftsmanship. *Subaks* maintain irrigation channels collectively using ancient techniques. In some cases, local management and maintenance techniques are supported by local government (e.g., irrigation works). While traditional protection and conservation methods have proved effective for hundreds of years, recent developments call for integrated protection and conservation measures to cope with increasingly complex development pressures. Hence, training activities and expertise in conservation will complement traditional management of Bali's heritage.

Thus, there are many sources of expertise which will be helpful to enhance the capability of local people in the conservation and management of the properties.

1. The Office of Archaeological Heritage Conservation of Bali-NTB-NTT has some expertise and training in conservation and management technique. The office is staffed with archaeologists, anthropologists, historians, and architects who can help the local conservators through training and technical assistance.
2. The Department of Archaeology, Faculty of Arts, Udayana University, and the Departement of Archaeology, Faculty of Cultural Sciences, Gadjah Mada University offer training in Cultural Resource Management. Such institutions can help to establish the more detail conservation and development plans for the properties.
3. The Bali Heritage Trust has training and workshop for management of heritage. The institution is staffed scholars with good experience in bringing social awareness to the public on the need to conserve Balinese heritage.
4. The Borobudur Conservation Centre in Magelang, Central Java, may provide training and workshop especially on material conservation which are much needed by the local conservators.
5. The Directorate General of History and Archaeology in Jakarta facilitates and promotes the programs to enhance people's awareness on the heritage conservation, provide technical as well as financial support, and offers training in conservation and management of the heritage.
6. A principal external collaborator will be the Stockholm Resilience Center. The Center, a premier institution for environmental research and

adaptive governance of social-ecological systems at Stockholm University, will support research, capacity building, and policy development (per MOU Stockholm Resilience Center-Ministry of Culture and Tourism of the Republic of Indonesia).

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CHAPTER SIX

MONITORING

CHAPTER SIX
ADAPTIVE MONITORING, EVALUATION, AND REPORTING SYSTEM

Effective co-management of Bali's proposed World Heritage property requires a consistent and comprehensive flow of information that can be readily synthesized and utilized—for both the short-term implementation of the program and for longer term planning. The Monitoring, Evaluation, and Reporting Unit will become a central component of the Coordinating Board for management of the World Heritage property (Figure 6.1). Housed within Bali's proposed World Heritage Coordinating Board, the unit will work with the Governor appointed Chair of the Coordinating Board to design a dynamic and adaptive monitoring system to collect and manage data on social and ecological variables, as well as contextual changes that potentially affect the conservation and enhancement of the World Heritage site.

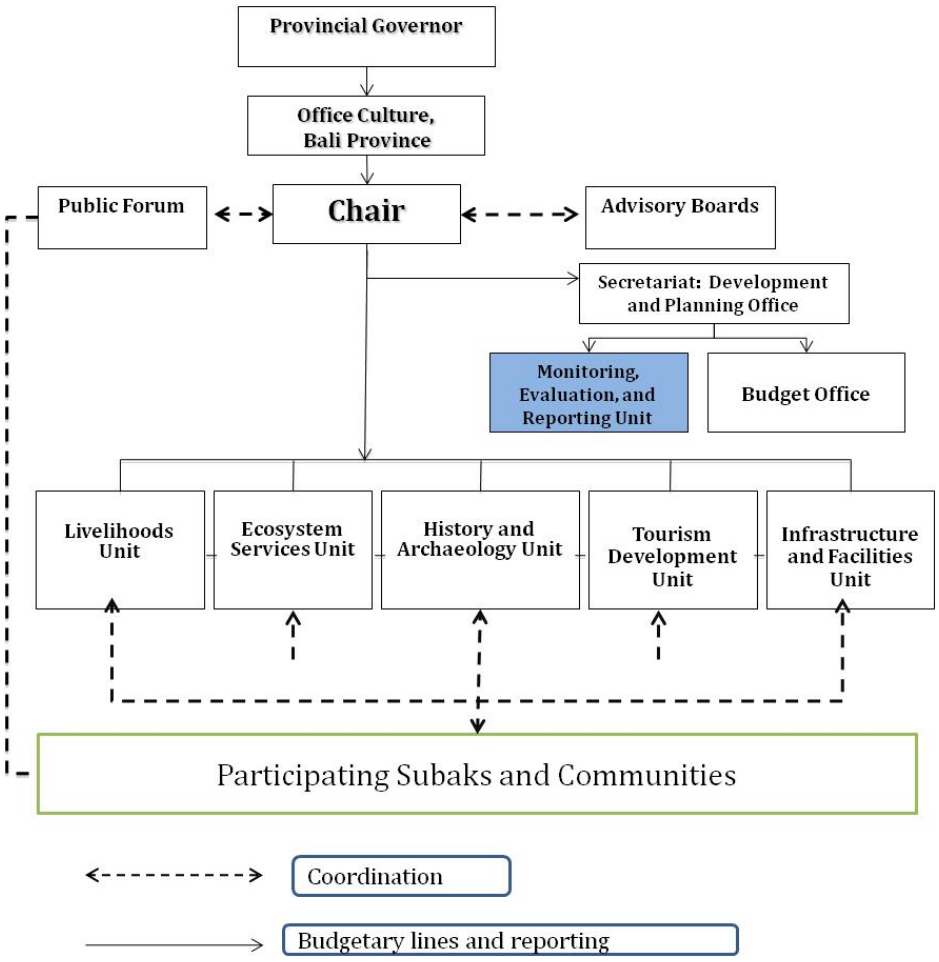

Fig. 6.1. Position of the Monitoring, Evaluation, and Reporting Unit within the Coordinating Board

The system will include baseline data on key social and ecological indicators, and the state of conservation of the World Heritage properties. Baseline data on livelihoods, *subak* institutional capacity, and environmental factors such as soil and water quality and environmental change have been collected to varying degrees in Batukaru and Tampaksiring areas (2006-2008). This baseline data will be reviewed to identify core indicators of sustainability and identify current knowledge gaps. Data will be collected to fill these gaps and the baseline study extended to the Mengwi site and any other future serial sites.

The system will also include a participatory monitoring component involving *subak*s and other stakeholders. It will be important to monitor and report on regular program outputs (i.e., the provision of goods and services such as distribution of organic fertilizer and training in organic farming). Periodic evaluations will be conducted to assess the overall social and ecological impacts of the program, against baseline data.

6.a. Key Indicators to Measure the State of Conservation

Since the property includes a diverse cluster of sites, each with different attributes, it will be necessary to establish a small set of core social-ecological indicators for overall program monitoring. Output level indicators will be tailored to each individual site, to monitor the site-specific activities. The system will be closely linked to the participatory planning process and implementation of specific activities at each of the five sites in the proposed cluster. To develop a system that effectively integrates and responds to social and ecological feedback, the Coordinating Board and the Monitoring, Evaluation, and Reporting Unit will seek guidance from the Stockholm Resilience Center. In addition, the Indonesian Ministry of Culture and Tourism, as the official State Party, may request expert advice from the World Heritage Advisory Bodies and the Secretariat. Periodic reports will be submitted to the UNESCO World Heritage Centre.

The table below presents potential key indicators for measuring the state of conservation and change in the social-ecological system. The indicators correspond with the five Strategic Priorities discussed in the Management Plan (Annex 2).

I. **Livelihood protection and enhancement** for *subak* institutions and their members, as guardians of Bali's unique cultural landscape;
II. **Conservation and promotion of ecosystem services** to ensure sustainable use of natural resources upon which *subak*s and their farming systems depend;
III. **Conservation of material culture** to preserve and enhance the authenticity of sites and structures as a living manifestation of Bali's heritage;
IV. **Appropriate tourism development** within the site, to achieve a balance between public and visitor education, generation of tourism-based revenue, and conservation; and
V. **Infrastructure and facility development** consistent with preservation and enhancement of the cultural landscape.

