BOROBUDUR-YOGYAKARTA-PRAMBANAN

BASELINE SUPPLY & DEMAND, MARKET DEMAND FORECASTS, AND INVESTMENT NEEDS

MARKET ANALYSIS AND DEMAND ASSESSMENTS TO SUPPORT THE DEVELOPMENT OF INTEGRATED TOURISM DESTINATIONS ACROSS INDONESIA

WORLD BANK SELECTION #1223583

ACKNOWLEDGMENTS

PREPARED BY:

Horwath HTL
Hotel, Tourism and Leisure Celebrated 100 years in 2015

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TABLE OF CONTENTS

TABLE OF FIGURES

INTRODUCTION

The Government of Indonesia in the National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*, RPJMN) 2015 to 2019, has set a number of objectives to increase the role of tourism in the Indonesian economy. Between 2015 and 2019, its goals together with the Ministry of Tourism's goals are to increase:

- international visitors from 9 million to 20 million;
- domestic visits from 250 million to 275 million;
- the tourism contribution to GDP from 4 percent to 8 percent;
- tourism foreign exchange revenues from IDR120 trillion to IDR240 trillion;
- Indonesia's Travel and Tourism Competitiveness Index ranking from 70th to 30th place; and
- tourism sector employment from 11 million to 13 million workers.

To achieve these goals President Joko Widodo urged his cabinet to accelerate the development of 10 priority tourism destinations (Figure 1):

- **Borobudur (Jogjakarta, Solo, Semarang: Central Java)**
- **Lake Toba (North Sumatra)**
- **Mandalika (Lombok)**
- Bromo, Tengger, Semeru (East Java)
- Labuan Bajo (Flores)
- Wakatobi (South East Sulawesi)
- Pulau Seribu / Kota Tua (DKI Jakarta)
- Morotai (North Maluku)
- Tanjung Lesung (Banten)
- Tanjung Kelayang (Bangka Belitung)

The 3 destinations in bold are considered high priority destinations with additional effort being expended to encourage and develop tourism.

The World Bank has been requested by the Government of Indonesia to support, through financing, advisory support, and analytics, the Government's efforts to accelerate tourism development in the 10 priority destinations. As part of this support, in August 2016 the World Bank engaged Horwath HTL (HHTL) and Surbana Jurong to conduct a market analysis and demand assessment for the 10 priority destinations, with a focus on Lombok, Borobudur, and Lake Toba.

FIGURE 1: LOCATION OF 10 PRIORITY TOURISM DESTINATIONS IN INDONESIA

Source: Google Maps, Surbana Jurong

The key objective of the Assessment is to assist the Government of Indonesia in identifying and prioritizing infrastructure, skill and SME development, planning and other tourism-related expenditures to accelerate the development of the 10 priority tourism destinations. The scope comprises of (1) market demand and supply analysis, plus investment analysis and (2) demand assessment (projections) and investment needs (including infrastructure). The findings are expected to inform the government's integrated tourism master plans for these destinations.

To this end, the following key tasks were undertaken:

Task 1: Understanding governmental decentralization & its effect on decision making plus preliminary information gathering.
Task 2: Collection and analysis of the government's statistical data.
Task 3: Survey of international and domestic tourism stakeholders for collection of public and private sector information.
Task 4: Survey of tour-operators in selected key markets.
Task 5: Secondary research on tourism supply and demand.
Task 6: Analysis of the image of Indonesia and the 10 priority destinations.
Task 7: Future market demand analysis.
Task 8: Investment and infrastructure needs assessment.
Task 9: SMEs and Skills assessment and needs.

Appendix IV contains a list of interviews undertaken with both the public and private sectors to gather primary research that was used to supplement secondary research. The list includes the number of interviews, the organization (where appropriate) and the location.

This Report is part of a series of reports:

- report for Indonesia, country level;
- reports for the 3 high priority destinations (Lombok, Borobudur, and Lake Toba); and,
- reports for the 7 other priority destinations (Bromo/Tengger/Semeru, Labuan Bajo, Wakatobi, Pulau Seribu/Kota Tua, Morotai, Tanjung Lesung and Tanjung Kelayang).

Assessment of the Destination and Key Tourism Areas

The 3As terminology (Attraction, Amenities and Accessibility) can help explain how the supply and demand analysis and needs assessment was carried out for the destination with respect to the destination boundary and the key tourism areas.

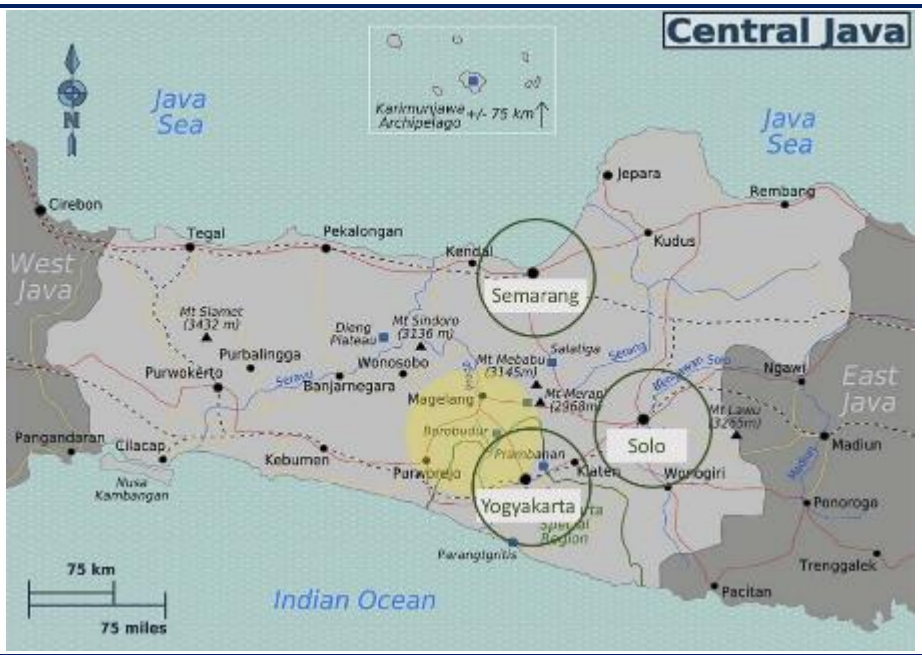
- **Attractions**: attractions specifically focused on engaging and drawing visitors to the destination. The destination is defined by its attractions and their ability to draw visitors. Within the destination boundary, (existing and future) clusters of attractions with potential for tourism development and propensity to generate overnight stays and revenue and/or (existing and future) key accommodation areas are identified and henceforth called "key tourism areas".
- **Accessibility**: methods of reaching the destination via the main gateways (external accessibility) plus transport links between gateways, attractions and key accommodation areas all of which support the destination (internal accessibility). For external accessibility, the focus is on the gateway hubs (such as airports and ports). For internal accessibility, the Report assesses the transport infrastructure; the existing, the gaps and the required transportation network that facilitates accessibility within the destination.
- **Amenities**: support the destination and the attractions such as hotels, restaurants and entertainment facilities together with basic capacity infrastructure. Within the destination boundary, and generally within the key tourism areas, the Report assesses:
  - the existing basic infrastructure capacity (water supply, power supply, telecommunication, waste water and waste management, etc.);
  - identifies any basic infrastructure capacity gaps;
  - analyses demand and supply of existing attractions and amenities;
  - provides projections for future attractions and amenities; and
  - provides an assessment of infrastructure needs of the destination to ensure success of the attraction and amenities. In some cases, when amenities within the destination boundary have a direct effect on the attractiveness of the key tourism areas, the scope of the baseline and investment needs of basic capacity infrastructure is conducted beyond the key tourism areas.

BASELINE DEMAND & SUPPLY

1. DESTINATION CHARACTERISTICS

The following section will provide our professional assessment of the potential **key attractions** within the destination boundary.

FIGURE 2: MAP OF JOGLOSEMAR (YOGYAKARTA-SOLO-SEMARANG)



Source: http://www.vacationbaliindonesia.com/

1.1 GEOGRAPHY

Joglosemar (Yogyakarta-Solo-Semarang) covers a vast area. It spans across 2 provinces, Jawa Tengah (Central Java) and DI Yogyakarta; several kabupaten (regencies); and 3 large cities—Yogyakarta, Semarang, and Surakarta (Solo).[1]

Yogyakarta is located in south Jawa Tengah, with an area of 32.5 square kilometers. While the city spreads in all directions from the Kraton (the Sultan's palace), the core of the modern city is to the north, centered around Dutch colonial-era buildings and the commercial district.

Semarang is located on the north coast of the island of Java. It is the capital and largest city of Jawa Tengah, with an area of 373.8 square kilometers. It is also a major port.

Solo adjoins Kab. Karanganyar and Kab. Boyolali to the north, Kab. Karanganyar and Kab. Sukoharjo to the east and west, and Kab. Sukoharjo to the south, with an area of 46 square kilometers. On the eastern side of Solo runs the Solo River (Bengawan Solo).

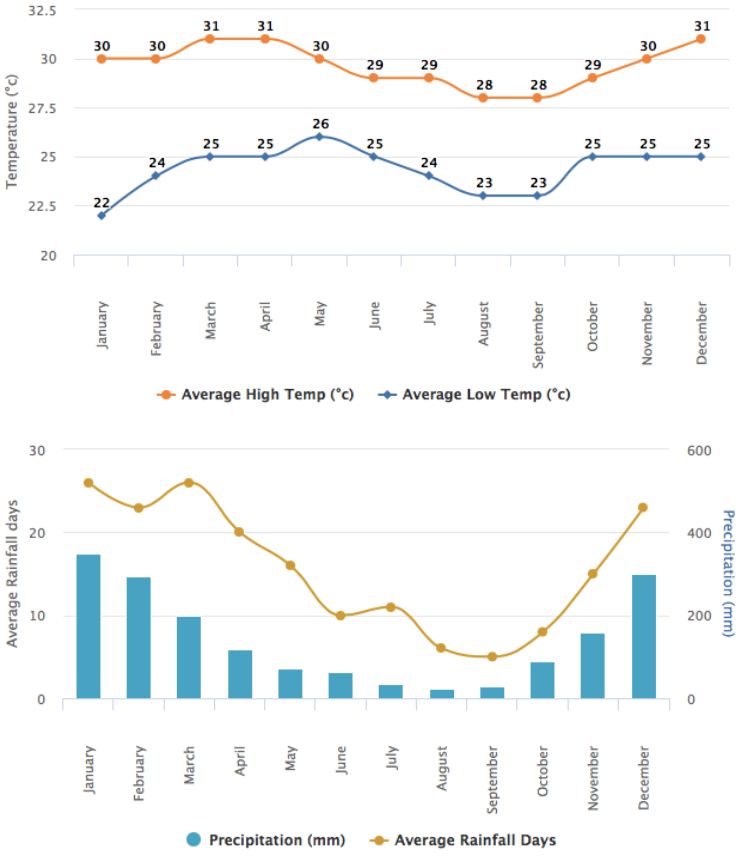
[1] In Indonesia, subnational governance includes four levels: (1) province/Provinci, (2) city/Kota and regency/Kabupaten, (3) sub-district/Kecamatan or district/Distrik, and (4) urban community/Kelurahan or village/Desa.

1.2 CLIMATE

Joglosemar area has a tropical rainforest climate - hot and humid. Similar to most other Indonesian destinations, the climate in Joglosemar can be characterized by two main seasons - wet season and dry season. The wet season generally falls between November and April. Much of the rain falls in short, sharp downpours, but occasionally there are prolonged bouts of rain which can last all day. In between the rain, hazy sunshine can be enjoyed. January is usually the wettest month. During the wet season, average daily temperature highs are around 28-30°C. The daily temperature range is generally low as the nights in the area remain at around 25°C.

The dry season in Joglosemar is between May and October. While there may be occasional rainfall in the beginning and end of this period, the months of June, July and August typically see only one eighth of the rain experienced during the wet season. During these months, average daily temperature highs are around 32°C with overnight lows at 25°C.

FIGURE 3: AVERAGE TEMPERATURE & RAINFALL OF JOGLOSEMAR



Source: https://www.worldweatheronline.com

2. DESTINATION DEFINITION

2.1 JOLOSEMAR ROAD MAP OF TOURISM DEVELOPMENT (TWC)

The Road Map of Tourism Development in Joglosemar as prepared by the PT Taman Wisata Candi Borobudur, Prambanan & Ratu Boko (Persero) (TWC) includes 8 clusters of development. It is our belief that the top 3 clusters should be prioritized as they have genuine tourism appeal, for both foreign and domestic visitors:

1. **The Borobudur Cluster** (The Borobudur Temple, Pawon Temple, Mendut Temple, Punthuk Setumbu, Bukit Rhema and surrounding cultural villages) covering Kecamatan Borobudur and Kecamatan Mungkid in Kabupaten Magelang (Jawa Tengah).
2. **The Prambanan-Boko Cluster** (The Prambanan Temple and Ratu Boko) covering Kecamatan Prambanan in Kabupaten Sleman (in DI Yogyakarta) and Kecamatan Prambanan in Kabupaten Klaten (Jawa Tengah).
3. **The Yogyakarta Cluster** (Keraton, Water Castle, Malioboro Shopping Street and Kotagede) covering 6 Kecamatans: Keraton, Gondomanan, Ngampilan, Gedongtengen, Danurejan and Kotagede.
4. Solo Cluster
5. Semarang Cluster
6. Cetho-Sukuh Cluster
7. Ambarawa Cluster
8. Dieng Cluster

There is no doubt that there are interesting attractions within the above clusters, such as:

- Semarang Old Town and Museum Lawang Sewu in the Semarang Cluster;
- the Keraton Surakarta and Sriwedari Park in the Solo Cluster; and
- Ambarawa Railway.

They will not however drive tourism in a similar fashion as to the clusters of Yogyakarta, Borobudur and Prambanan-Boko. Consequently, **the focus of this report is on the smaller triangle (the Yogyakarta – Borobudur – Prambanan-Boko triangle) with the highest tourism potential that will ensure resources and efforts are best placed to achieve the greatest tourism results**.

2.2 KEY ATTRACTIONS & TOURISM AREAS

There are 3 sites dominating the tourism landscape of Joglosemar (Figure 4):

- Borobudur Temple;
- Prambanan Temple; and
- Kota Yogyakarta.