An additional set of indicators presented in the table will be used to monitor changes in context that potentially affect the conservation and enhancement proposed initiatives. Baseline data for the indicators and targets will be determined based on findings from comprehensive site assessments planned for year one of the initiative. Except for general monitoring of the Cultural Landscape of Bali Province, the protection and conservation of each site should be monitored and evaluated according to its state of conservation. This process will involve *subak*s and local communities. Additional information on the conservation measures listed below is provided in Chapter Five of the Management Plan.

Acronym list, Responsible Authority:

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
I. Livelihood protection and enhancement for *subak* institutions and members					
1	% change in cultivated rice paddy land (ha)	Development pressures on households encourage sale and subsequent conversion of rice terraces	Provision of farm land tax relief	Annual	CBCB BA BRPD
2	% change in farmers cultivating own land (v. sharecropped)	Farmers are unable to earn sufficient income from farming and migrate to urban areas; landless farmers work as sharecroppers	Provision of farm land tax relief	Annual	CBCB BA BRPD

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
3	% change in sale of cultivated rice land (ha)	Development pressures on households encourage sale and subsequent conversion of rice terraces	Provision of farm land tax relief	Annual	CBCB BA BRPD
4	% change in income from cultivated paddy	External factors such as pest outbreaks and falling rice prices affect farmer income from harvest; lack of familiarity with organic methods may delay uptake of higher value organic rice in Sebatu, Tampaksiring, and Mengwi areas	• Provision of farm land tax relief • Subsidies and technical assistance for organic rice production	Annual	CBCB BA BRPD
5	% change in utilization of basic health services	Insufficient income or lack of available services inhibit use of health care facilities	Provision of health care subsidy	Annual	CBCB BA BRPD
6	% change in educational attendance among primary school students, boys and girls	Inability to afford school fees precludes families from sending children to school	Provision of health care subsidy	Annual	CBCB BA BRPD BE
7	% change in graduation rate (SMA)	Inability to afford school fees precludes families from sending children to school	Provision of educational subsidy	Annual	CBCB BA BRPD BE
8	% change in functioning* *subak*s (e.g., maintenance of irrigation works, equitable distribution of water)	In some areas of Bali, excessive land conversion and change in principal occupation away from farming has led to the disintegration of the *subak*	• Double current level of annual government allocation to *subak*s • Capacity-building and training workshops	Annual	CBCB BA BRPD BPW
9	Qualitative change in ceremonial rituals at water temples	Outmigration, particularly among youth, reduces knowledge and awareness of ritual practices; various factors such including lack of fulfillment of ritual obligations leads to change in ceremonial practices (e.g., role of royal family in maintaining ritual obligations, change in traditional *subak* offerings of rice bundles)	• Educational programs to improve awareness and knowledge of traditional values and practices • Cultural exhibitions and exchange programs • Provide advising services to *subak*s to manage cost of ceremonial activities	Annual	CBCB BA BE ORHT
10	% change in awareness among local population of outstanding universal values of the property	Affects the local value and appreciation of the property, as well as active participation in conservation efforts	• Educational programs to improve awareness and knowledge of traditional values and practices • Cultural exhibitions and exchange programs	Annual	CBCB BA BE ORHT
*'***functioning subak***'* will be defined based on locally determined criteria attained during community assessments					
II. Conservation and promotion of ecosystem services					
1	% change in violation of forest conservation regulations	Development pressure and livelihood insecurity lead to illegal use of forested areas, which in turn deteriorate water catchment services, increase soil erosion, and undermine sustainable supply of forest products	• Study formal and non-formal forest management • Socialization for forest conservation • Support for households relying on forest production • Enforcement of forest conservation regulations	Annual	CBCB BA BF
2	% change in forest cover	Population and development pressures lead to over use of forested areas, which in turn deteriorate water catchment services, increase soil erosion, and undermine sustainable supply of forest products	• Study formal and non-formal forest management • Socialization for forest conservation • Support for households relying on forest production • Enforcement of forest conservation regulations	Annual	CBCB BA BF

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
3	% change in forest species diversity	Population and development pressures lead to over use of forested areas, which in turn deteriorate water catchment services, increase soil erosion, and undermine sustainable supply of forest products	• Study formal and non-formal forest management • Socialization for forest conservation • Support for households relying on forest production • Enforcement of forest conservation regulations	Biannual	CBCB BA BF
4	% change in area cultivated with organic rice (ha)	Excessive use of chemical agricultural practices since the 1970s has deteriorated soil quality and rice paddy ecology	• Provide financial incentives to farmers to support costs of transition to organic farming • Implement training program for farmers in organic farming, post-harvest handling, processing and marketing • Provide ongoing extension services for organic farming	Semi-annual	CBCB BA BF
5	Change in number of farmers cultivating organic rice	Excessive use of chemical agricultural practices since the 1970s has deteriorated soil quality and rice paddy ecology	Support transition to organic farming (see above)	Semi-annual	CBCB BA
6	% change in area planted to local rice varieties	Modern agricultural practices introduced hybrid rice varieties, replacing traditional organic Bali rice	Provide assistance and incentives to certify organic Bali rice for export	Semi-annual	CBCB BA
7	Change in soil fertility (NPK, soil organisms)	Excessive use of chemical agricultural practices since the 1970s has deteriorated soil quality and rice paddy ecology	Support transition to organic farming (see above)	Annual	CBCB BA
8	Change in post harvest crop pesticide residue	Excessive use of chemical agricultural practices since the 1970s has deteriorated soil quality and rice paddy ecology	Support transition to organic farming (see above)	Annual	CBCB BA
9	Change in rate of irrigation flow (litre/sec.)	Development and population pressures reduce spring flow	Prohibit deep well construction; enforce existing restrictions	Semi-annual	CBCB BA BI
10	% change in levels of dissolved reactive phosphate (PO_4) in springs, river water, and lakes	Excessive use of chemical agricultural practices since the 1970s has deteriorated water	• Support transition to organic farming thereby decreasing use of chemical fertilizers • Develop composting facilities for livestock waste	Annual	CBCB BA BI
11	Number of key government staff and farmers trained in ecosystem services concepts and practices	Forestry, agricultural, and water resource sectors operate as separate and non-integrated sectors; training in ecosystem services will enhance linkages among agencies and encourage focus on watershed scale	Train government agencies and farmers in ecosystem services concepts and conservation practices	Annual	CBCB BA BI
III. Conservation of material culture					
1	Change in presence of micro-organisms cover on structures (moss, lichen, fungi, algae, *pteridophyta*, spermatophyte, and bryophyte)	Deterioration of structures and materials due to rapid growth of microorganisms, noted in particular at Pura Tirtha Empul, Pura Gunung Kawi, and Pura Mengening in Tampaksiring	Inspect and treat/ restore damaged parts of properties and replace new fabricated materials which do not conform to the conservation policy	Monthly	CBCB OAHC BA
2	Change in chemical deterioration of structures (salting)	Deterioration of structures and materials due to chemical deterioration	Inspect and treat/ restore damaged parts of properties and replace new fabricated materials which	Monthly	CBCB OAHC