FIGURE 4: KEY TOURISM AREAS IN JOGLOSEMAR – THE "YOGYAKARTA – BOROBUDUR – PRAMBANAN-BOKO" TRIANGLE

Source: Google maps, Surbana Jurong

A = Borobudur Cluster
B = Prambanan-Boko Cluster
C = Yogyakarta Cluster

2.2.1 THE BOROBUDUR CLUSTER: BOROBUDUR TEMPLE, PAWON TEMPLE AND MENDUT TEMPLE (KAB. MAGELANG, KEC. BOROBUDUR & KEC. MUNGKID)

2.2.2 PRESENTATION OF THE CULTURAL SITES

The Borobudur Temple Compound, dating from the 8th and 9th centuries, is located in the village of Borobudur, Magelang, Jawa Tengah. It is 40 kilometers north-west of Yogyakarta and 100 kilometers south-west of Semarang.

The Borobudur Temple Compound consists of three monuments, namely the Temple of Borobudur and two smaller temples (Mendut Temple and Pawon Temple) located to the east on a straight axis to the main temple.

The main temple of Borobudur itself is the largest Buddhist temple in the world. This 60,000-cubic meter monument is 34.5 meters high and has a square base of 123 meters X 123 meters. Borobudur was built in three tiers. The base of the temple consists of a pyramid formed by five concentric square terraces. This is followed by the trunk of a cone with three platforms. On the very top is a monumental stupa (a mound-like structure containing Buddhist relics). The walls and balustrades of Borobudur, covering a total surface area of 2,500 square meters, are decorated with fine low reliefs depicting various Buddhist scenes.

The Borobudur Temple Compound has been a UNESCO World Heritage Site since 1991. Apart from its magnificent scale, Borobudur has significant historical, cultural and religious values. The temple was designed in Javanese Buddhist architecture, which blends the Indonesian indigenous cult of ancestor worship and the Buddhist concept of attaining Nirvana. The temple also demonstrates the influences of Gupta art that reflects India's influence on the region, yet there are enough indigenous scenes and elements incorporated to make Borobudur uniquely Indonesian. It is also an outstanding example of Indonesia's art and architecture from between the early 8th and late 9th centuries that exerted considerable influence on an architectural revival between the mid-13th and early 16th centuries. Until today, Borobudur is still used for pilgrimage. Once a year, Buddhists in Indonesia celebrate Vesak (Buddha Day) at the monument.

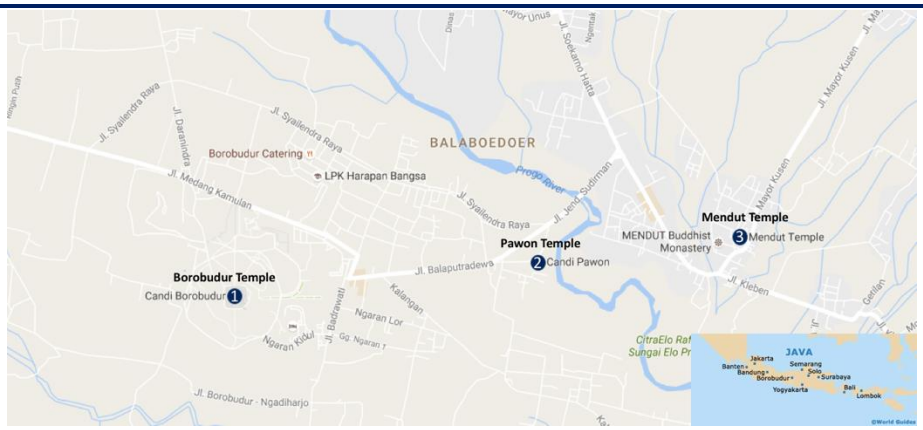
A special pass is required to visit Borobudur at sunrise before it is opened for public visitors, something that has been gaining popularity in recent years. Visitors can enjoy the stunning panoramic scenery of Borobudur with Java's beautiful landscape and volcanoes in the background.

During the restoration in the early 20th century, it was discovered that three Buddhist temples in the region, Borobudur, Pawon and Mendut, are positioned along a straight line. It is believed that a ritual relationship between the three temples must have existed.

Built in the early 9th century AD, the **Mendut Temple**, a rectangular temple with multi-storied roofs decorated with small stupas is located 3 kilometers east of Borobudur Temple. It is the oldest among the three temples.

Pawon Temple, is situated between the other two temples, and is also built during the Sailendra dynasty (8th–9th centuries). The name Pawon literally means kitchen (Javanese Language) which is derived from the root word Awu or dust. The connection to the word dust also suggests that this temple was probably built as a tomb or mortuary temple for the king. In the contemporary era during the full moon in May or June, Buddhists in Indonesia observe Vesak annual ritual by walking from Mendut passing through Pawon to Borobudur.

FIGURE 5: LOCATION OF BOROBUDUR, PAWON & MENDUT TEMPLES



Source: Google Maps

FIGURE 6: IMAGES OF BOROBUDUR, PAWON AND MENDUT TEMPLES

Source: Online photo stock (from left: Borobudur Temple, Pawon Temple and Mendut Temple)

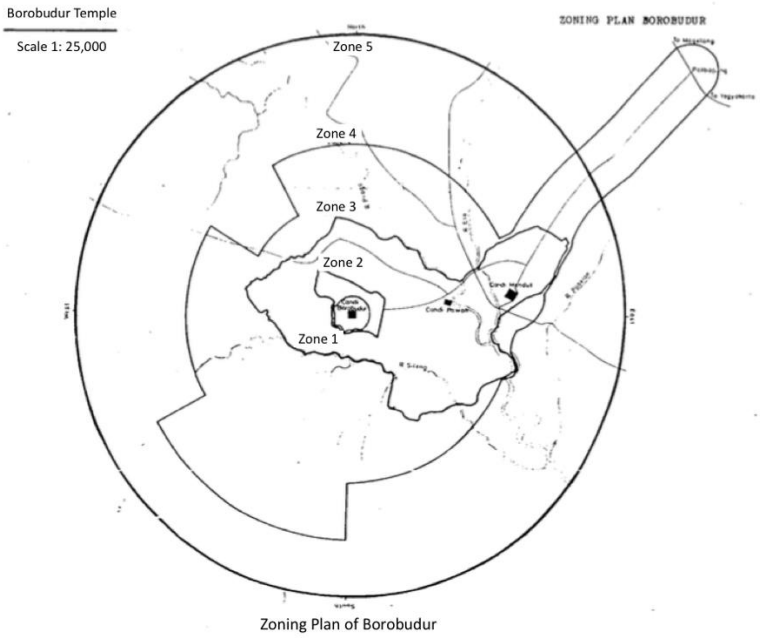
2.2.3 MANAGEMENT OF BOROBUDUR COMPOUND

The Indonesian government established five management zones for the Borobudur Temple Compound with the support of UNESCO and Japan International Cooperation Agency (JICA). These include:

- Zone I (managed by the Ministry of Education and Culture of the central government), covering an area with a radius of 100 to 300 meters from the temple;
- Zone II (managed by a state-owned institute PT. Taman Wisata Candi Borobudur, Prambanan and Ratu Boko - TWC) with a radius of up to 2.5 kilometers; and
- Zone III-V (managed by local government of Kab. Magelang), the area beyond 2.5 kilometers from the temple.

Zone I covers the area of the three temples themselves. The Ministry is obligated to protect and maintain the physical state of the temples. Zone II is the area where tourism, research and conservation activities are carried out. Zone III-V is where any planning, usage or development must be monitored.

FIGURE 7: ZONING MAP OF THE 5 MANAGEMENT ZONES



Zoning Plan of Borobudur

Source: http ://whc.unesco.org/

Besides TWC, several stakeholders participate in the preservation, management and development of Borobudur.

- UNESCO – coordinated and funded the restoration of Borobudur (it provided a total amount of USD 7 million between 1972 and 1983.) It also offers financial and technical support in case of destruction (it donated USD 3 million as a part of the costs towards the rehabilitation of Borobudur after Mount Merapi's 2010 eruption), and supports sustainable tourism development (both in motivating and supporting local community in the Borobudur area and preservation of the monument itself).
- Borobudur Studies and Conservation Institute (under Ministry of Education and Culture) – conservation and preservation management of the Borobudur Temple (Zone I). They also work with Gadjah Mada University of Yogyakarta for conservation and preservation programs.
- Kab. Magelang – monitors the planning, usage and development in the greater Borobudur area (Zone III – V).
- Surrounding villagers are of course key stakeholders and should be engaged in the development, operations and management of the destination.

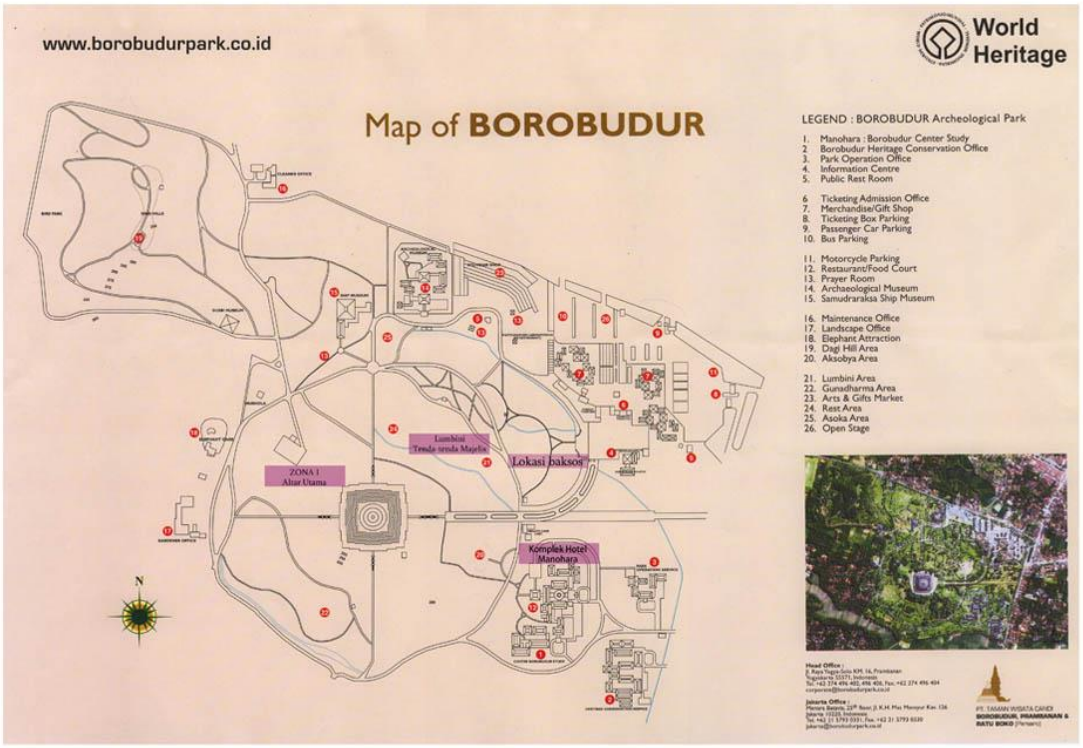
Each party has its own mandates and objectives and is responsible for different sections of the site. TWC is more business orientated, while the local government's main interest is increasing tourism contributions to regional income. It is understandable therefore that the two organizations want more visitors to raise revenue and contribute to the local economy.

On the other hand, Borobudur Studies and Conservation Institute is a conservation agency and more concerned with the adverse impact that visitors have on the temple. As a result, there is a lack of a common vision and clear mechanism to coordinate these parties for the conservation and promotion of the Borobudur area.

2.2.4 VISITOR'S EXPERIENCE OF BOROBUDUR TEMPLE

The visitor's experience follows the following sequence:

FIGURE 8: MAP OF BOROBUDUR



Source: Taman Wisata Candi

Bus Parking

Capacity: With a total area of 4 hectares, the car park can accommodate 100 buses and 230 cars.

Tickets (Fares and Admission Office)

Admission tickets for Indonesian residents cost IDR 30,000 (approximately USD $2.30) for adults while students pay IDR 15,000 (approximately USD $1.15).

The ticket admission for foreigners are significantly higher than the locals which are IDR 325,000 (USD $25) for adults and IDR 195,000 (USD $15) for children.

The signature sunrise trip at Borobudur is IDR 400,000 (USD $31) for foreign visitors and IDR 270,000 (USD $21) for Indonesians.

The package including Borobudur Temple and Prambanan costs IDR 520,000 (USD $40) for adults and IDR 325,000 (USD $25) for children (valid for two days).

Visitor's Centre & Audio Centre

The main function of the visitors' center is ticketing and to provide basic information about the temple itself and about the facilities inside the Borobudur Temple Compound. There is a documentary film screening about Borobudur Temple in the audio-visual room. It is of comparatively poor quality and therefore not very popular. While it is in principle a good idea and appropriate service, the quality and presentation could definitely be improved.

Shops & Restaurants

Stalls for souvenir shops are located in the market near the exit through which all visitors need to pass before leaving the Borobudur Temple Compound.

There are inadequate restaurants, offering breakfast and simple lunches. The quality of the facilities and meals is mediocre.

Restaurants inside the Compound are mainly in Manohara Hotel.

Museums

There are two museums located within Borobudur compound a few hundred meters to the north of the temple (the entrance fee is included within the Borobudur entrance ticket):

- Samudra Raksa Museum Gallery is a maritime museum featuring ancient maritime Indian Ocean trade among Indonesia, Madagascar, and East Africa, popularly referred to as "the cinnamon route". The centerpiece of the museum is the full-scale reconstruction of the 8th-century Borobudur ship which was used in a successful expedition from Indonesia to Madagascar and Ghana in 2003 to 2004. The ship is 25 meters long and modelled after wall reliefs found on Borobudur Temple.
- Karmawibhangga Museum Gallery is also known as Borobudur Museum featuring pictures of Karmawibhangga bas reliefs carved on the hidden foot of Borobudur, some disassembled Borobudur stones, and other archaeological artefacts found around Borobudur and Jawa Tengah. The museum also displays the Borobudur architecture and structure, as well as the documentation of the restoration project conducted between 1975 and 1982 under UNESCO guidance. The museum was built in traditional Javanese architecture.

Both of these museums use primarily pictures and text to display the history and stories, without any interactive elements. There is no record on the number of visitors to these museums but from our observation only frequent independent travelers (FITs) who are more interested in history and culture of the area would visit and spend time in these museums. It is likely that tour groups do not have sufficient time to include a museum visit during their stay.

Vegetation around the Temple

The luxurious trees and vegetation planted around the Temple add to the experience as one proceeds from the entrance to the temple itself, and complement the scenery of the surrounding area when viewed from the top of the Temple. The trees also provide shelter and shade, protecting visitors from the sun.

FIGURE 9: LUXURIOUS VEGETATION AROUND BOROBUDUR TEMPLE

Source: Online Photo Stock

Hawker Problem

The "hawker problem" is considered to be a problem and source of dissatisfaction by many visitors. This issue has two components:

- The first is the chaotic vendor stalls that visitors must walk through before exiting the Borobudur compound which is incompatible with visitors' expectations of a world class heritage site. Many vendors travel from around Java to set up stalls. As such not all of the business activities at the stalls benefit the local communities; and
- The second involves local villagers who received lifetime free access to the Temple when they were displaced from their homes to make way for the establishment of the Compound. Today, they enter the Temple freely and sell unrelated items such as water and snacks close to the temple itself. Both problems are exacerbated during peak periods and disturb and frustrate visitors.

TWC has been trying to control the hawkers for over a decade however they have limited power to police and regulate the local community.

2.2.5 CARRYING CAPACITY OF BOROBUDUR TEMPLE

The main attraction of Borobudur, Borobudur Temple, is rather small in size at around 15,000 square meters, compared to the much larger scale world wonders such as the Great Wall of China or Angkor Wat in Cambodia. The small capacity of the monument and rising visitor numbers have been causing an overloading problem, especially during peak season.

The Borobudur Studies and Conservation Institute has indicated in interviews with Horwath HTL that the optimal capacity of the Temple itself, from a conservation point of view, is under 200 visitors on the temple at any one time[2]. In our meetings, this carrying capacity was widely accepted by the Dinas Pariwisata of Magelang as well as the TWC and as far as we know, there is no carrying capacity endorsed by UNESCO.

Despite exceeding the endorsed carrying capacity, there are currently no systems in place to regulate or limit the number of visitors allowed at one time or per day or to introduce mandatory guided tours to regulate visitor activities. Despite warning signs on all levels not to touch anything, the regular transmission of warnings over loudspeakers and the presence of guards, vandalism on reliefs and statues is a common occurrence.

FIGURE 10: PHOTOS OF VISITORS AT BOROBUDUR TEMPLE

Source: Online photos

2.2.6 BUKIT RHEMA & PUNTHUK SETUMBU

Besides the key attractions of the three distinctive temples, there are some surrounding attractions that are frequently visited by visitors of Borobudur (Figure 11). These attractions include:

- Punthuk Setumbu: a sunrise spot with Mount Merapi and Mount Merbabu as the background and the view of Borobudur from above - 5 kilometers from Borobudur; and
- Bukit Rhema: an abandoned prayer house for a view of Borobudur surrounded by mountains - 4 kilometers from Borobudur.

[2] This equates to around 3,000 pax / day (200 pax x 1hr climb x 15 hrs). In 2015 there were 3.6 million visitors (see below) and during peak periods daily entrance exceeded 20,000 pax.

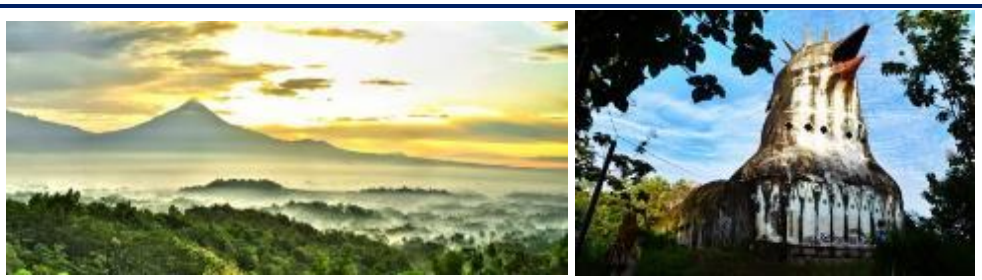
FIGURE 11: LOCATION OF POPULAR ATTRACTIONS SURROUNDING BOROBUDUR

Source: Google Map

Punthuk Setumbu is mostly visited by independent travelers as a cheaper option to substitute the sunrise at Borobudur where the entrance fee is high for both foreign visitors and Indonesians. (IDR 400,000 and IDR 270,000 respectively).

Bukit Rhema became popular because of its unique design as a 'chicken church' and the panoramic views. It was built by a man called Daniel Alamsjah in 1990 after he had a "vision from God" to build a prayer house on top of a hill. Both Punthuk Setumbu and Bukit Rhema have become even more popular among local visitors after they were featured in the popular Indonesian movie Ada Apa Dengan Cinta 2 (AADC 2).

FIGURE 12: IMAGES OF PUNTHUK SETUMBU AND BUKIT RHEMA



Source: Online Photo Stock left: sunrise at Punthuk Setumbu; right: Bukit Rhema)

2.2.7 SURROUNDING CULTURAL VILLAGES

In addition to the above attractions, there is an increasing number of cultural village tours around Borobudur which we believe have tremendous potential to distinguish the Borobudur area from other heritage or religious destinations across the country or even across the globe. There are around 20 villages surrounding the Borobudur Temple, each unique in its own way, distinguished by the specialties and cultural practices of the villagers. Figure 13 depicts the location and some visitor activities in Candirejo Village which is one of the more developed cultural villages located about 3 kilometers from Borobudur:

FIGURE 13: LOCATION AND ACTIVITIES IN CANDIREJO VILLAGE

Source: Google Map and Online Photo Stock (Up from left: location of Candirejo Village, Andong ride (horse cart); bottom from left: rice field with Borobudur as the background, pottery making, rattan making)

In the past, visitors visiting Borobudur visited the temple as one single monument. Now, however, there is a rising awareness of Borobudur Temple as the center of a wider cultural landscape. The surrounding villages retain many of their cultural traditions including ceremonies such as traditional dance, music and visual arts as well as farming, pottery, crafts and cooking.

Visitors going on these village tours can see traditional art performances, visit home industries such as pottery and tofu making and at the same time enjoy the beautiful rural landscape. These tours are usually organized on push bike or traditional 'Andong' (horse-drawn passenger cart). Visitors visit the villages assisted by a tour guide through several predetermined routes which are flexible depending on the situation, time availability and the visitors' preferences.

Homestays have sprung up in these cultural villages where visitors can stay with the locals and experience their daily lives in a more intense and almost untouched way. Through village tours and interaction with the villagers, visitors gain a more in-depth understanding of the local culture, adding another dimension to experiencing the destination.

2.2.8 PROJECTS WITHIN THE BOROBUDUR CLUSTER

We are aware of the following TWC projects, planned and ongoing:

- Together with Kab. Magelang, TWC is planning to build a market (around 6 hectares) with car park outside Borobudur and then relocate the current vendors. The existing market place may be turned into a botanical garden. It is understood to be still in the planning stage.

- There is also a plan to add one more entrance and a ticket office. This project is also understood to be in the planning stage.
- TWC is trying to develop a smart ticketing system to better manage and monitor the number of visitors. It is understood that this is already budgeted by TWC.
- TWC has an ongoing campaign to develop the surrounding villages into tourism villages based on the specialty of each village. It offers assistance in infrastructure and training and has been rolled out in the first few pioneer villages.

2.2.9 THE PRAMBANAN-BOKO CLUSTER (KAB. SLEMAN, KEC. PRAMBANAN & KAB. KLATEN, KEC. PRAMBANAN)

2.2.9.1 PRAMBANAN

Prambanan Temple is the largest Hindu temple of ancient Java, and the first building was completed in the mid-9th century. The temples collapsed during a major earthquake in the 16th century and were abandoned. It was rediscovered in 1811 during British occupation under Sir Thomas Stamford Raffles, who also rediscovered Borobudur. In 1918, the Dutch began reconstruction of the compound and proper restoration began only in 1930. It was listed as a UNESCO World Heritage Site in 1991 together with Borobudur. Efforts at restoration continue to this day. The Prambanan Temple and its surrounding area are also managed by PT. Taman Wisata Candi Borobudur, Prambanan and Ratu Boko, the same state-owned enterprise managing Borobudur.

It should be noted that there is a popular Ramayana Ballet at Prambanan which has run since 1961. The performance is held in an open theatre in the Prambanan Temple Complex at nights during the dry season (and indoors during the wet season). The dance and uniform portray the Javanese tradition and culture and is a popular night activity.

Although Prambanan Temple is a Hindu temple while Borobudur Temple is a Buddhist one, it is often visited in combination with Borobudur for domestic and international visitors alike. There are three reasons for this:

1. both Prambanan Temple and Borobudur Temple are magnificent historical Javanese temples dated back to the 9th to 10th century and 8th to 9th century respectively. They are also both UNESCO World Heritage Sites;

2. they are under the same management of PT Taman Wisata Candi Borobudur, Prambanan & Ratu Boko (TWC) and thus are often marketed and promoted via similar channels; and

3. the distance between the two temples is only 55 kilometers and around 1.5 hours by car under normal travelling conditions.

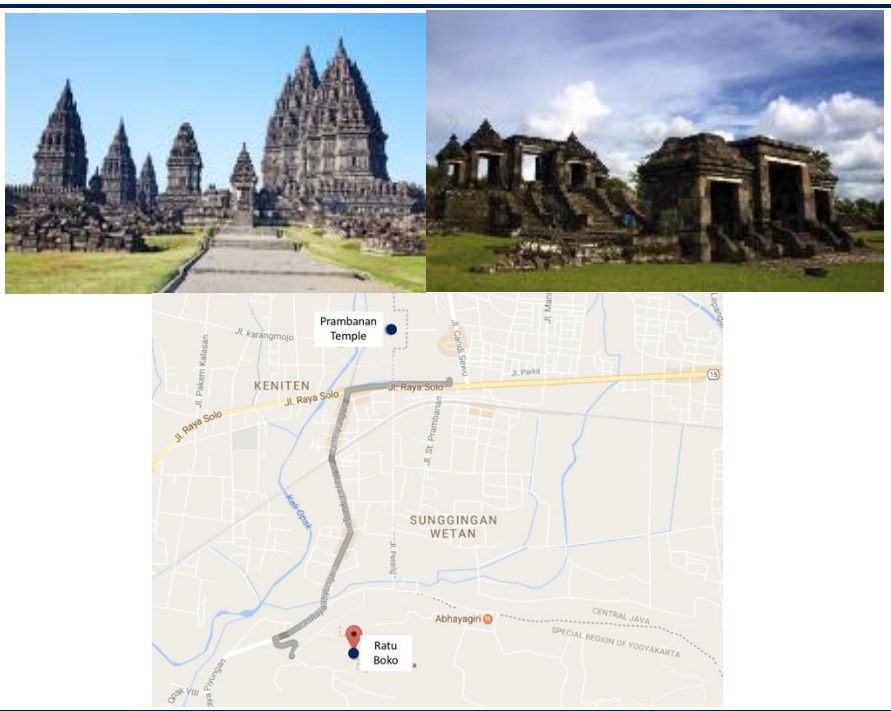
2.2.9.2 RATU BOKO

In Javanese, Ratu Boko means "Stork King". Located 3 kilometers from Prambanan, Ratu Boko covers 16 hectares in two hamlets (Dawung and Sambireja) of the village of Bokoharjo and Prambanan. The history of Ratu Boko is unclear, and much of what is understood about the site comes from inscriptions and folklore. The oldest inscription found on the site is believed to date back to 792AD, naming the site Abhayagiri Wihara.

A mix of Buddhist and Hindu structures are found in the complex, including the Buddhist Dyani Budha, Stupika, Terakota Tablet, and a gold and silver plaque with a Buddhist inscription. There are also three small Hindu temples, as well as Yoni, a Durga statue, a Ganesha statue and a plaque with an inscription to Rudra, the other name for the god Shiva.

However, Ratu Boko has not been a popular attraction as most of the site was destroyed and is slowly being restored using limited resources.

FIGURE 14: IMAGES AND LOCATIONS OF PRAMBANAN TEMPLE AND RATU BOKO



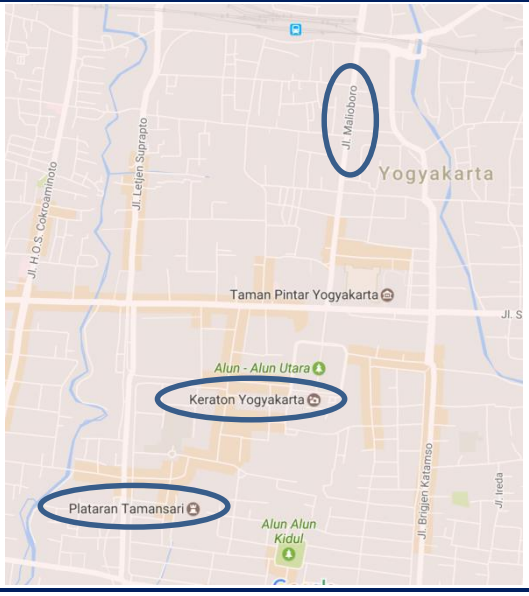
Source: Online Photo Stock (top left: Prambanan Temple; top right: Ratu Boko); Google Map

2.2.10 THE YOGYAKARTA CLUSTER

Yogyakarta is one of the most attractive cities in Java and Indonesia. It offers a mix of attractions that covers cultural and historical aspects (The Kraton, Kota Gede, Water Castle, etc), shopping (the famous Malioboro shopping street and various shopping centers) and a wide range of restaurants.

In Yogyakarta, there are 3 key attractions: the Kraton, Taman Sari and Malioboro Shopping Street as illustrated in Figure 15.

FIGURE 15: KEY ATTRACTIONS, KOTA YOGYAKARTA



Source: Google maps, Horwath HTL

2.2.11 KRATON (PALACE) OF YOGYAKARTA

The Kraton is not only a residence for the king and his family, it is also a living museum that centers around Javanese culture. At the Palace, visitors can learn and see directly how the Javanese culture continues to live and be preserved.

It is a popular attraction surrounded by the old streets of Yogyakarta. Within the Palace there are glass boxed collections of antiquities ranging from ceramics and glassware, weapons, photographs, miniatures and replicas, to batik cloths and tools from batik manufacturing. There are also a variety of performances such as macapat, puppet shows, shadow puppets, and dances.

2.2.12 WATER CASTLE (TAMAN SARI)

The Water Castle is a site of a former royal garden of the Sultanate of Yogyakarta. Built in the mid-18th century, Taman Sari has four distinct areas: a large artificial lake with islands and pavilions located in the west, a bathing complex in the center, a complex of pavilions and pools in the south, and another smaller lake in the east. Today only the central bathing complex is well preserved, while the other areas have been largely occupied by Kampung Taman (settlements inside Taman Sari).

2.2.13 MALIOBORO SHOPPING STREET (JALAN MALIOBORO)

Malioboro Shopping Street is a major shopping street in Yogyakarta. The name is also used more generally for the neighborhood around the street and it lies on a north-south axis in line between the Kraton and Mount Merapi. The street is the center of Yogyakarta's largest tourist district surrounded with many hotels, restaurants and shops. Sidewalks on both sides of the street are crowded with small stalls selling a variety of goods and oleh oleh (souvenirs). In the evening, several open-air street side restaurants, called 'Lesehan', operate alongside street musicians and painters.