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
			do not conform to the conservation policy		
3	Change in physical deterioration of structures (cracks, length, width, depth)	Deterioration of structures and materials due physical deterioration; particularly problematic at Pura Mengening, Tampaksiring	Inspect and treat/ restore damaged parts of properties and replace new fabricated materials which do not conform to the conservation policy	Monthly	CBCB OAHC
4	Change in deterioration of structures from human factors (looting, graffiti, over-use)	Deterioration of structures and materials due to heavy use and increasing tourism pressure, particularly at Pura Gunung Kawi and Tirtha Empul in Tampaksiring and Pura Taman Ayun in Mengwi; damage to stones from graffiti or theft of ancient relics occurs, though rarely	• Inspect and treat/ restore damaged parts of properties and replace new fabricated materials which do not conform to the conservation policy • Establish guidelines for use of highly significant buildings and cultural materials	Monthly	CBCB OAHC
5	Number of local conservation specialists (*undaqi*) trained in integrated local and contemporary material preservation	Local knowledge and practice of local conservation techniques is threatened by youth outmigration and modern techniques that interfere with traditional methods	• Integrate research on local knowledge and modern conservation techniques into training materials • Conduct training workshops with local conservation specialists	Semi-annual	CBCB OAHC
6	Extent of structures and landscape rehabilitated with traditional materials	Modern rehabilitation practices undermine use of local materials and expertise in restoring structures; deforestation and high demand leads to lack of available local materials; development pressures from increasing tourism, population growth leads to conversion of the land, road development, or extension of commerce (retail shops) or services (electrification) in a manner that alters the traditional character of the landscape. Restoring structures and landscapes while respecting the ongoing process of dynamic change (livelihoods, change in living heritage) presents a challenge.	• Rehabilitate and restore altered cultural landscapes in sites, as needed • Restore damaged parts of properties and replace new fabricated materials which do not conform to the conservation policy • Provide incentives to local communities for the restoration and maintenance of traditional architecture • Conserve forested areas above and surrounding the sites to ensure supply of local materials	Annual	CBCB OAHC BA
7	Number of public meetings conducted on maintenance of cultural landscape	Development pressures undermine appreciation of local population for their cultural landscape heritage	Provide public education via traditional flora to enhance awareness among the local population of the benefits of maintaining their original cultural landscape	Annual	CBCB BE BA OAHC
IV. Appropriate tourism development					
1	Number of community consultative workshops held on sustainable tourism development	Present rate of tourism development is rapid and unplanned, often leading to a deterioration of the quality of the site and subsequent visitation. Changes or regulations regarding tourism development should be in consultation with community members and stakeholders	Hold consultative workshops on Sustainable Tourism in Bali involving the local population living surrounding the heritage sites	Annual	CBCB TBBP BA
2	Change in number of visitors to World Heritage sites	Findings from consultative meetings will provide a basis for tourism development plans	• Establish a new tourism management plan • Establish visitor management plan for individual sites	Annual	CBCB TBBP BA

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
3	Change in number of visitors to visitor centre and trail networks	Presently there is a lack of visitor facilities and access to sites. Development of facilities and trail networks based on traditional architecture and design will manage the flow of visitors to sites	Establish visitor centers and trail networks through rice terraces and to select water temples at each site (initial consultation and landscape planning in 2008)	Monthly	CBCB TBBP BA
4	Change in visitor appreciation of site (visitor surveys)	It is anticipated that increasing visitor appreciation will also enhance the sense of public responsibility for maintaining the sites	Enhance visitor facilities, access, and interpretive materials	Semi-annual	CBCB TBBP BA
5	Tourism revenue transferred to *subak*s and site conservation funds	Presently, revenue from visitor entrance fees to rice paddy areas (e.g., Jatiluwih) is distributed to communities and local governments. Revenue from entrance to temple sites is distributed to government agencies and communities responsible. Entrance fees can be increased for international visitors and a portion allocated to site conservation and to *subak*s.	Establish and maintain a mechanism to redistribute tourism revenue for conservation of the heritage sites	Annual	CBCB TBBP BA
6	Change in number of scientific and educational publications on the cultural landscape (as basis for interpretive materials)	Current gaps in knowledge of history and archaeological significance of sites is in some cases limited; further study is required.	Carry out scientific studies on the property to fill information gaps and increase knowledge of history and living traditions in the areas	Annual	CBCB TBBP BA
V. Infrastructure and facility development					
1	Change in vehicle flow to sites	In some areas, roads are poorly developed (e.g., Jatiluwih); elsewhere traffic congestion inhibits access and enjoyment of the area	• Identify problems and potential of transportation leading to each site • Establish and maintain a well-marked 'Cultural Landscape' route to link all sites together with a central visitor center	Semi-annual (seasonal)	CBCB BPW BA
2	Change in availability of quality interpretive materials	Sites lack interpretive kiosks that could improve appreciation without interfering with the aesthetics or function of the site	Provide comprehensive information on the properties for each site	Annual	CBCB BPW BA
3	Number of World Heritage facilities constructed and maintained	Current visitor facilities vary greatly by site and will require improvement or development in a manner that does not lead to a deterioration of the cultural and ecological value of the sites	• Provide facilities for the comfort, safety and well-being of visitors that enhance the enjoyment of their visit • Establish guidelines for the development of environment- and heritage-friendly infrastructure • Enforce the implementation of an impact assessment on the heritage sites prior to infrastructure construction	Annual	CBCB BPW BA
4	Change in visitor numbers to World Heritage Visitor Centre	Sites are selected to represent social-ecological systems. A central visitor facility will be necessary to describe the sites as a coherent network, and to explain the linkages between *subak*s, rice terraces, water temples, and	Develop and maintain a comprehensive World Heritage visitor center (existing Volcano museum facility)	Monthly	CBCB BPW BA TBBP

No.	Key Indicators	Factors Affecting State of Conservation/ Social-Ecological System	Conservation Measures	Periodicity	Responsible Authority
		watersheds			
5	Number of studies conducted on retail establishments	At some sites, tourist retail shops extend beyond the entrance to the site. It will be necessary to review the current constraints and opportunities for adapting retail establishments.	Conduct studies on retail establishments within and leading to the sites	Annual	CBCB BPW BA TBBP
6	Number of retail establishments adapted to Cultural Landscape of Bali Province standards	Based on findings of above studies, support can be provided to modify tourist shops, without jeopardizing livelihoods of retailers.	• Adapt the layout and location of retail shops based on findings of the study and in accordance with standards for maintaining an authentic Cultural Landscape • Provide training and support services to enhance the quality of retail within and surrounding the sites	Annual	CBCB BPW BA
VI. External context monitoring					
1	Level of volcanic activity	Level of volcanic eruption influence into the properties and its landscape condition	Develop measures to anticipate and mitigate effects of volcanic disturbance	Monthly	
2	Level of tectonic activity	Level of tectonic earth quake influence into the properties and its landscape condition	Develop measures to anticipate and mitigate effects of tectonic disturbance	Monthly	
3	Climate change	Changes in climate conditions may influence functioning of the *subak*s and rice production, or affect structures or visitation	Develop measures to anticipate and mitigate effects of climate change	Annual	
4	Occurrence of pest outbreaks	Outbreaks of pests (e.g., rat infestation in Tabanan in 2008) may negatively affect rice yields and impede transition to organic farming	Promote traditional coordination among *subak*s to manage pests	Semi-annual	CBCB BA
5	Change in political and policy environment	Political reforms (e.g., decentralization) or policy changes (e.g., zoning laws) may affect the coordination of the site, cooperation among government agencies, the rate of legal reforms, or the flow of resources needed for site management	Maintain a flexible and institutional structure to facilitate the capacity to anticipate and respond to political change	Periodically	CBCB GBP
6	Change in economic conditions, policies, and markets	Current economic constraints may negatively effect the ability to implement initiative or result in lower numbers of visitors to the sites; Increasing costs of fuel, or unfavorable market prices for rice may negatively effect rice production and farm-based livelihoods	Develop the capacity to monitor economic and market changes and respond	Periodically	CBCB GBP

6.b. Administrative Arrangement for Monitoring Property

1. **Government of Bali Province**
   Jl. Basuki Rahmat Denpasar
   Tel: +62 361 224671

2. **Office for Archaeological Heritage Conservation Province of Bali, West Nusa Tenggara and East Nusa Tenggara (acting as Coordinating Board)**
   Jl. Raya Tampaksiring, Bedulu, Blahbatu, Gianyar,
   Bali 80581, Po Box 145
   Tel: +62 361 942354, 942347

3. **Board of Regional Planning and Planning**
   Jl. Juanda No.1 Denpasar

4. **Board Of Irrigation, Province of Bali**
   Jl. Cok Agung Tresna Denpasar

5. **Board of Agriculture, Province of Bali**
   Jl. W.R. Supratman, No 71 Denpasar
   Tel: +62 361 22716

6. **Board of Culture, Province of Bali**
   Jl. Juanda No.1 Denpasar
   Tel: +62 361 264471

7. **Board of Tourism, Province of Bali**
   Jl. Puputan Renon Denpasar
   Tel: +62 361 226578

8. **Meteorology and Geophysics Board, Province of Bali**
   Jl. Raya Tuban
   Tel: +62 361 757975

9. **Board of Forestry, Province Bali**
   Jl. Puputan Renon Denpasar
   Tel: +62 361 237039

10. **Office for Archaeological Research in Bali**
    Jln. Raya Sesetan No.64 Denpasar
    Tel: +62 361 228661

11. **Office for Research on History and Traditional Values in Bali**
    Jl. Raya Dalung, Abian Base No.107 Kuta Badung
    Tel: +62 361 439546

12. **Board of Public Work, Province of Bali**
    Jl. Cok Agung Tresna
    Tel: +62 361 227208

6.c. Result and Previous Reporting Exercise

Agung, A.A Gede dkk.,
Laporan Pemetaan dan Pendataan Benda Cagar Budaya/Situs Sepanjang Aliran Sungai Pakerisan di Kabupaten Gianyar (tidak diterbitkan), Balai Pelestarian Peninggalan Purbakala Bali-NTB-NTT, 2002
(**Report: inventory and mapping of archaeological sites along the Pakerisan River**)

Proyek Pemugaran Taman Ayun 1983/1984.
(**Report: Restoration of Pura Taman Ayun)**

Proyek Pemugaran Pura Mengening 1983/1987
(**Report: Restoration of Pura Mengening)**

Proyek Konservasi Candi Tebing Gunung Kawi 1992/1997
(**Report: Conservation on Pura Gunung Kawi)**

Wiguna, AAI
Laporan akhir Pengkajian Eko-farming, 2006/2007/2008
Transformasi Inovasi Pertanian dengan Pendekatan Eko-farming pada Ekosistem Subak di Bali
(**Report: Transformation of Agriculture Inovation with Eco-farming Approach in Subak Ecosystem Bali)**

Dinas Pertanian Tanaman Pangan Provinsi Bali
Laporan Pelaksanaan Kegiatan Pertanian Tanaman Pangan, 2008
(Report: Activities of Food Crop Services)

Dinas Pertanian Tanaman Pangan Provinsi Bali
Laporan Pelaksanaan Penyaluran Pupuk, 2007/2008
(Report: Distribution of Fertilizer)

CHAPTER SEVEN

DOCUMENTATION

CHAPTER SEVEN

DOCUMENTATION

7.a. Photograph, Slide, Image, Inventory, and Authorization Table and Other Audiovisual Materials

Id. No	Format	Caption	Date of Photo	Photographer	Copyright Owner	Contact Detail of Copyright Owner	Non Exclusive Cession of Right
II. DESCRIPTION Introduction: Subaks, Rice Terraces and Water Temple							
P1	JPG	Mount and Lake Batur	n/a	Ministry of Culture and Tourism	Ministry of Culture and Tourism	Directorate of Archaeological Heritage Tel: 62 21 5725512	yes
P2	JPG	Pura Ulun Danu Beratan, Beratan Lake	ibid	ibid	ibid	ibid	yes
P3	JPG	Pura Ulun Danu Batur	ibid	ibid	ibid	ibid	yes
2.a. Description of the Property A. Supreme Water Temple *Pura* Ulun Danu Batur							
P4	JPG	Pura Ulun Danu Batur	ibid	ibid	ibid	ibid	yes
P5	JPG	Main entrance to *Pura* Ulun Danu - Batur	ibid	ibid	ibid	ibid	yes
B. 2. Pura Tirtha Empul and Subaks Pulagan and Kumba							
P6	JPG	Water reservoir of Pura Tirtha Empul	ibid	ibid	ibid	ibid	yes

B. 3. Pura Mengening and Subak Kulub							
P7	JPG	Architecture of Prasada agung (Pura Mengening) represents a sacred mountain	ibid	ibid	ibid	ibid	yes
B. 4. Pura Gunung Kawi (Rock Cut Temple)							
P8	JPG	Bridge to Pura Gunung Kawi Temple	ibid	ibid	ibid	ibid	yes
P9	JPG	Rock cut temple of Gunung Kawi	ibid	ibid	ibid	ibid	yes
B. 5. Subaks Basangambu, Pulagan, Kumba and Kulub							
P10	JPG	Water temple of Pura Luhur Batukaru	ibid	ibid	ibid	ibid	yes
P11	JPG	Main entrance to the Pura Mengening Temple	ibid	ibid	ibid	ibid	yes
C. *Subaks* and Water Temples of Batukaru (Catur Angga Batukaru)							
P12	JPG	Pura Ulun Danu Tamblingan	ibid	ibid	ibid	ibid	yes
P13	JPG	Temple Pura Luhur Besikalung. Shrines in the inner courtyard	ibid	ibid	ibid	ibid	yes
P14	JPG	Pura Luhur Pucak Petali	ibid	ibid	ibid	ibid	yes
2.b. History and Development **B. Supreme Water Temple Pura Ulun Danu Batur**							
P15	JPG	View of the village of Batur circa 1920 when it was located on the floor	ibid	ibid	ibid	ibid	yes

		of the caldera					
P16	JPG	Baris dancers in front of the temple Pura Ulun Danu Batur, circa 1920	ibid	ibid	ibid	ibid	yes
D. Subaks and Water Temple of Batukaru							
P17	JPG	*Cili, Cau* (harvest offering) dedicated to goddess Sri, placed in the field during harvest time	ibid	Ibid	ibid	ibid	yes
P18	JPG	Rice granaries; the higher called *gelebeg*, and the smaller one *klumpu*, *Wongaya-Gede*, on the slope of the Watukaru Mountain	ibid	ibid	ibid	ibid	yes
2. c. Site Under Consideration for Serial Nomination							
P19	JPG	Subak Batan Badung Meeting Place – Mengwi District	ibid	ibid	ibid	ibid	yes
P20	JPG	Shrine to the Deity of Lake Beratan in the temple Pura Taman Ayun	ibid	ibid	ibid	ibid	yes
P21	JPG	The head of the Subak Batan Badung stands beside the altar where his subak gives thans for the water from the moat of the temple Pura Taman Ayun, which irrigated their fields	ibid	ibid	ibid	ibid	yes
P22	JPG	Flooded paddy fields, where rice pests are	ibid	ibid	ibid	ibid	yes

		deprived of their habitat					
P23	JPG	Photos of the construction of the large dam of Pejeng by local subaks, taken during a visit by the Governor of Netherlands Indie in 1925	ibid	ibid	ibid	ibid	yes
III. JUSTIFICATION FOR INSCRIPTION							
P24	JPG	Pura Tirtha Empul	ibid	ibid	ibid	ibid	yes
P25	JPG	*Piodalan* ceremony at Pura Taman Ayun, 1950	ibid	ibid	ibid	ibid	yes
P26	JPG	Aerial photograph of Pura Gunung Kawi (Rock Cut Temple)	ibid	ibid	ibid	ibid	yes
IV. STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY							
P27	JPG	Retail shops along the path to the Pura Gunung Kawi Temple	ibid	ibid	ibid	ibid	yes
P28	JPG	Restoration work in the temple, 1983	ibid	ibid	ibid	ibid	yes
P29	JPG	Main road within the Jatiluwih area	ibid	ibid	ibid	ibid	yes
P30	JPG	*Pura* Ulun Datu Batur located by the main street in Bangli Regency	ibid	ibid	ibid	ibid	yes
P31	JPG	Condition of Pura Tirtha Empul after earthquake disaster, 1972	ibid	ibid	ibid	ibid	yes
P32	JPG	Large group of visitors in *Pura* Tirtha Empul	ibid	ibid	ibid	ibid	yes