FIGURE 16: IMAGES OF THE KRATON, WATER CASTLE AND MALIOBORO SHOPPING STREET

Source: Online Photo Stock (from left: the Kraton, Water Castle and Malioboro Shopping Street)

2.2.14 MOUNT MERAPI AND MOUNT MERBABU

We have not included the volcanoes of Mount Merapi & Merbabu in the key attractions of Yogyakarta as they are not believed to have the same draw as the above listed 3 key attractions. That said, they are areas of interest for visitors to Yogyakarta.

Borobudur is located in an elevated area between two twin volcanoes, Sundoro-Sumbing and Merbabu-Merapi, and two rivers, the Progo and the Elo. According to local myth, the area known as Kedu Plain is a Javanese "sacred" place and has been dubbed "the garden of Java" thanks to its high agricultural fertility. Mount Merapi is the most active volcano in Indonesia and has erupted regularly since 1548. Adjacent to Mount Merapi is the dormant volcano of Mount Merbabu. Unlike other volcanos in Indonesia that are accessible and fit for welcoming visitors; due to the lack of infrastructure and the geographical configuration of the mountains themselves, these two are more difficult to access. As a result, the trekking tours to Mount Merapi and Mount Merbabu, together with rafting along Progo and Elo rivers are considered niche tourism products to target the adventurous visitors typically staying in Yogyakarta. It is believed that they do not offer potential to be developed into significant, and even less so mass tourism, attractions.

2.3 CONCLUSIONS ON ATTRACTIONS

The key attractions as defined above are the clusters of Borobudur, Prambanan and Kota Yogyakarta. We note that each of the remaining 5 tourism clusters, although not prioritized, should not be ignored and should be restored in due course by the cities in question. They will add value to the tourism assets of the city.

Going forward it is recommended that the Borobudur and Prambanan Temple Compound experiences should be refreshed (Prambanan to a lesser extent), with a complete overhaul of the product to enhance the cultural aspects and minimize the dissatisfaction currently experienced. The destination could be further enhanced with the integration of the surrounding cultural villages. The hub for tourism is and will always remain Kota Yogyakarta with its wide-ranging offer of accommodation and supporting tourism facilities. This will continue to attract large volumes of domestic visitors plus some foreigners. That said, the tourism attraction of Kraton and Tamansari should also be refreshed.

3. VISITOR ARRIVALS & DEMOGRAPHICS

The tourism arrival analysis includes different types of visitors who can overlap: foreign and Indonesian visitors staying in commercial accommodation, domestic visitors staying at family and relatives plus day visitors to the Borobudur and Prambanan temples.

The Report distinguishes between foreign and domestic visitors, and includes a focus on visitors to the key clusters of Borobudur, Prambanan and Kota Yogyakarta (the Destination).

3.1 FOREIGN VISITORS

Foreign visitors accounted for only 293,500 visitors to the Destination in 2015 (2.5% of total arrivals to the Destination).

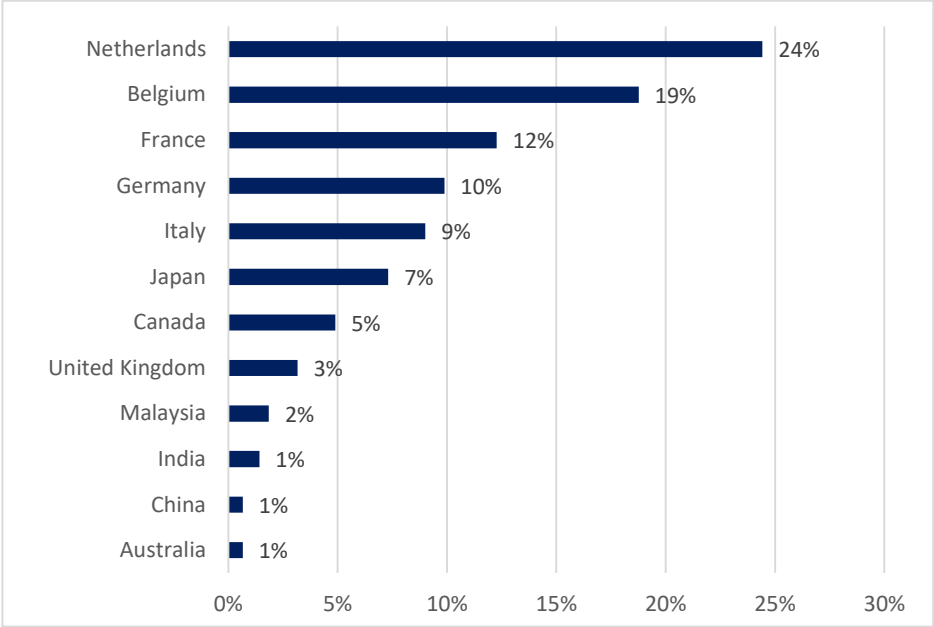
Unlike domestic visitors, most foreigners visit Borobudur and/or Prambanan Temples. It is estimated by TWC that 60% of the foreign visitors to Borobudur temple also visit Prambanan temple.

3.1.1 A SMALL PROPORTION OF INTERNATIONAL VISITORS TO INDONESIA

The 293,500 foreign arrivals represent 2.5% of international visitors to Indonesia (10.2 million in 2015). This proportion is slightly higher for European visitors (Netherlands, France; Belgium, Germany, Italy). This tends to show that the Destination (and particularly Borobudur) may be a 'must visit site' for certain international visitors, but is ignored by a larger segment, especially visitors from China, India, Malaysia and Singapore (less than 2% of visitors).

Japan is the only Asian country with a significant number of visitors to Borobudur temple. This may be explained both because of religious affinities and appetite of the Japanese for cultural tourism, and because the Japan International Cooperation Agency participated in the conservation of the heritage site at the moment of its inscription as a UNESCO World Heritage Site, contributing to the awareness of the site in Japan.

FIGURE 17: BREAKDOWN OF FOREIGN VISITORS TO BOROBUDUR TEMPLE BY NATIONALITY, 2015



Source: TWC

Other countries like Malaysia, Singapore and China plus Australia are under-represented vis a vis their visitor numbers to Indonesia. This is consistent with the lesser awareness of Borobudur among interviewed tour operators in China, for instance[3].

These figures demonstrate that Borobudur is far from reaching its commercial potential among visitors from Asia.

3.1.2 ACCOMMODATION OF FOREIGN VISITORS

The main options to spend the night for the visitors of the temples are:

- DI Yogyakarta (particularly Kota Yogyakarta), which accounts for 75% of foreign arrivals; and
- Kab. Magelang which accounts for 25% of foreign arrivals. International guests account for as much as 50 to 70% of the total hotel guests in Kec. Borobudur & Kec. Mungkid.

[3] Awareness and image of the destination among international markets will be developed further ahead.

Arguments in favor of choosing accommodation in Borobudur area for international guests	Arguments in favor of choosing accommodation in DI Yogyakarta for international guests
Better quality of accommodation for higher-end guests who wish to stay at a high quality standard boutique hotel and enjoy its amenities (spa, swimming pool, garden, restaurants…)	More activities, services and dining options
Rustic homestays for those who want to explore the villages and are attracted by an immersive experience, and those who speak either Bahasa Indonesia or English	Events at night in the streets
Closeness to the heritage site for those wishing to visit it at sunset	Greater choice of hotels for all budgets
➔ Only niche segments currently prefer to spend the night in Borobudur.	Greater choice of accommodations adapted to groups
	Possibility to combine with a visit to the old city center (Kraton, museum…)
	Proximity to the international airport and Prambanan
	More people speak English and other foreign languages in hotels and restaurants
	➔DI Yogyakarta appeals to a greater segment of visitors as a place to spend the night

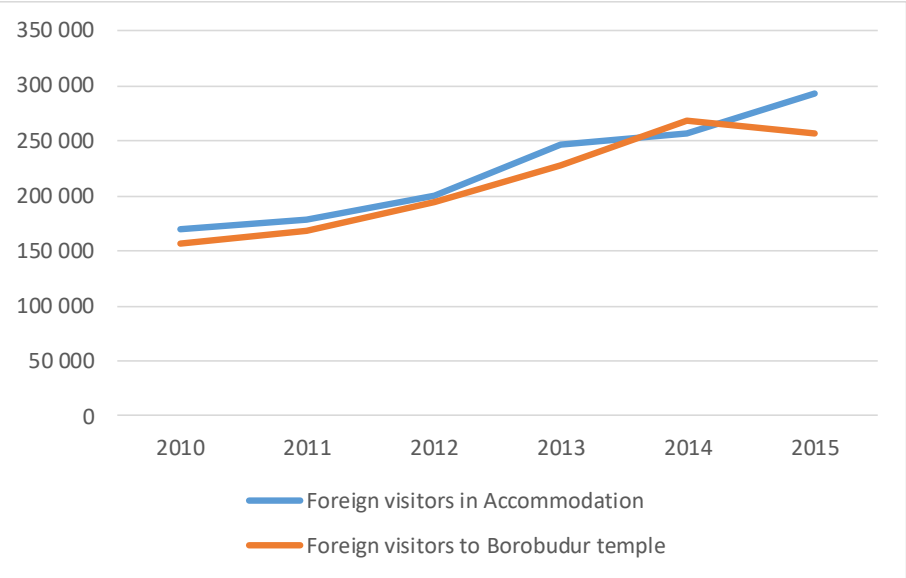
Some hotels, especially star-rated, are trying to offer a range of activities such as village tours featuring home industries like tofu, glass noodles, or pottery (by walking, bike or horse cart), sunrise tours (at Borobudur or Punthuk Setumbu), adventurous activities (hiking or rafting), horse, elephant or jeep riding around the surrounding area so as to lengthen the average length of stay (ALOS) of guests. However, as leisure, quality dining and entertainment options around Borobudur Temple Compound itself are very limited, the majority of foreign visitors either favor a visit and /or night stay in Kota Yogyakarta, or enjoy the amenities of their hotel in Borobudur (spa, swimming pools and hotel's restaurant).

The average length of stay is 1.8 nights for foreign guests. It is 1.3 nights in Kab. Magelang, as Borobudur is the only place to visit, and 2 nights in DI Yogyakarta, where guests will visit the city, Borobudur temple and Prambanan Temple.

3.1.3 GROWTH OF FOREIGN VISITOR ARRIVALS

Foreign visitor arrivals experienced significant growth between 2010 and 2015 of more than 10% per year, as shown in Figure 18. The average annual growth rate (CAGR) of 6.5% between 1975 and 2015 is lower than for domestic visits, 9.1%.[4]

FIGURE 18: GROWTH OF FOREIGN VISITORS ARRIVALS 2010-2015



Source: TWC and BPS Accommodation Survey

The graph shows that arrivals at commercial accommodation and visitors of Borobudur Temple follow a very similar trend, as more than 90% of foreign visitors to the Destination go to the temple.

It is noted that foreign visitors to Borobudur Temple dropped significantly in 2015, whereas domestic visitors continued to grow (similar pattern at Prambanan Temple). Possible reasons for the decline in international arrivals is the over-crowding of the monument and the unregulated hawkers, causing negative impacts on the image of the destination.[5]

[4] The historical data on domestic and foreign arrivals are provided by the Accommodation survey. It should be noted that there are discrepancies between the BPS data (Published in Kabupaten-Magelang-Dalam-Angka-2016) and Yogya Tourism office data (published in Statistk Kepariwisatan 2015, Dinas Pariwaiata Daerah Istimewa Yogyakarta). The figures for 2015 are approximately at the same level, but not the evolution between 2011 and 2015. We have opted for the BPS data, whose more gradual evolution during the last 5 years seems more realistic.

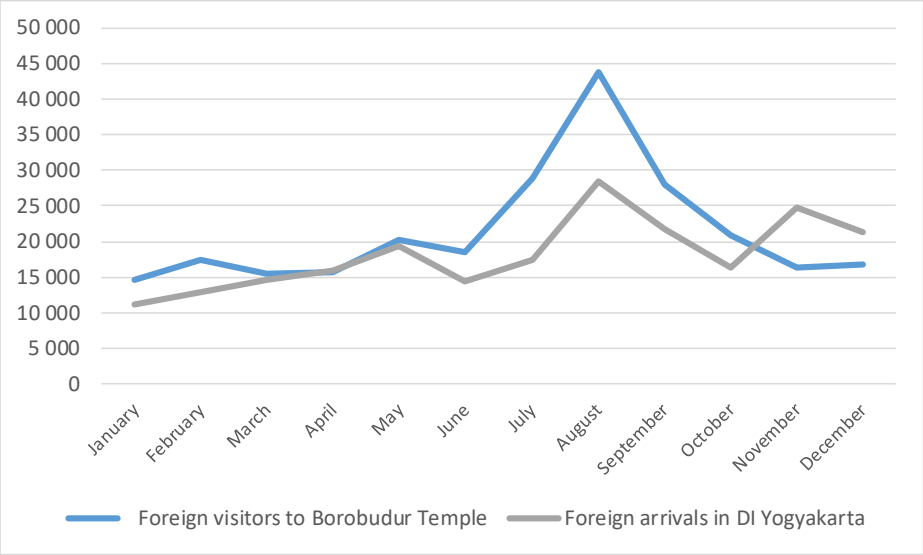
[5] An analysis of the image of Borobudur presented further ahead will confirm that this is indeed an important source of dissatisfaction among visitors, even leading some potential visitors to question the value of the visit or prompt them to visit to Prambanan instead of Borobudur.

3.1.4 SEASONALITY OF FOREIGN VISITOR ARRIVALS

The seasonal pattern of foreign visitors is completely different than that of domestic visitors:

- There is an important peak in foreign visitors to Borobudur Temple in the Northern summer months. This is the favorite period for European visitors to Indonesia, who represent an important proportion of foreign visitors to the Temple. There is no peak in December peak since the nationalities who visit most actively during this Southern summer month (Australians, Singaporeans and Malaysians) account for a small share of overall Borobudur visitors. There is no peak for Vesak Day, as the share of foreign visitors from Buddhist countries is very low; and
- Figure 19: this seasonal peak is less pronounced among the foreign guests at commercial accommodation in DI Yogyakarta (monthly results are not available for Kab. Magelang).