7.b. Text Relating to Protective Designation, Copies of Property Management Plan or Documented Management System and Exact of Other Plan Relevant to the property (see annexes)

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

Subak

Ambler, John S.,1991
Dinamika Irigasi Petani: Kerangka dan Prinsip-prinsip Kelembagaan. In *Irigasi di Indonesia*. John S. Ambler, ed. Jakarta: LP3ES.

Ardika, I Wayan,1994
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Baal, J. van.,1993
Bali: Further Studies in Life, Thought, and Ritual Man, *New Series*, Vol. 7, No. 4 (Dec., 1972), pp. 678-679

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Jha, Nitish, 2002
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"On Irrigation and the Balinese State" *Current Anthropology*, volume 46 pages 305–308

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'Volcanic Fertilization of Balinese Rice Paddies',*Ecological Economics*. Vol. 38. page 383-390

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A case study of Balinese irrigation management: institutional dynamics and challenges. *2nd Southeast Asia Water Forum* 29 August - 3 September, 2005,

Lorenzen, Stephan, Rachel P. Lorenzen dan Dr. Pascal Perez, 2005
International Symposium on Ecohydrology Bali, 21 - 25 November 2005

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7.d. Address Where Inventory, Record and Archive are Held

The inventory, record and archive are kept in the Library Division Office for Archaeological Heritage Conservation, Province of Bali-NTB-NTT

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7.e. Bibliography

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CHAPTER EIGHT

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8.a. Preparer

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Local Bureau

Name	: Ida Bagus Sedhawa
Title	: Head of Cultural Board of Bali Province
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Telephone	: +62 361 245294, 245297
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Email	: -

8.b. Official Local Institutions

1. The Coordinating Board for the Management of the Cultural Landscape of Bali Province
2. Cultural Office of Government of the Bali Province
3. Tourism Board of Government of the Bali Province
4. Office for Archaeological Research, Bali
5. Office for Research on History and Traditional Values in Bali

6. Office for Archaeological Heritage Conservation in Gianyar
7. Institute for Agriculture Assessment Technology in Denpasar
8. Non-Government Organization
9. Individual Academic or University or Other Research Agencies
10. Government of Gianyar Regency
11. Government of Tabanan Regency
12. Government of Badung Regency
13. Government of Buleleng Regency
14. Government of Bangli Regency
15. Udayana University, Denpasar

8.c. Other local Institutions

***Pura* Ulun Danu Batur**

Desa Adat Batur

***Pura* Pegulingan**

1. *Desa Adat* Basangambu
2. *Subak* Basangambu

***Pura* Tirtha Empul**

1. *Desa Adat* Manukaya
2. *Subak* Pulagan

***Pura* Mengening**

1. *Desa Adat* Saraseda
2. *Subak* Kumba

Gunung Kawi Rock Cut Temple

1. *Desa Adat* Penaka
2. *Subak* Kulub

***Pura Luhur* Batukaru**

1. *Desa Adat* Wangaya Gede
2. *Subak*s

***Pura Luhur* Pucak Petali**

1. *Desa Adat* Yutu
2. *Subak*s

***Pura Luhur* Besikalung**

1. *Desa Adat* Babahan
2. *Subak*s

***Pura Luhur* Muncaksari**

1. *Desa Adat* Sangketan
2. *Subak*s

***Pura* Taman Ayun**

1. *Desa Adat* Mengwi
2. *Subak* Batan Badung

8.d. Official Web Address

-

Signed on behalf of State Party

Hari Untoro Dradjat

Full Name

Director General of History and Archaeology

Ministry of Culture and Tourism

Title

September, 16, 2009

Date

DECREE

ABOUT

ESTABLISHMENT OF PROTECTED CULTURAL SITES AND OBJECTS

IN THE AREA OF PROVINCE OF BALI

No: 131/M/1998

THE MINISTER OF EDUCATION AND CULTURE

OF THE REPUBLIC OF INDONESIA

1998

DUPLICATE

DECREE OF

THE MINISTER OF EDUCATION AND CULTURE OF THE REPUBLIC OF INDONESIA

No: 131/M/1995

REGARDING

ESTABLISHMENT OF PROTECTED CULTURE SITES AND OBJECTS IN THE AREA OF THE PROVINCE OF BALI

THE MINISTER OF EDUCATION AND CULTURE,

Considering : a. that Pura Pegulingan, Mengening, Goa Gajah, and Pengukur-ukuran posses values which are important for history and culture;
b. that in connection with the above mentioned in paragraph a it is deemed necessary to establish the aforesaid as protected culture sites and objects;

Considering : 1. Law No. 5 of 1992;
2. Regulation of the Government of the Republic of Indonesia No. 10 of 1993;
3. Decrees of the President of the Republic of Indonesia;
   a. No. 44 of 1974
   b. No. 61 of 1998
   c. No. 122/M of 1998
4. Decrees of the Minister of Education and Culture;
   a. No. 022e/O/1980;
   b. No. 0255/O/1981;
   c. No. 087/U/1993;
   d. No. 062/U/1995;
   e. No. 063/U/1995;
   f. No. 064/U/1995;

DECREES

Establishes :

Firstly : Sites and monuments comprising:
1. Pura Pegulingan in the village of Manukaya, Tampaksiring Subdistrict, Gianyar District;
2. Pura Mangening in the village of Tampaksiring, Tampaksiring Subdistrict, Gianyar District;
3. Pura Goa Gajah in the village of Bedahulu, Tampaksiring Subdistrict, Gianyar District;
4. Pura Pengukur-ukuran in the village of Sawo Gunung, Tampaksiring Subdistrict, Gianyar District;

are declared as Protected Culture Sites and Objects.

Secondly : The area and boundaries of the Protected Culture Sites and Objects mentioned in the First Dictum above are recorded in the Annex of this Decree

Thirdly : This Decree shall become valid from the date that it is decreed.

Decreed in Jakarta
On the 16th of June 1998
MINISTER OF EDUCATION AND CULTURE,

signed

Prof. Dr. Juwono Sudarsono, M.A.

Copies of this Decree are delivered to:
1. The Secretary-General of the Department of Education and Culture,
2. Inspector General of the Department of Education and Culture,
3. Director General of Culture, Department of Education and Culture,
4. Head of the Research and Development of Education and Culture Body of Department of Education and Culture,
5. Secretaries of the Inspectorate General, Directorate General of Culture and the Research and Development of Education and Culture Body of Department of Education and Culture,
6. Head of the Provincial Office of the Department of Education and Culture of Bali Province,
7. Local office of the State Treasury and Cashier,
8. Financial Audit Body,
9. Directorate General of Budget of the Department of Finance,
10. Commission VII of the Peoples' Representative Council of the republic of Indonesia.

Duplicate according to the original
Law and Public Relation Bureau
Department of Education and Culture,
Head of Section for Compilation and Drafting
Of Regulations and Laws,

Signed

Muslikh, S.H.
NIP 131479478

CERTIFICATE

REGARDING

PROTECTED CULTURAL PROPERTIES

IN THE AREA OF PROVINCE OF BALI

No: UM.001/ /Dir.iv/SP/IX/09

THE DIRECTORATE OF ARCHAEOLOGICAL HERITAGE,

MINISTRY OF CULTURE AND TOURISM

OF THE REPUBLIC OF INDONESIA

2009

MINISTRY OF CULTURE AND TOURISM
DIRECTORATE OF ARCHAEOLOGICAL HERITAGE

Depdiknas Complex Building E 11th floor
Jl. Jend. Sudirman – Senayan Jakarta 10270

Website
http://www.depbudpar.go.id

Telp/Fax
(021) 5725512, 5725048

CERTIFICATE

No. UM.001/ /Dir.iv/SP/IX/09

The undersign below:

Name : Drs. Junus Satrio Atmodjo, M.Hum.
NIP : 19561110 198403 1 001
Position : Director for Archaeological Heritage
Address : Depdiknas Complex, Building E, 11th floor,
Jalan Jenderal Sudirman, Senayan, Jakarta

By this letter certify that objects:

1. Pura Ulun Danu Batur in the village of Batur, Kintamani Subdistrict, Bangli District;
2. Pura Tirta Empul in the village of Basangambu, Tampaksiring Subdistrict, Gianyar District;
3. Gunung Kawi Rockcut Temple in the village of Tampaksiring, Tapaksiring Subdistrict, Gianyar District;
4. Pura Luhur Batukaru in the village of Beraban, Kediri Subdistrict, Tabanan District;
5. Pura Luhur Pucuk Petali in the village of Penebel, Penebel Subdistrict, Tabanan District;
6. Pura Luhur Bsikalung in the village of Babahan, Penebel Subdistrict, Tabanan District;
7. Pura Luhur Muncak Sari in the village of Sangketan, Penebel Subdistrict, Tabanan District;
8. Pura Luhur Tambawaras in the village of Sangketan, Penebel Subdistrict, Tabanan District;
9. Pura Taman Ayun in the village of Mengwi, Mengwi Subdistrict, Badung District;

are listed in our inventory of archaeological remains based on the criteria on article 1 of the regulation of the Republic of Indonesia No. 5/1992 about Cultural Property. The inventory number of the cultural properties are recorded in the Annex.

As a consequence, the government and society are obliged to protect and perpetuate the cultural property, and may use it, as long as it is not in contradiction with the regulation No. 5/1992 about Cultural Property.

This certificate is released for the appropriate use, if there is an appropriate expalanation in the near future, it will be evaluated later.

Jakarta, September , 2009
Director for Archaeological Heritage,

Drs. Junus Satrio Atmodjo, M.Hum.
NIP. 19561110 198403 1 001

Copies of this Decree are delivered to:

1. Minister of Culture and Tourism
2. Director General of History and Culture, Ministry of Culture and Tourism

Annex: CERTIFICATE
No. : UM.001/ /Dir.iv/SP/IX/09
Date : September , 2009

LIST OF CULTURAL PROPERTIES
PROVINCE OF BALI

NO.	NAME OF PROPERTIES	LOCATION	INVENTORY NUMBER
1	Pura Ulun Danu Batur	village of Batur, Kintamani Subdistrict, Bangli District	2/14-06/b/3
2	Pura Tirta Empul	Basangambu, Tampaksiring Subdistrict, Gianyar District	2/14-04/TB/105b
3	Gunung Kawi Rockcut Temple	village of Tampaksiring, Tapaksiring Subdistrict, Gianyar District	2/14-04/TB/15
4	Pura Luhur Batukaru	village of Beraban, Kediri Subdistrict, Tabanan District	2/14-02/B/8
5	Pura Luhur Pucuk Petali	village of Penebel, Penebel Subdistrict, Tabanan District	in process
6	Pura Luhur Bsikalung	Village of Babahan, Penebel Subdistrict, Tabanan District	in process
7	Pura Luhur Muncak Sari	village of Sangketan, Penebel Subdistrict, Tabanan District	in process
8	Pura Luhur Tambawaras	village of Sangketan, Penebel Subdistrict, Tabanan District	in process
9	Pura Taman Ayun	village of Mengwi, Mengwi Subdistrict, Badung District	2/14-03/TB/4

MEMORANDUM OF UNDERSTANDING

BETWEEN

BALI PROVINCIAL GOVERNMENT

AND

REGENCY / MUNICIPALITY GOVERNMENT OF BALI

NUMBER: 075/06/KB/B.PEM/2008

NUMBER : 130/3505/T.Pem
NUMBER : 316/2303/T.Pem
NUMBER : 188/7783/Sekret
NUMBER : 316/1815/PEM. UM
NUMBER : 188/6442/Sekret
NUMBER : 126/3895/Bupati Krg.
NUMBER: 188/2757/Sekret (Um)
NUMBER : 316/737/Pem
NUMBER : 316/2480/T. Pem

ON

STIPULATION OF BALI PROVINCE STRATEGIC ZONES

On this day, Tuesday, the thirtieth of December Year two thousand and eight in Denpasar, we are the persons undersigning the following document:

1. Made Mangku Pastika.	:	Bali Governor, herein acts upon and on the name of Government of Bali Province, official address at Jalan Basuki Rahmat Niti Mandala Denpasar, further referred to as "**THE FIRST PARTY.**"
2. Drs. Putu Bagiada, MM.	:	Regent of Buleleng, herein acts upon and on the name of Buleleng Regency Government, official address at Jalan Pahlawan Number 1 Singaraja.

3. N. Adi Wiryatama, S. Sos, M. Si.	:	Regent of Tabanan, herein acts upon and on the name of Tabanan Regency Government, official address at Jalan Pahlawan Number 19 Tabanan.
4. I Nengah Arnawa, S. Sos, MM.	:	Regent of Bangli, herein acts upon and on the name of Bangli Regency Government, official address at Jalan Ngurah Rai Number 30 Bangli.
5. Anak Agung Gede Agung, SH.	:	Regent of Badung, herein acts upon and on the name of Badung Regency Government, official address at Jalan Raya Sempidi Mengwi Badung.
6. DR. Ir. Tjok Oka Artha Ardhana Sukawati M. Si.	:	Regent of Gianyar, herein acts upon and on the name of Gianyar Regency Government, official address at Jalan Ngurah Rai Number 5-7 Gianyar.
7. I Wayan Geredeg	:	Regent of Karangasem, herein acts upon and on the name of Karangasem Regency Government, official address at Jalan Ngurah Rai Amlapura.
8. I Wayan Candra	:	Regent of Klungkung, herein acts upon and on the name of Klungkung Regency Government, official address at Jalan Untung Surapati Number 2 Semarapura.
9. Prof. Dr. Drg. I Gede Winasa	:	Regent of Jembrana, herein acts upon and on the name of Jembrana Regency Government, official address at Jalan Surapati Number 1 Jembrana.
10. Ida Bagus Rai Dharmawijaya Mantra SE, M. Si.	:	Mayor of Denpasar Municipality herein acts upon and on the name of Denpasar Municipality Government, official address at Jalan Gajah Mada Number 1 Denpasar.

Number 2 until number 10 further on referred as **"THE SECOND PARTIES"**.

THE FIRST and **THE SECOND PARTIES,** further on referred as **THE PARTIES** agreed upon to conduct Memorandum of Understanding on Bali Province Strategic Zones with the following provisions:

AGREEMENT GROUNDWORK

Article 1

1. Law Number 64 Year 1958 on the structuring of the Provincial Government, Bali, West Nusa Tenggara and East Nusa Tenggra (State Gezatte of Republic of Indonesia Year 1958 Number 115, Addendum State Gezatte of Republic of Indonesia Number 1649).