FIGURE 19: BREAKDOWN BY MONTH OF FOREIGN VISITORS AT COMMERCIAL ACCOMMODATION IN DI YOGYAKARTA AND AT BOROBUDUR TEMPLE 2015



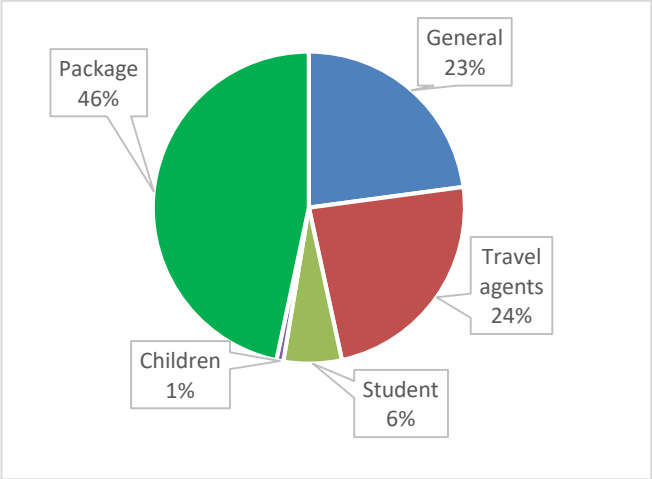
Source TWC

3.1.5 BEHAVIOUR OF FOREIGN VISITORS

Despite their short length of stay, 46% of foreign visitors buy a package including the visit to Borobudur Temple plus:

- Visits to the other temples, especially Prambanan (see detailed analysis below); and
- A package bought through a local agency in Indonesia or by a foreign tour-operator may also include transportation, accommodation or volcano tours to Merapi or Bromo.

FIGURE 20: BREAKDOWN OF FOREIGN VISITORS TO BOROBUDUR TEMPLE BY TICKET TYPE, 2015



Source TWC

The Destination is not a standalone destination for foreign visitors. Figure 21 illustrates how the attractions of the Destination are included in the tours of international tour operators. Though not exhaustive, this sample is representative of the propositions considering that operators all have the common objective: include as many "must-see" sites as possible in the proposed tours.

The lack of accommodation and infrastructure is considered very crucial for this destination, especially in Yogyakarta, which is the point of arrival by air for international visitors.

FIGURE 21: PLACES ASSOCIATED WITH BOROBUDUR IN PACKAGES OFFERED BY TOUR OPERATORS INTERVIEWED

Country	Destination Associated
Australia	Example 1: Java Island / Jakarta, Pangandaran, Jogjakarta, Borobudur, Seloliman Nature Reserve, Bromo, Kalibaru, Pemuteran / Bali Island - Intrepid (14 days)
China	Not commercialized in the sample analyzed.
France	Example 1: Java Island/ Yogyakarta, Borobudur, Selo, Merapi, Prambanan, Tawangmangu, Sukuh, Malang, Tumpang, Ranupani, Kalimati, Semeru, Kalimati, Ranupani, Bromo, Cemorolawang, Pananjakan, Cemorolawang, Kawah Ijen; Bali Island; Lombok Island (22 days) - Balaguère Example 2: Java island / Semarang, Wonosobo, Dieng, Borobudur, Jogjakarta, Prambanan, Jombang, Trowulan, Bromo, Surabaya, Makassar, Rantepao, Toraja, / Bali island (16 days) - Asia Example 3: Java island / Jogjakarta, Prambanan, Keraton, Jogjakarta, Borobudur, Mont Bromo, Mont Ijen / Bali Island (16 days) - Makila

Country	Destination Associated
Germany	Example 1: Java Island / Jakarta, Bandung, Tangkuban Perahu, Sariater, Bandung, Jogjakarta, Borobudur, Jombang, Malang, Bromo, Kalibaru / Bali Island: Bali, Ubud, Mengwi; Bedugul, Lovina, Candidasa, Sanur – Tui (16 days) Example 2: Java Island / Yogyakarta / Solo, Prambanan, Borobudur Temple, Dieng Plateau, Yogya, Surabaya, Mount Bromo, Mount Penanjakan, - Transorient (5 days)
Japan	Example 1: Java Island / Jakarta, Jogjakarta, Borobudur, Jogjakarta / Bali Island - Japan Travel Bureau (8 days) Example 2: Bali Island / They stay at Denpasar during all the stay and take plane for visiting places in Java on the: 2nd day for Prambanan & Yogyakarta & Borobudur;
Malaysia	Example 1: Java Island / Kasongan, Parangtritis Beach, Merapi Volcano, Borobudur, Kraton Yogjakarta, Taman Sari – Ice Holidays (4 days)
Singapore	Example 1: Java Island / Yogjakarta, Mangkunegara Palace, Bengawan Solo, Yogya Return Monument Malioboro Road, Pasar Bringharjo, Sultan Palace, Borobudur Temple, Mendut Temple, Pawon Temple, Ketep Pass, Sleman Village – Euro Asia (3 days) Example 2: Java Island / Semarang, Ambarawa, Candirejo, Borobudur, Jogjakarta, Kota Gede, Jogjakarta, Kaliurang, Merapi, Prambanan, Solo, Jombang, Trowulan, Pasuruan, Bromo, Surabaya (7 Days) Cango Travel
UK	Example 1: Java Island / Jogjakarta, Borobudur (2 days), Mount Kelud, Malang, Bromo; Bali Island – Abercrombie & Kent (13 days)

Source: Analysis of packages offered by tour operators interviewed by Horwath HTL (qualitative sample of 41 tour-operators)

3.1.6 AWARENESS, IMAGE & SATISFACTION OF FOREIGN VISITORS TO THE DESTINATION

Yogyakarta enjoys a good awareness at international level both among the travel trade and the general public. It is considered both a cultural and urban destination. Besides its cultural attractions (Kraton, Tamansari), its main assets are related to its economic capital status:

- More activities, services and dining options,
- Events at night in the streets,
- Greater choice of hotels for all budgets, as well as accommodations adapted to groups.

Kab. Magelang is mainly identified with Borobudur, which benefits from a very good awareness at the international level and will be discussed in more detail in a following section.

3.2 DOMESTIC VISITORS TO THE DESTINATION

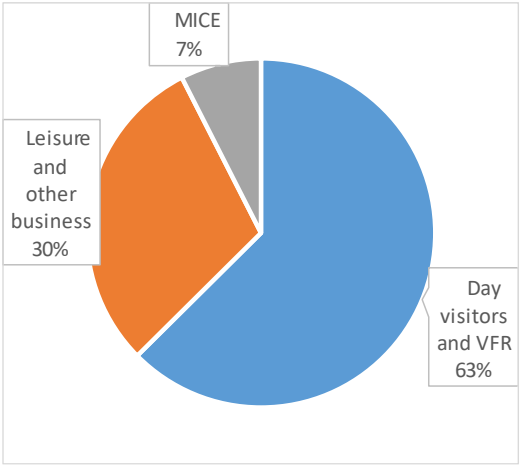
The destination receives predominantly domestic visitors. They accounted for 11.209 million arrivals at the Destination in 2015, around 97.5% for total arrivals (11.502 million).

2 categories of domestic visitors can be distinguished.

- Domestic visitors staying with family and relatives (VFR) and day visitors represented 7.0 million arrivals in 2015. Day visitors focus on the Borobudur Temple (approximately 1.2 million students and 986,000 other local visitors).

- Domestic visitors staying in commercial accommodation represented 4.196 million arrivals in 2015, with two sub-segments:
  - 842,000 arrivals in 2015 for MICE, mostly to Yogyakarta (well connected, provincial capital, and economic center hosting international hotel chains); and
  - 3.35 million arrivals in 2015 for leisure or other professional purposes: The majority of domestic leisure demand is concentrated in Yogyakarta (weekend getaway destination). It is estimated that only 165,000 of these domestic visitors in the destination visit the Borobudur Temple Compound.

FIGURE 22: BREAKDOWN OF DOMESTIC VISITORS -2015



Source: Horwath HTL, based on BPS data

3.2.1 FOCUS ON VISITORS STAYING AT COMMERCIAL ACCOMMODATION

- They prefer to stay in Yogyakarta rather than in Magelang.
- The average length of stay for the domestic visitors in the destination is around 1 – 1.4 nights (for visitors staying in commercial accommodations).

There are no official statistics on the average spending of domestic visitors. However, based on our interview findings:

- Most of the spending is on transportation (from Yogyakarta to Borobudur around USD 9 – 15 per person) and tickets (Borobudur Temple and Prambanan Temple at ~USD 2) and only a small amount on F&B and souvenirs (around USD 4 – 8); and
- For those staying overnight at Borobudur their additional spending is around USD 8 – 40 per person, depending on the type of accommodation chosen.

Therefore, the estimated average spending for domestic day-trippers (majority of domestic travelers) is around USD 17 – 27 while that of the overnight visitors would be around USD 25 – 67.

3.2.2 FOCUS ON DOMESTIC MICE DEMAND

While there are no official statistics available, it is clear from interview findings that:

- Business and MICE demand comes mostly from domestic visitors (up to 99% according to interviewed hoteliers). The demand mainly comes from the Government, banks, oil companies and consumer goods companies.
- Both business and MICE demand are significant in Yogyakarta. This can be inferred from the fact that the city is the provincial capital, well-connected (with an international airport), an economic center, and hosts international hotel chains, driving business demand;
- Both business and MICE demand is very limited in the area around Borobudur temple, contributing less than 3% of the overall hotel demand, as there is no significant economic center in the area, and because of the lack of suitable facilities: most hotels are small with around 20 to 30 rooms that cannot host more than 50 guests, and have only 1 to 2 meeting rooms. Therefore, they would rather focus on the higher yielding leisure guests[6].
- The two exceptions in Borobudur are Manohara Hotel, located inside the Borobudur Compound and managed by TWC, which attracts some government and company meetings as well as some Buddhist groups; and Plataran, whose conference hall has a maximum capacity of 500 guests.

3.3 VISITORS TO BOROBUDUR & PRAMBANAN TEMPLES

Borobudur temple is the most visited attraction in the Destination, with 3.56 million visitors in 2015 (compared with 1.921 million to Prambanan).

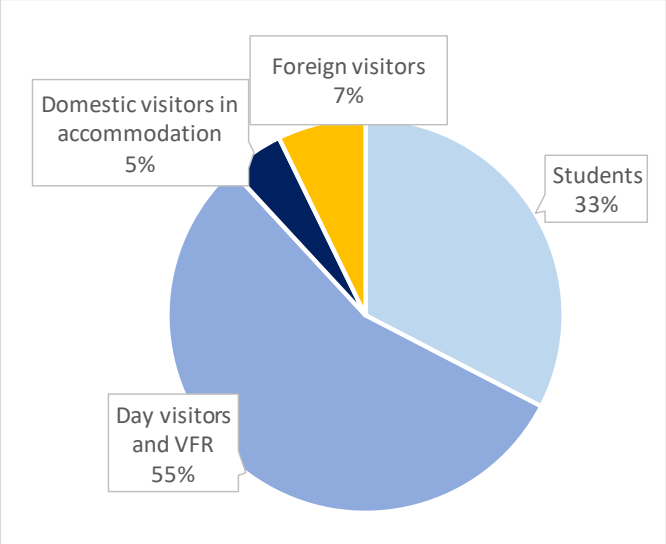
3.3.1 TYPOLOGY OF THE TEMPLE VISITORS

There are 4 segments of visitors to the Borobudur Temple:

- Students and schoolchildren (1.2 million, 33%);
- Day visitors and VFR (1.98 million, 55%). This volume is mainly due to public intervention to encourage visits of this segment, with tickets sold at a discounted price for Indonesians;
- Domestic visitors staying in commercial accommodation (5% of visitors); and
- Foreign visitors: representing 7% of visitors, 256,000 entries, compared with 198,000 at Prambanan). The top 5 nationalities (2014 figures) are the Netherlands, Japan, Malaysia, France and Germany. Malaysia, Singapore, China and Australia are under-represented vis a vis their total visitor numbers to Indonesia.

[6] While pure business guests have a higher spending pattern than leisure guests, the MICE segment usually require discounted rates, which is why when demand from business travellers is non-existent, hoteliers tend to favour leisure demand over MICE demand.

FIGURE 23: BREAKDOWN OF VISITORS OF BOROBUDUR TEMPLE, 2015



Source: TWC

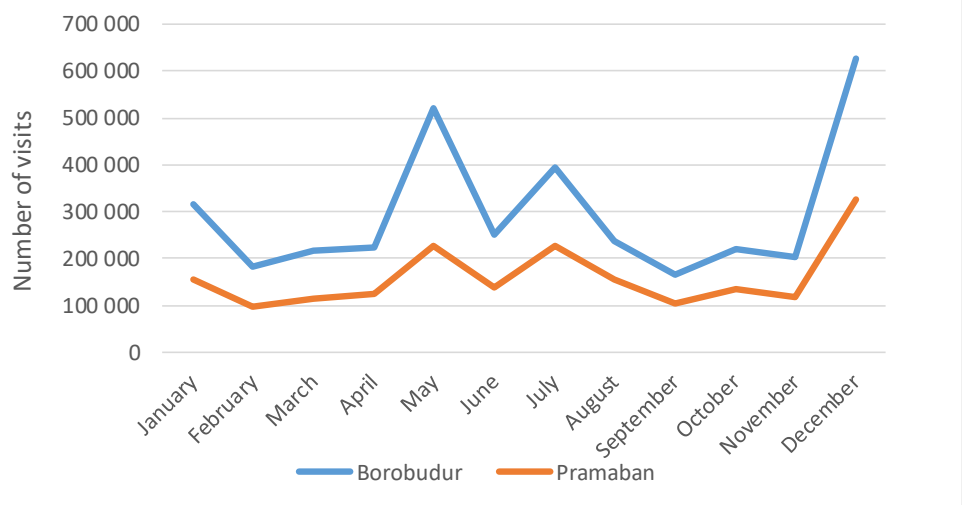
- The typology of visitors to Pramaban is similar, but with a higher proportion of students (54%).
- Regarding domestic visitors, less than 1% of the tickets sold at Borobudur Temple and 7% of those sold at Prambanan temple are packaged including other visits (temples of Prambanan, Ratu Boko, Kariumun Jawa or the Tamahiana show). In other words, domestic visitors consider going to one of them for a day excursion rather than visiting several attractions during a stay in the Destination.
- 47% of foreign visitors buy a package including other visits, most of the time as a one or two-day excursion paired with a visit to Yogyakarta.

3.3.2 SEASONALITY OF VISITS TO THE TEMPLES

The seasonality of visits is very similar for the two temples of Borobudur and Prambanan. It is driven by annual events (Figure 24):

- Local school holidays, together with Christmas and New Years for international visitors during December. Total visitors during this month reaches more than 600,000 (more than 20,000 per day), mostly due to Indonesian visitors. January is also a popular month to visit Borobudur.
- Vesak Day for Borobudur temple: during the full moon in May or June attracts Buddhist pilgrims from Indonesia and around the world. Vesak Day has been an official national holiday in Indonesia since 1983.
- When the temple hosts a performance of Mahakarya Borobudur (usually in October), a traditional Javanese ballet/dance which tells the story of the construction of the Temple.
- In addition, there is a weekly seasonality of the Temple with more domestic visitors coming during weekends (especially long weekends). International visitors try to avoid the crowds by visiting Borobudur during weekdays or early morning.

FIGURE 24: BREAKDOWN OF DOMESTIC VISITS TO BOROBUDUR AND PRAMBANAN TEMPLES BY MONTH, 2015



Source: TWC

3.3.3 GROWTH OF TEMPLE VISITORS

Borobudur temple has become increasingly popular since its reopening. Between 1990 and 2015 the number of tickets sold has increased by a factor 5. Over a more recent period, growth has continued at a high pace for both temples as shown in Figure 25, slightly higher for foreign visitors: however, in absolute volume, it is domestic visitors that are the most important.

Volcanic activities have a great impact on the tourism activities and preservation of Borobudur.

- Eruption of Mount Merapi occurred in October and November 2010 and caused the closure of Borobudur temple for a few days and the closure of the Yogyakarta airport for 3 weeks. In 2012, visitors bounced back by 43% compared to the trough in 2011.
- Visitors to Borobudur continued to grow steadily from 2012 till 2015, despite some natural disasters and security threats during this period such as the eruption of Kelud volcano and a threat posted in the social media by a self-proclaimed Indonesian branch of ISIS, both in 2014.
- In February 2014, the volcanic ash from the eruption of Kelud volcano in East Java caused the closure of major attractions in Yogyakarta and Jawa Tengah, including Borobudur, Prambanan and Ratu Boko.

FIGURE 25: VISITORS TO BOROBUDUR TEMPLE, 2011 – 2015

Year	Foreign visitors	Growth rate of foreign visitors	Domestic visitors	Growth rate of domestic visitors	Total visitors	Growth rate of total visitors
2010	156,247	-	2,283,532	-	2,439,779	-
2011	168,028	*8%*	1,949,817	*-15%*	2,117,845	*-13%*
2012	193,982	*15%*	2,830,230	*45%*	3,024,212	*43%*
2013	227,337	*17%*	3,148,368	*11%*	3,375,705	*12%*
2014	268,664	*18%*	3,159,744	*0%*	3,428,408	*2%*
2015	256,362	*-5%*	3,302,328	*5%*	3,558,690	*4%*

Source: Annual reports of PT. Taman Wisata Candi Borobudur, Prambanan and Ratu Boko

During the same period of time, visitors to Prambanan (Figure 26) experienced a surge from 1,099,484 in 2010 to 1,921,252 in 2015, with a CAAG of 12%. Prambanan visitors have been increasing steadily over the past 6 years driven by domestic growth and despite natural disasters along the way. International visitors actually declined in 2015.

FIGURE 26: VISITORS TO PRAMBANAN TEMPLE, 2011 – 2015

Year	Foreign visitors	Growth rate of foreign visitors	Domestic visitors	Growth rate of domestic visitors	Total visitors	Growth rate of total visitors
2010	132,352	-	967,132	-	1,099,484	-
2011	143,527	*8%*	993,318	*3%*	1,136,845	*3%*
2012	167,169	*16%*	1,107,345	*11%*	1,274,514	*12%*
2013	196,198	*17%*	1,219,531	*10%*	1,415,729	*11%*
2014	206,830	*5%*	1,407,825	*15%*	1,614,655	*14%*
2015	198,490	*-4%*	1,722,762	*22%*	1,921,252	*19%*

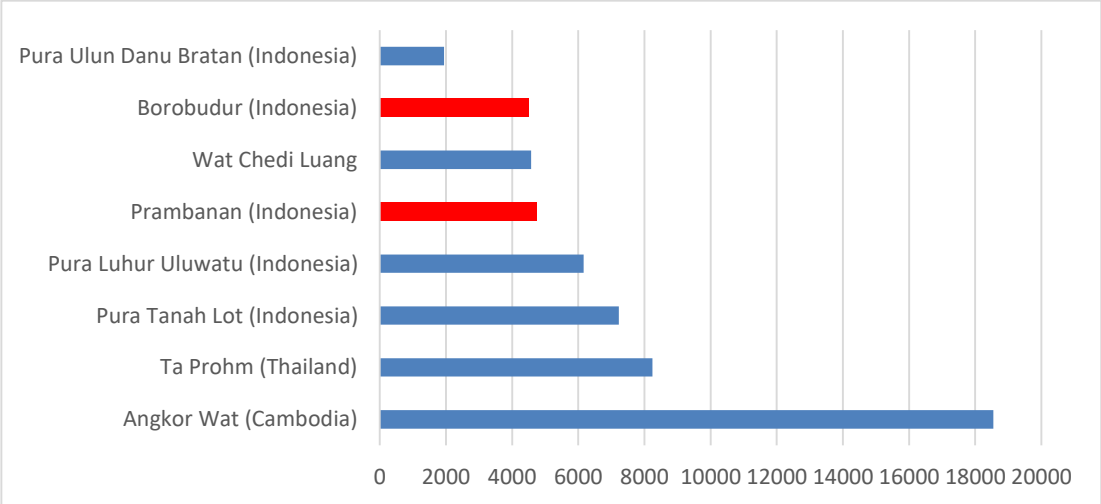
Source: Annual reports of PT. Taman Wisata Candi Borobudur, Prambanan and Ratu Boko

3.4 VISITOR SENTIMENT, LIKES AND DISLIKES

3.4.1 DESTINATION AWARENESS AMONG INTERNATIONAL TRAVELLERS

Borobudur Temple benefits from a very strong awareness at the international level, both among the travel trade and international travelers. However, when compared with other major temples in South-East Asia, Borobudur has a lower awareness, expressed in terms of number of reviews on the TripAdvisor website (Figure 27). Borobudur has 9,154 reviews on TripAdvisor's website (consulted as of October 2016, in all languages available), with Borobudur Temple itself (classified in "Things to do") accounting for 4,513 reviews (consulted as of October 2016).

FIGURE 27: NUMBER OF REVIEWS ON BOROBUDUR TEMPLE COMPARED WITH MAJOR TEMPLES IN SOUTH-EAST ASIA (CLASSIFIED IN "THINGS TO DO"), 2016



Source: Analysis of TripAdvisor Website by Horwath HTL in all available languages, 31/10/2016

Many reviews and opinions about Borobudur Temple as a tourism activity may be found in the English language in user-generated content websites, showing that the awareness of the destination is already widespread (Figure 28).

FIGURE 28: ACTIVITIES & PRODUCTS ASSOCIATED WITH BOROBUDUR ON THE TRIPADVISOR WEBSITE

Number of reviews on TripAdvisor website	Languages	Places/attractions associated with the destination	Topics/ activities/products associated with the destination
Things to do: 4,911 (for 10 items) Lodging: 3,660 (for 34 items) Restaurants: 561 (for 8 items)	50% English 30% Other European languages 10% Bahasa Indonesia 10% Other Asian languages	Borobudur Temple Borobudur tours & travel Selogriyo Temple Javalestari Tour – Day tour Rhema Hill Candirejo Village Sukmojoyo Hill	Cultural visits Day tours

Source: Analysis of TripAdvisor Website by Horwath HTL in all available languages, 31/10/2016. https://www.tripadvisor.fr/Tourism-g790291-Borobudur_Magelang_Central_Java_Java-Vacations.html

3.4.2 AWARENESS AMONG TOUR OPERATORS

33 out of the 41 tour operators and travel agents interviewed in the framework of the study had heard about Borobudur (5 out of 6 professionals interviewed in China, 3/3 in France, 4/4 in Germany, 4/5 in Japan, 4/4 in Malaysia, 6/7 in Singapore, 4/5 in UK, 3/7 in Australia).

Generally speaking, professionals interviewed associate Borobudur with its Buddhist Temple and the UNESCO's Heritage label. Finally, inbound agencies, tour operators and tour guides stressed the importance of cultural and religious motives for visiting Borobudur.

Moreover two-thirds of the interviewed operators offered packages including Borobudur: 0/6 in China, 3/3 in France, 4/4 in Malaysia, 3/5 in UK, 6/7 in Singapore, 4/4 in Germany, 4/5 in Japan, 2/7 in Australia. Major differences only exist for Chinese tour operators interviewed: they mainly all know Borobudur but none of them sell it anymore because of its cost, which has increased over time, and lack of Chinese speaking guides.

According to a survey conducted by TWC in 2011 among Asian travel agents, many tour guides did not know about Borobudur, let alone ordinary Asian travelers. This partly explains why there is a low percentage of Asian travelers to Borobudur in comparison to European visitors.

According to interviewed operators, commercialization of the destination should have three different futures:

- Japanese tour operators interviewed think that the destination will decrease, Malaysian operators think it will increase, whilst others think the destination will stagnate;
- the increase will be linked with the rise of repeat guests to Yogyakarta; and

- Singaporean, French and UK respondents think the stagnation will be caused by access difficulties of the site and the lack of accommodation.

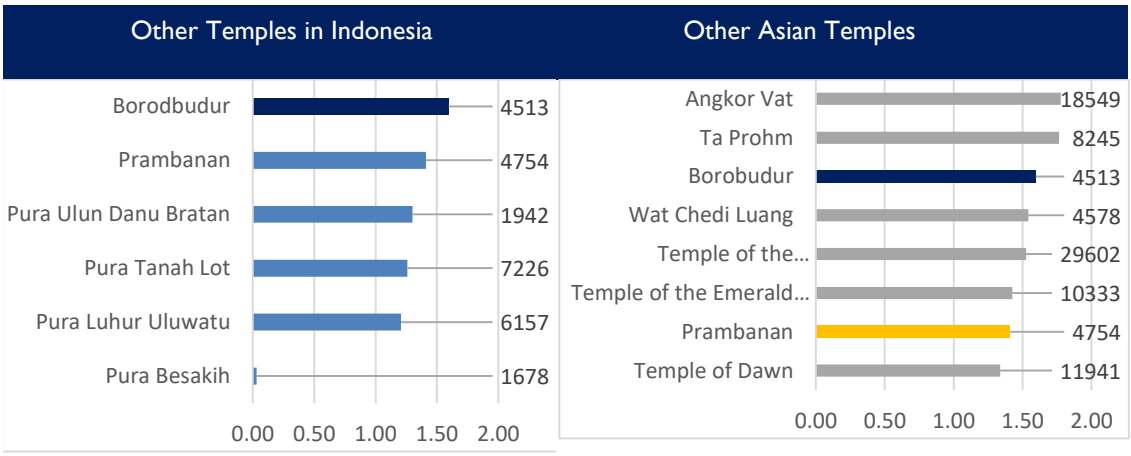
3.4.3 SATISFACTION AND DISSATISFACTION

3.4.4 QUANTITATIVE AND COMPARATIVE APPROACH

Borobudur and Prambanan have a higher satisfaction index on TripAdvisor than other temples in Indonesia, including Ulun Danu Bratan. However, many complaints arise, both from the travel trade and the general public, regarding overcrowding, deterioration of the site, and lack of varied accommodation choices and tourism amenities around the temple compound.

Borobudur scores higher on the visitor satisfaction index than most religious heritage sites in South East Asia (Figure 29).

FIGURE 29: COMPARISON OF SATISFACTION INDEX FOR BOROBUDUR AND PRAMBANAN TEMPLES & OTHER ASIAN TEMPLES



The bars show the satisfaction index, calculated on the following basis: Excellent + 2 point, Good + 1 point, Moderate 0 point, poor -1 point, horrible -2 points.
Source: Analysis of TripAdvisor Website by Horwath HTL in all available languages, 31/10/2016. HTL

3.4.5 QUALITATIVE APPROACH

A review of the content written about Borobudur on the internet (excluding official websites in charge of promoting tourism in Indonesia) offers the image of a "wonderful temple" or a "stunning temple" in Java. The temple is regarded as a window into Indonesian history and culture.

As the destination is associated with the temple, activities are also related to the temple. The general public talks about day tours to visit the temple or cultural sites, appreciating the mix of nature and culture in one place.

The destination and especially the temple enjoys extremely positive reviews from users: most reviews are "excellent" or "very good". Negative reviews of the entrance costs are widely cited: "Abusive ticket price", "Tourist trap", "commercial exploitation at its worst". Even if those reviews are limited, they are similar to comments from tour operators interviewed.

FIGURE 30: MAIN REASONS FOR SATISFACTION & DISSATISFACTION

Topics of satisfaction	Topics of dissatisfaction
Cultural place: Temple	Costs (access of the site)
Mixt of culture and nature	Commercialization of the site
World's heritage	Crowd
History	
Views	

Source: Analysis of TripAdvisor Website by Horwath HTL in all available languages, 31/10/2016. https://www.tripadvisor.fr/Tourism-g790291-Borobudur_Magelang_Central_Java_Java-Vacations.html

Professionals interviewed stressed similar reasons for satisfaction and dissatisfaction for international and domestic visitors and highlighted specific elements:

- Satisfaction reasons were linked to the natural and cultural potential of the site, and
- Dissatisfaction reasons vary within the different key markets. Both domestic and foreign visitors complained about unregulated hawkers and that the site was too crowded during peak season. Other main reasons for dissatisfaction related to: entrance cost, lock of accommodation, and poor connectivity (see Figure 31).

FIGURE 31: MOTIVES OF SATISFACTION & DISSATISFACTION ACCORDING TO TOUR OPERATORS & INBOUND AGENCIES INTERVIEWED

Key Market	Topics of Satisfaction	Topics of Dissatisfaction
General feedback	**Borobudur Temple** **Stunning view** **Cultural value**	**Hawkers** **Crowds** **Expensive ticket price**
China	Impressive cultural destination	Not enough Chinese tours Flights too expensive and no flight schedule adapted for the visit
France	Borobudur Temple Hotels	Admission charges Expensive and very few hotels so people sleep at Yogyakarta (bad accommodations) City of Yogyakarta
Japan	World heritage Views Accessibility from Bali	No information
Malaysia	Borobudur Temple Value for money	Borobudur felt unsafe for some visitors Poor connectivity and long travel time between Yogyakarta and other destinations
Singapore	Accessibility from different places: Semarang, Solo and Jogjakarta Resorts Nature UNESCO site Value for money	Roads Traffic Poor connectivity: no direct flights (easier for European visitors) Hotels facilities: lack of quality
Australia	No specific information, limited tours sold but a secondary location with no specific customer feedback.	
Germany	No specific information, limited tours sold but a secondary location with no specific customer feedback.	