2. Law Number 69 Year 1958 on the Structuring of the Regency Government within the provincial Government of Bali, West Nusa Tenggara and East Nusa Tenggra (State Gezatte of Republic of Indonesia Year 1958 Number 122, Addendum State Gezatte of Republic of Indonesia Number 1655).

3. Law Number 1 Year 1992 on the Structuring of Municipality of Denpasar (State Gezatte of Republic of Indonesia Year 1992 Number 9, Addendum State Gezatte of Republic of Indonesia Number 3469).

4. Law Number 25 Year 2004 on National Development Planning System (State Gezatte of Republic of Indonesia Year 2004 Number 104, Addendum State Gezatte of Republic of Indonesia Number 4421).

5. Law Number 32 Year 2004 on Local Government (State Gezatte of Republic of Indonesia Year 2004 Number 125, Addendum State Gezatte of Republic of Indonesia Number 4437) which have been amended several times, the latest Law Number 12 Year 2008 on the Second Amendement on Law Number 32 Year 2004 of Local Government (State Gezatte of Republic of Indonesia Year 2008 Number 59, Addendum State Gezatte of Republic of Indonesia Number 4844).

6. Law Number 26 Year 2007 on Spatial Planning (State Gezatte of Republic of Indonesia Year 2007 Number 68, Addendum State Gezatte of Republic of Indonesia Number 4725).

7. Government Regulation Number 38 Year 2007 on The Division Affairs among The Governments, and Provincial Governments and Regencies /Municipality (State Gezatte of Republic of Indonesia Year 2007 Number 82, Addendum State Gezatte of Republic of Indonesia Number 4737).

8. Government Regulation Number 50 Year 2007 on Implementation Procedure of Local Cooperation (State Gezatte of Republic of Indonesia Year 2007 Number 112, Addendum State Gezatte of Republic of Indonesia Number 4761).

9. Government Regulation Number 26 Year 2008 on National Spatial Planning of National Zone (State Gezatte of Republic of Indonesia Year 2008 Number 48, Addendum State Gezatte of Republic of Indonesia Number 4833).

OBJECTIVES

Article 2

This Memorandum of Understanding aims at stipulating of the Bali Province Strategic Zones which will be pursued in the spatial planning of Bali Provincial Zone and as reference in the Spatial planning zone of the Regencies/Municipality.

SCOPE

Article 3

(1) The Scope of The Memorandum of Understanding on the Stipulation of Bali Province Strategic Zones covers:
   a. defense and security
   b. economic growth
   c. social culture
   d. empowerment of natural resources and/ or high technology, and
   e. utility and environment potency.

(2) The Criteria of Strategic Zones as stated on paragraph (1) covers:
   a. Strategic Zones based on the defense interest and security, is utilized for military based, military practice, ammunition waste zone, and other military apparatus, ammunition warehouse, missile systems testing area, and/or zone of industrial defense system.

   b. Strategic Zone based on economic growth interest, covers: potency of economic rapid growth, and supported by infra structures and economic facilities.

   c. Strategic Zone based on social and cultural interests, as preservation area and development of customs or local culture, area of heritage conservation and as an asset which shall be protected and preserved.

d. Strategic Zone based on empowerment of natural resources and/or high technology, is utilized for the interest of development of science and technology, hold strategic natural resources, and

e. Strategic Zone based on utility and environment potency, as fauna and flora conservation, national asset as protected zone which stipulated as ecosystem protection, flora and/ or fauna that are almost extinct or which are presumed to be extinct that should be protected and /or conserved. These determines the changes on nature ecosystem and has wide impact towards the life, gives protection macro weather balance, protection to water utilization system, natural disaster threat and coastal area protection.

(3) The spread of Strategic Zones as it stated on paragraph (2) on the Attachment and as part of bound document of this Memorandum of Understanding.

AUTHORITY AND RESPONSIBILITY

Article 4

(1) **THE FIRST PARTY** has the authority and responsibility of:
a. granting recommendation towards the result of consultation, and
b. conducting evaluation.

(2) **THE SECOND PARTIES** have the authority and responsibility of:
a. planning draft of Spatial Zones of the Regency/Municipality in accordance with the Memorandum of Understanding
b implementing the result of the Memorandum of Understanding, and
c. executing consultation and evaluation in accordance with the law.

OTHERS

Article 5

In case there is an amendment on this Memorandum of Understanding, there will be addendum agreement based on the agreement of **THE PARTIES**, who are bound and as part of the bound affairs of this Memorandum of Understanding.

END

Article 6

This Memorandum of Understanding is composed and signed on Tuesday, the thirtieth of December year two thousand and eight in Denpasar, as stated initially in this agreement in duplicate (2) of each has the same legal right under the sufficient government seal to be utilized wherever necessary.

SECOND PARTIES **FIRST PARTY**

Drs. Putu Bagiaada, MM **Made Mangku Pastika**

N. Adi Wiryatama, S.Sos, M.Si.

I Negah Arnawa, S.Sos. MM

Anak Agung Gede Agung, SH.

Dr.Ir. Tjok Oka Artha Ardhana Sukawati, M.Si

I Wayan Geredeg

I Wayan Candra , SH, MH, MBA, MBL

Prof. Dr.Drg. I Gede Winasa.

Ida Bagus Rai Dharmawijaya Mantra, SE, M.Si

ATTACHMENT

MEMORANDUM OF UNDERSTANDING STIPULATION OF BALI PROVINCE STRATEGIC ZONES

1. Location of Bali Province Strategic Zones
2. The map of Bali Province Strategic Zones

    a. The map of Strategic Zones based on the defense security
    b. The map of Strategic Zones based on economic growth interest
    c. The map of Strategic Zones based on social cultural interest
    d. The map of Strategic Zones based on empowerment of natural resource and/or high technology
    e. The map of Strategic Zones based on utility and environment potency interests:
    1). Map of forest zones, National Park of West Bali, Benoa Bay, **Marine Natural Tourism**, Batukaru Forest Conservation, Mountains and Hills
    2). Map of Volcanic Natural Disaster
    3). Map of Under-Grown natural resources
    4). Map of Potential River Streams through regencies/municipality

3. Exposure and width of Forest conservation spread
4. Exposure of natural Lakes and coverage of fishing zones
5. River Streams of rivers which covered the area of Bali Province Strategic Zones

1**. Location of Bali Province Strategic Zones**

No	**Classification of Strategic Zones**	**Criteria of Strategic Zones**	**Location Exposure**
1	Strategic Zones based on **the defense security**	Utilize for military practice area (not utilize as ammunition waste and other apparatus defense, ammunition warehouse, missile system testing area and/or industrial defense system area and other practices which contaminate and alarm surrounding environment).	**Pulaki Military Practice Area**
2	Strategic Zones based on **economic growth** interest	- Rapid Growth of Economy Potency. - Supported by infrastructure and economic facilities	1. **Harbours**: Gilimanuk, Padangbai Harbour, Benoa Harbour, Celukanbawang Harbour, Gunaksa Harbour, Amed Harbour, Sangsit