Source: Analysis of tour operators interviewed (36). Horwath HTL

As a "must see" in Java, Borobudur is often linked with other destinations. It can explain the frequent mention of accessibility issues. The analysis of a selection of representative packages offered by tour operators interviewed shows that two types of packages exist:

- Packages for long haul markets: circuits including long stays in Indonesia are often linked with Bali and Java Islands. Borobudur is planned for a one-day excursion; and
- Packages for short haul markets: short stays and circuits located on Java Island.

3.5 TOURISM PROMOTION / DESTINATION MARKETING

The Dinas Pariwisata Kab. Magelang is actively engaged in promoting tourism development in the area, especially for Borobudur, which is the focal attraction. Below are the lists of events and promotions initiated by the Dinas Pariwisata Kab. Magelang.

List of Tourism Events

- Culinary Festival for Magelang district and provincial level
- Development of Tourism Awareness Group
- Festival Telaga Bleder (Bleder Lake)
- Training and Coaching in Arts
- Training and Coaching in Traditional Values
- Training and Coaching in Cultural Heritage Interpreter Guidance
- Research Competition on Cultural Heritage
- Antiquities and Museums Culture Camping
- Coaching in Development of Tourism Film Making
- Javanese Poetry and Javanese Speech Contests
- Cultural Arts Extravaganza Festival
- Arts Events

List of Tourism Promotion Activities

- Tourism Roadshows locally and regionally
- Tourism Exhibitions
- Conducting One Day Tour to introduce Kab. Magelang
- Gebyar Nusantara Tourism Exhibition
- Tourism Publications: leaflets, booklets, magazines, travel and event calendars.
- Cooperation with other regencies and cities (Java Promo)

- Cooperation with business owners/GMs through Pesona Magelang WA group
- Tourism Promotions through Social Media

3.6 CONCLUSIONS ON VISITOR ARRIVALS & DEMOGRAPHICS

The total number of visitors to the Destination reached 11.5 million in 2015, 2.5% of which were international and 97.5% were domestic. Top foreign source countries for the destination are the Netherlands, France, Japan, Malaysia and Singapore and they typically choose to say in Yogyakarta. Domestic visitors are predominantly made up of day trippers or VFR (63% or 7 million), with Yogyakarta attracting a good mix of leisure, business and MICE travelers.

Borobudur is the most visited attraction within the Destination, with 3.6 million visitors in 2015, only 7% of which were foreign. The temple is largely ignored by the large potential Asian market. There were a strong 1.9 million visitors at Prambanan over the same period.

The Destination is well known abroad with Yogyakarta being seen as both a cultural and urban destination, given its economic status. Borobudur is well known, however there are many complaints, both from travel trade and the general public, regarding overcrowding, deterioration of the site, and lack of varied accommodation choices and tourism amenities around the temple compound.

4. ACCESSIBILITY HIGHLIGHTS

The transport system in the study boundary consists of road, rail, air and water transport facilities. The boundary for Borobudur tourism destination covers 3 DPNs including Semarang (Karimunjawa and surroundings), Solo (Sangirang and surroundings), and Borobudur (Yogyakarta and surroundings).

The focus of the Destination and this report is the third on the list, DPN Borobudur with its 9th-century Buddhist Temple located in Kab. Magelang. Punthuk Setambu, Bukit Rhema and Prambanan are other attractions identified around the Borobudur, Yogyakarta and Prambanan-Boko Clusters. Located around 40 km from Yogyakarta, Borobudur's primary destination is accessed largely by the Adi Sucipto International Airport. The vast majority of visitors visit Borobudur as a day trip from Yogyakarta. Transport infrastructure is assessed with a focus on connectivity from the airport to the attractions, as well as connectivity between these attractions and places of accommodation.

4.1 EXISTING MODE OF TRAVEL AND VISITOR'S MOVEMENT

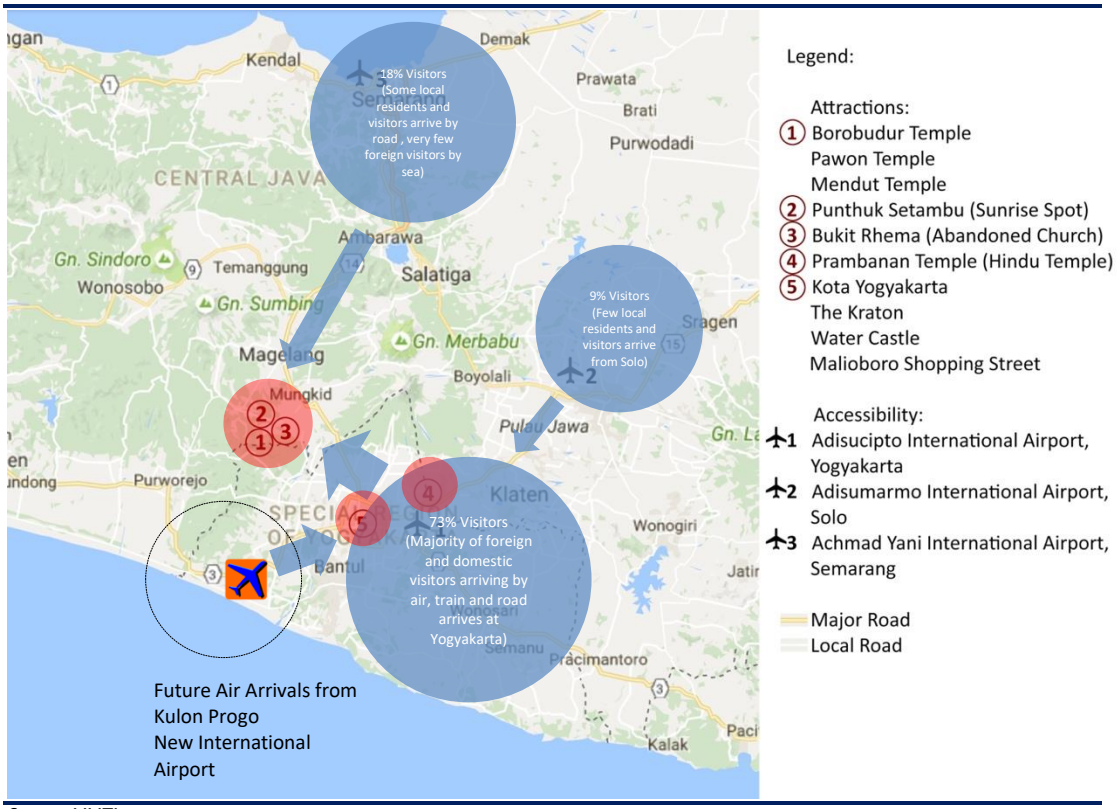
4.1.1 MARKET SHARE OF VISITORS

The origin of visitors is important for an accessibility assessment as it indicates the mode of arrival of the visitors as well as explains visitor distribution patterns within the tourism destination. Out of 11.5 million visitors, around 97% of visitors were domestic in 2015. 29% domestic visitors and 87% foreign visitors to the Destination visit Borobudur.

4.1.2 EXISTING MODE OF ARRIVAL AND VISITOR'S MOVEMENT

- In 2015, 79% of domestic visitors arrived by land, 11% by air and the remaining 9% by train. Domestic visitors include the day visitors, those staying with friends and relatives, as well as those in commercial accommodations. Land transport is an important mode of transportation for domestic visitors.
- Airports are the predominant gateways for foreign visitors as 65% of them arrive by air. Around 25% of foreign visitors arrive by road and 10% by train.
- The majority of foreign and domestic visitors arriving by air arrive at Yogyakarta and also stay around Yogyakarta. Hence, the International Airport at Yogyakarta is a key gateway for tourism development in Borobudur.
- Based on the visitor arrival modes, the visitors' distribution is illustrated in Figure 32.

FIGURE 32: KEY ATTRACTIONS IN THE CLUSTERS OF YOGYAKARTA, BOROBUDUR & PRAMBANAN-BOKO



Source: HHTL

- Around 73% of visitors are estimated to come to Borobudur & Prambanan from Yogyakarta, hence making the connectivity between Yogyakarta and Borobudur the most important linkage for Destination tourism development.
- Around 18% of the visitors come from Semarang, out of which, visitors from Semarang Airport is insignificant. Hence, the International Airport at Semarang is not directly linked to Destination tourism development.
- Around 9% of total visitors come from Solo, out of which, visitors from Solo Airport is insignificant. Hence, the International Airport at Solo too is not directly linked to Destination tourism development.

4.1.3 EXISTING MODES OF TRANSPORT

As per the market study, Borobudur is a favored destination for short trips with an average stay of 1.4 days. Figure 33 presents the summary of existing modes of transport used by visitors to reach Borobudur.

FIGURE 33: TRAVEL TIME AND CONDITIONS FOR BOROBUDUR

	Public Bus / Rail	Private Tour Bus/Taxi / Rental Car
Travel Time	• From Yogyakarta to Borobudur by bus: 2 hour (40 km) • From Magelang to Borobudur by bus: 1 hour (17 km) • From Jakarta to Yogyakarta by Rail: 8 hours • From Solo to Jogja by Rail: 1 hour (65 km)	• From Yogyakarta to Borobudur: 1 to 1.5 hour (40 km) • From Semarang to Borobudur in rental car or tourist van with 7 seaters van: 2.5 to 3 hours approximately (100 km) • From Solo to Borobudur: 3 hours (100 km)
Existing Condition of Transport Facility Provisions to Borobudur	• Public transport mostly used by Domestic Visitors. • Yogyakarta Public Transport links Trans Jogja bus, Damri bus to Jombor Terminal to Borobudur. • Railway (Maguwo Train Station) connects Yogyakarta city center to nearby cities (E.g. Kutoarjo and Surakarta). • Regular buses available from Magelang to Borobudur.	• Majority of visitors commute by private vehicles. • Cars, motorcycles, taxis are the available modes of transport. • Most of the route is well-maintained (four-lane) highway. • Transport Facilities such as Parking Areas around the complex are being proposed to be relocated due to heritage sensitivity for Borobudur.

- In the current context, the majority of visitors (more than 80%) take private tour buses, taxis and rental cars to reach Borobudur from Yogyakarta. Few of the domestic and foreign visitors take public transport. This is largely due to the additional time taken to reach Borobudur from Yogyakarta by public transport.
- 55% of domestic visitors are estimated to use their own private cars or rental cars to visit Borobudur and 25% use tour buses/vans.
- 70% of foreign visitors are estimated to come through travel agents, thus use tour buses/vans to reach Borobudur, and 20% use rental cars or taxis.
- The majority of the visitors will take private transport such as private tour bus, taxi, car rental in future to reach Borobudur.
- Travel time is not a major issue for Borobudur; however, it is important to maintain the adequacy of transport infrastructures such as pedestrian facilities and parking facilities.

5. HOTELS & LODGING OPTIONS (AMENITIES)

The following section looks systematically through the different levels of accommodation within the 3 key tourism clusters of Yogyakarta – Borobudur – Prambanan/Boko. We look at (1) total room count, (2) star vs. non-star vs. homestay, (3) performance and (4) seasonality.

The existing performance of the hotels is assessed using information from the government and through our market research.

Homestays are usually included in the category of 'non-star-rated hotels' and in most parts of Indonesia (including DI Yogyakarta), there is no specific record on the number of homestays. Moreover, homestays in most areas of the country are unregistered. Nonetheless, in Kab. Magelang, there is a specific data collected regarding homestays, though it is not updated annually. In defining homestays, there are effectively 2 types:

Type 1: Basic Businesses in Undeveloped and Remote Areas

This is the most common, whereby local residents open their homes to overnight guests. These are demand driven and developed by the local community as they perceive there is a lack in supply and wish to generate income from their homes. Type 1 homestays represent the majority of homestays around Borobudur.

Type 2: More Developed Businesses in Developing Areas

The alternative is a purpose-built new structure or 'home' within a local community, typically run as a business either as a community based business or individual investor. The success of Type 1 homestays has led to a proliferation of Type 2 homestays.

5.1 VOLUME OF ROOMS

Demand for accommodation generated by Borobudur, Prambanan-Boko and Yogyakarta clusters is supplied by hotels located in DI Yogyakarta and Kab. Magelang. Visitors currently choose hotels in DI Yogyakarta over Kab. Magelang for the wider choices of lodging facilities, more tourism support (restaurants, shopping area, tourist attractions, etc) and its central location to all key attractions.

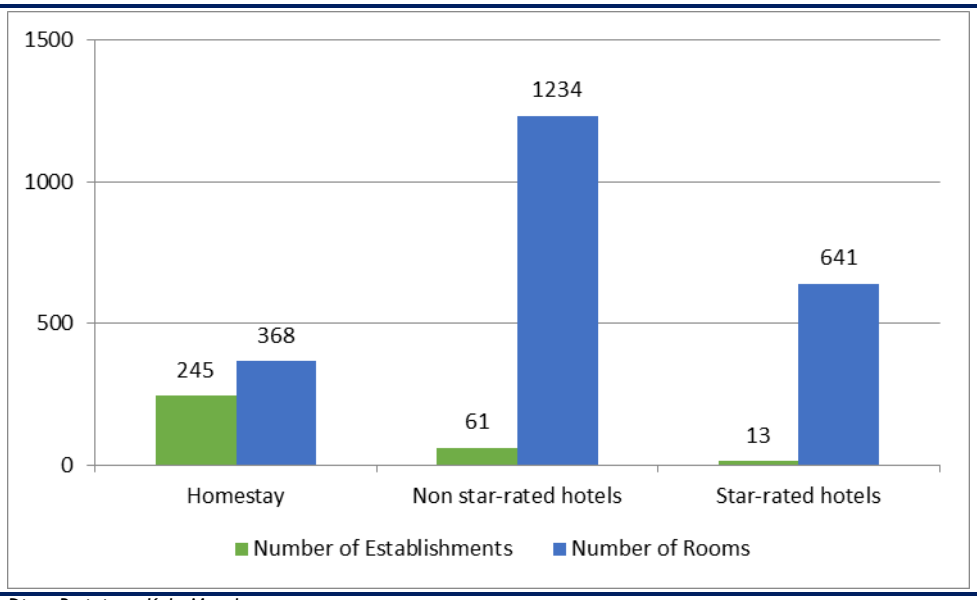
According to our interviews with travel agents and hotel operators in Kota Yogyakarta and Kab. Magelang, this is particularly relevant for domestic visitors and for the most part is unlikely to change. However, in contrast, international guests are more likely to stay closer to Borobudur, in Kab. Magelang, due to (1) the proximity to the temple shortening travel time (2) sunrise over the temple and (3) the cultural appeal.