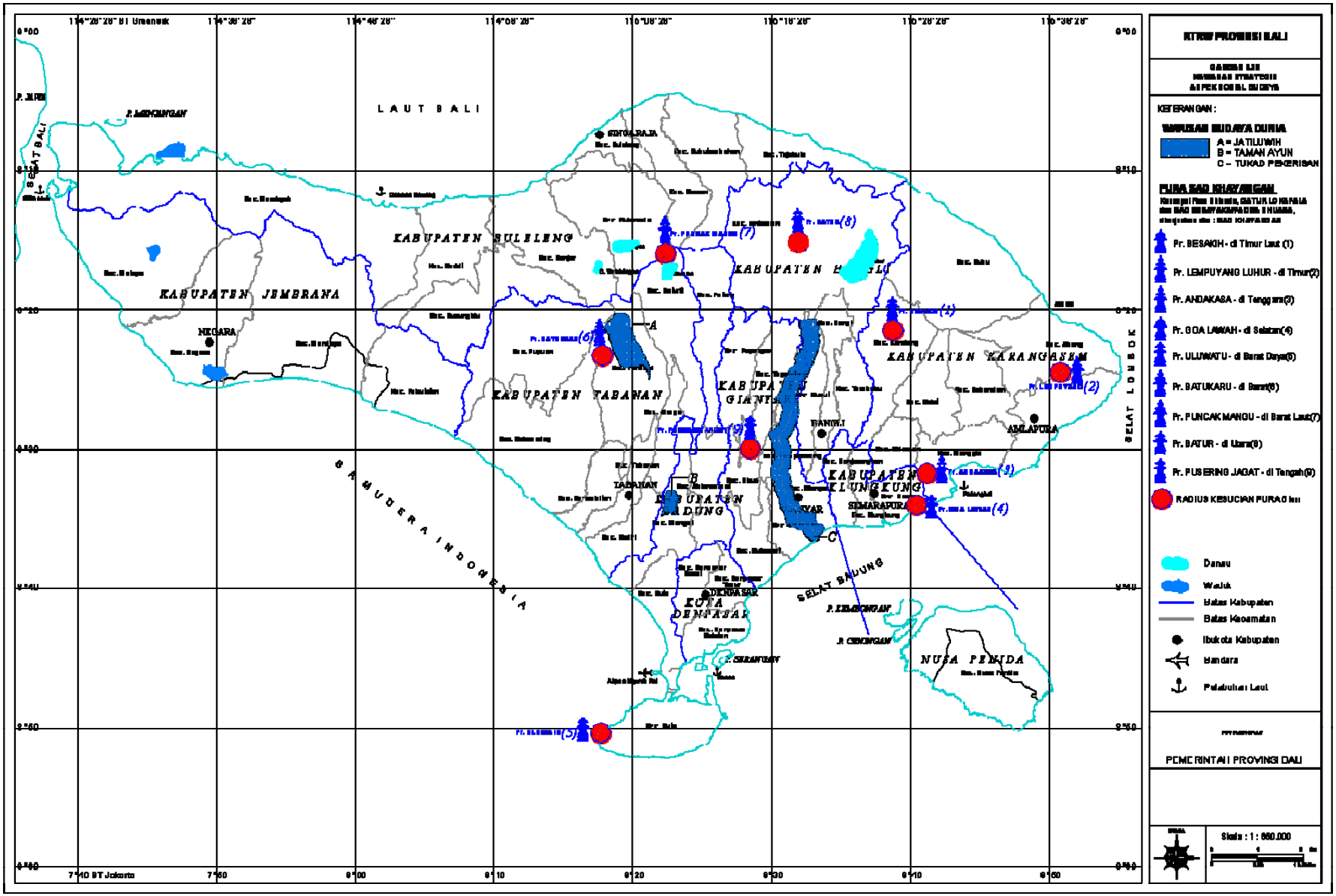
			Harbour, Pegametan Harbour, Tanah Ampo Tourism Harbour, Pengambengan Fishing Area, **Labuan Amuk Fuel Storage Harbour.** 2. **Airports**: Ngurah Rai Airport, Colonel Wisnu Airport. 3. **Tourism Zones**: - Nusa Dua, Tuban, Kuta, Sanur, Ubud, Lebih, Soka, Perancak, Candikusuma, Batuampar, Kalibukbuk, Nusa Penida, Candidasa, Ujung, Tulamben, Air Sanih. - Particular Tourism Attractions, Kintamani, Bedugul-Pancasari, Tanah Lot, Palasari, Gilimanuk. 4. **Industrial Zones**: Celukanbawang Industrial Zone, Pengambengan Industrial Zone. 5. **Metropolitan Zones Sarbagita and Renon Civic Centre**. **6. National Road along the Zone.** **7. Passengers Terminal Type A Mengwi.**
3	Strategic Zones based on **social cultural** interest	- The place of conservation and development of custom or local culture.	**Sacred Area Zone of Sad Kahyangan Temple and Dewata Nawa Sanga, based on Rwa Bhineda Concept, Tri Guna, Catur Lokapala, Sad Winayaka/Padma Bhuana cover:** Lempuyang Luhur Temple (The peak of Mount Lempuyang Karangasem

			Regency), Anadakasa Temple (Peak of Mount Andakasa Karangasem Regency), Batukaru Temple (The slope of Mount Batukaru Tabanan Regency), Batur Temple (peripheral crater of Mount Batur Bangli Regency), Goa Lawah Temple (Klungkung Regency), Luhur Uluwatu Temple (Bukit Pecatu Badung Regency), Puncakmangu Temple (Badung Regency), Besakih The Mother Temple (Slope of Mount Agung Karangasem Regency), Pusering Jagat Temple (Pejeng, Gianyar Regency), and Kentel Gumi Temple at Banjarangkan district Klungkung Regency.
		- Conservation Zone of Cultural Heritage. -Conservation and Protection Assets.	**Cultural Heritage Zone covers:** - **Jatiluwih Area** comprises of: Tamblingan Lake Zone, Buyan, and The surrounding Forest as well as Jatiluih Area, Wangaya Gede and the surrounding Subak (Jatiluih Subak, Gunung Sari Subak, Umadui Subak, Kedamaian Subak, Kusambi Subak, Soka Subak, Gelagateba Subak, Wangaya Betan Subak, Paselatan Subak, Piling Subak) and Wangaya Betan Zone with its entire temple related to Subak system in the zone. -**Taman Ayun Zone** covers: Taman Ayun Temple, Subak Batan Badung, and Subak Beringkit. -**Tukad Pakerisan River Stream Zone** covers: Ulun Danu Batur Temple, irrigation

			and its subak in Tampaksiring (Tirta Empul Temple, Gunung Kawi Temple, Mengening Temple, Pegulingan Temple, Pulagan Subak, Kumba Subak, Pulu Subak), Subak Temple along Sebatu area (Sebatu Subak, Kedisan Subak, Jasan Subak, Jati Subak, Bonjaka Subak, Timbul Subak, Calo Subak, Pujung Subak, and Pakudul Subak).
4	Strategic Zones based on empowerment of **natural resource and/or high technology**	- utilize for Science and Technology Development interests	**Eka Karya Botanical Garden Bedugul.**
		- Strategic Natural Resources.	**Offshore Oil Exploration Plan** in South-West Bali Island.
5	Strategic Zones based on **utility and environment** potency interests	- Protection of diverse kinds of flora and fauna	**1. West Bali National Park** **2. Benoa Bay** **3. Marine Natural Tourism** at Nusa Lembongan and Menjangan Island **4. Coastal Area** **5. Wild life Conservation/Batukaru Forest Conservation**
		- National Assets in the form of Protection area which stipulated as ecosystem protection flora and/or fauna which are almost extinct or presumed will be extinct that shall be protected and/or conserved. - determining the changes on nature and has wide effect on life sustainability. - provide protection towards macro climate	**1. The entire forest Zone** **2. Mountains and hills** **3. The entire coastal areas.**

		balance.	
		- Provide protection on the balance of water system utilization.	**1. River Stream (DAS) for potential river flows through** regencies/municipality **2. Natural Lake** at Bali Province **3. Underground water basin potency** (based on Hydrogeology)
		- Natural Disaster Threat	**Volcanic Disaster Threat Zones** (Mount Agung and Mount Batur)

Bali Province Strategic Area for Cultural Heritage and Temples



Bali Province Strategic Area for empowerment of natural resources and/or high technology