There may be limited room night demand driven by the Borobudur Cluster in Solo but according to our fieldwork interviews and research only limited accommodation demand is generated for the hotel markets in Solo and even less in Semarang given the distance and commuting time. For this reason, these 2 hotel markets will not be discussed further.

Kab. Magelang

The total volume of accommodation is lower around the Borobudur area in Kab. Magelang. According to the latest data of the Dinas Pariwisata in Kab. Magelang, the number of units of homestays, non-star-rated hotels and star-rated hotels are 245 units, 61 units and 13 units respectively. It should be noted that the most updated statistic for homestays was recorded in 2011 and that of the hotels were updated in 2016. As the statistics for the number of accommodations were not updated annually in the past few years, there is no official source for hotel trends. Nonetheless, based on interviews with the Dinas Pariwisata and Statistics department of Kab. Magelang, it is understood that there was limited hotel development since 2012. One of the reasons for the stagnant hotel development in the area is the low occupancy level at existing hotels, averaging around 35% in 2015. A discussion on the potential causes for low occupancy rates is presented in the section 'Performance estimates per tier' ahead.

FIGURE 34: NUMBER OF ESTABLISHMENTS & ROOMS FOR HOMESTAYS (2011), NON-STAR-RATED HOTELS & STAR-RATED HOTELS IN KAB. MAGELANG (2016)



Source: Dinas Pariwisata Kab. Magelang

DI Yogyakarta

From the latest statistics (2015) of the BPS of DI Yogyakarta, there are 1,081 non-star-rated and 85 star-rated hotels in DI Yogyakarta. Although the number of non-star-rated hotels far outweighs that of the star-rated ones, the growth rates of star-rated are substantial. In the period 2010 to 2015, the number of star-rated hotels in DI Yogyakarta grew from 41 to 85, representing a CAAG of 20%. In contrast, the number of non-star-rated hotels only rose by a CAAG of 0.4 % in the same period. The total number of non-star-rated hotels remained around 1,050 to 1,100 in the past 5 years.

FIGURE 35: NUMBER OF ESTABLISHMENTS & ROOMS FOR NON-STAR-RATED & STAR-RATED HOTELS IN DI YOGYAKARTA (2015)

Source: BPS of DI Yogyakarta

FIGURE 36: GROWTH RATES OF NON-STAR-RATED HOTEL ROOMS & STAR-RATED HOTEL ROOMS IN DI YOGYAKARTA (2011 - 2015)

Year	Number of non-star-rated hotel rooms	Growth rate of non-star-rated hotel rooms	Number of star-rated hotel rooms	Growth rate of star-rated hotel rooms
2010	12,519		3,631	
2011	12,407	*-0.01%*	3,953	*9%*
2012	13,309	*7%*	5,150	*30%*
2013	13,547	*2%*	5,801	*13%*
2014	13,624	*1%*	6,864	*18%*
2015	13,831	*2%*	8,763	*28%*
CAAG 10-15	2%		19%	

Source: BPS of Yogyakarta

5.2 PERFORMANCE ESTIMATES

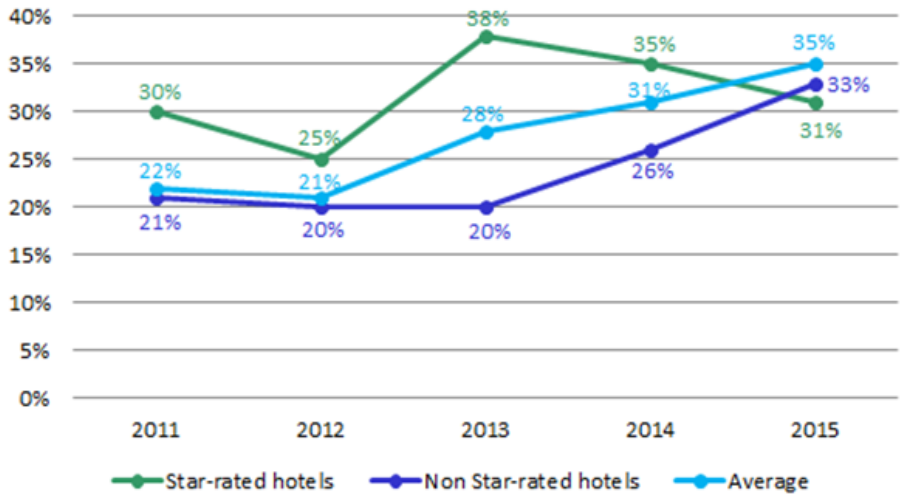
5.2.1 KAB. MAGELANG

Based on the 2015 statistics from BPS Kab. Magelang, 73% overnight travelers stay in non-star-rated hotels (excluding homestays) while the rest 27% reside in star-rated hotels.

Star-Rated Hotels (Information from Interviews & BPS Kab. Magelang)

According to the statistics from Kab. Magelang, occupancy levels of star-rated hotels ranged between 25% and 38% from 2011 to 2015 (Figure 37).

FIGURE 37: OCCUPANCY OF STAR & NON-STAR-RATED HOTELS IN KAB. MAGELANG, 2011 – 2015



Source: Statistics Department of Kab. Magelang

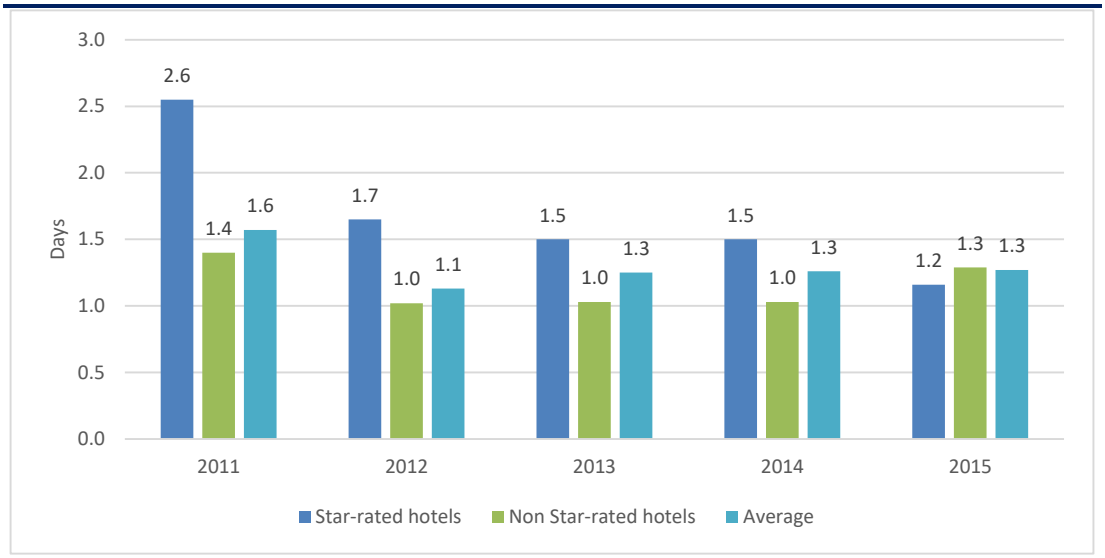
Hoteliers in the area commented that the main reasons for underutilization of star-rated hotels are:

- Seasonality: higher occupancy during weekends and peak months such as July and August but low during weekdays and the first quarter of the year, result in low average annual occupancy;
- Luxury positioning of most star-rated hotels in the area (both internationally branded and locally branded): among the 6 star-rated hotels in the area, over half of them (including Amanjiwo, Villa Borobudur, Plataran Borobudur and Mesastila Hotels and Resorts) are luxury with room rates of between IDR 2 to 12 million (~USD 150 – 900). Demand for high price rooms is low in the area and even across Indonesia. Star-rated hotels within the range of IDR 1 – 2 million (~USD 75 – 150) do not currently exist however we believe there is potential within this range to target both international guests and middle to high spending domestic guests;
- Lack of hotels adapted for groups with mid-tier positioning and larger room capacity;
- Competition from Yogyakarta hotels: currently visitors, especially domestic, prefer to stay in Yogyakarta hotels instead of Borobudur as there are more choices of tourist facilities (hotels, tourist attractions, restaurants, shopping, etc) and activities; and
- If staying in Borobudur, due to the lack of quality restaurants and pleasant 'urban' atmosphere, guests are mostly confined to their hotels. As a result, we believe that developing more attractions, local events, accommodation and food & beverage outlets will contribute to making a stay in Borobudur more attractive for visitors.

In terms of average daily rates (ADR), the variances are large as there are luxury hotels such as Amanjiwo and Villa Borobudur with ADR of IDR 4 to 12 million (~USD 300 – 900) and standard hotels such as Grand Artos Aerowisata and Saraswati of ADR IDR 0.6 to 1 million (~USD 45 – 100).

The average length of stay (ALOS) for star-rated hotels fell from 2.6 to 1.2 days between 2011 and 2015. It is understood that this can be attributed to changing travelling patterns, improved connectivity to Yogyakarta and nearby cities which facilitates visitors staying shorter periods in the area before moving on. Improvement in connectivity made visiting multiple attractions within a short period of time possible, driving between various attractions but on the other hand shortened the ALOS. Indeed, ALOS by hotels should not be mistaken for ALOS in the Destination. We believe creating more activities and events around the area has the potential to enhance the ALOS by generating additional room night demand within the Borobudur Cluster (Kec. Borobudur and Kec. Mungkid).

FIGURE 38: ALOS OF STAR & NON-STAR-RATED HOTELS IN KAB. MAGELANG, 2011 – 2015



Source: Statistics Department of Kab. Magelang

Non-Star-Rated Hotels (Information from Interviews & BPS Kab. Magelang)

The average occupancies of non-star-rated hotels are lower than star-rated hotels, ranging from an estimated 20 to 33% from 2011 to 2015. Explanations include:

- weekend and high season seasonality;
- competition from hotels in DI Yogyakarta; and
- Non-star-rated hotels do not typically undertake marketing and promotional efforts nor do they revenue manage their rooms.

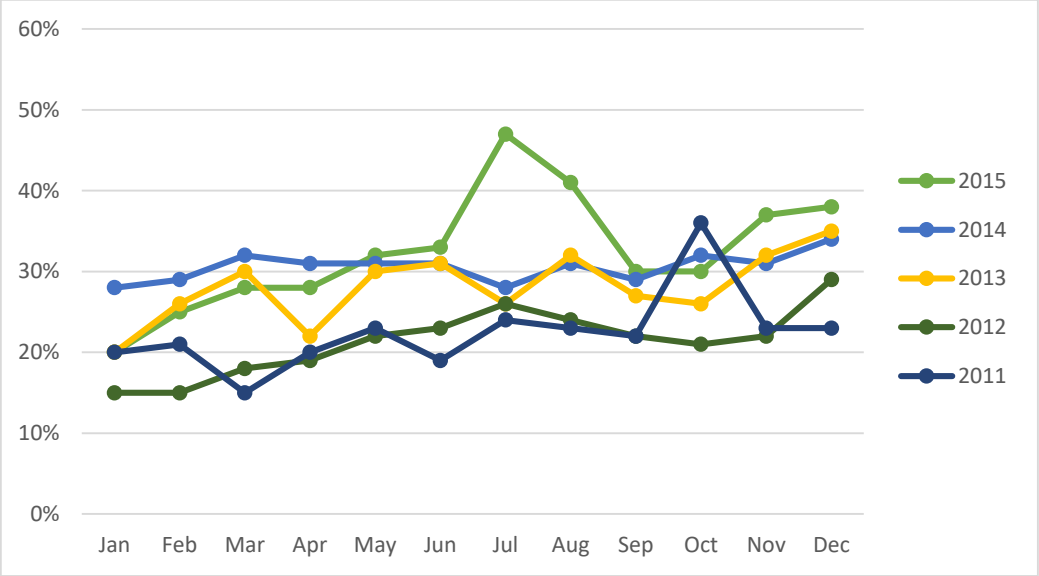
A couple of the good performers are Manohara Hotel and Amata Borobudur Resort which achieve occupancies of around 80%. The Manohara Hotel location is unique within the Borobudur Compound and it is believed the Amata Borobudur Resort achieved high occupancy due to its personalized service, efficient management and intense marketing efforts.

The ADR range for non-star-rated hotels is between IDR 0.3 – 1 million (~USD 25 – 75). There is usually a 15 to 25% difference in room rates between weekdays and weekends.

In terms of ALOS, it is typically lower in non-star-rated hotels (except year 2015) with only 1 to 1.4 days in the period 2011 to 2015.

Seasonality periods for accommodations in Kab. Magelang are similar to the demand for Borobudur Temple: peak periods during the dry season from May to August. Most visitors prefer to visit during school holidays, Vesak festival (in May or June), and Christmas. Low season falls during rainy months from January to April. In terms of weekly seasonality, the demand is usually higher during weekends when there are more domestic visitors travelling.

FIGURE 39: AVERAGE MONTHLY OCCUPANCIES OF HOTELS (STAR-RATED & NON-STAR-RATED) IN KAB. MAGELANG, 2011 - 2015



Source: Statistics Department of Kab. Magelang Note: we do not have an explanation for the unusual peak in July 2015, however, as pattern is set from the years 2011 to 2014

Homestays in Magelang (Interviews & BPS Kab. Magelang)

The homestays in the tourism villages are estimated to perform as follows:

- Type 1: average occupancy of 15 to 25% and
- Type 2: average occupancy of 25 to 40%. The estimated ADR for both is between IDR 150,000 – 300,000 (~USD 12 – 24).

Previously and to a certain extent at present, the majority of homestay demand comes from domestic travelers as language barriers and their inability to access international marketing and booking channels make it harder for operators to capture international guests. Recent improvements in tourism villages in terms of infrastructure and training of owners and staff has helped raise the quality of homestays. An increasing number of homestays now sell their products through local agents or online travel agents to capture a wider range of potential guests including international guests.

To discern further between Type 1 and 2 homestay guests:

- Type 1: leisure individuals, particularly young travelers with less income and a more adventurous spirit. They are around 90% domestic; and
- Type 2: also leisure individuals plus families and small groups as Type 2 typically offer more rooms. As they are more professionally run and often sold by travel agents, there is an increased number of foreigners in the range of 50 to 70% (mostly European as they enjoy the cultural transfer, longer stays and lower daily budgets).

5.2.2 DI YOGYAKARTA

Non-Star-Rated & Star-Rated Hotels in Yogyakarta (Information from BPS Yogyakarta)

As aforementioned in Figure 36, the number of star-rated and non-star-rated hotel rooms rose significantly between 2010 to 2015, representing a CAAG of 19% and 2% respectively.

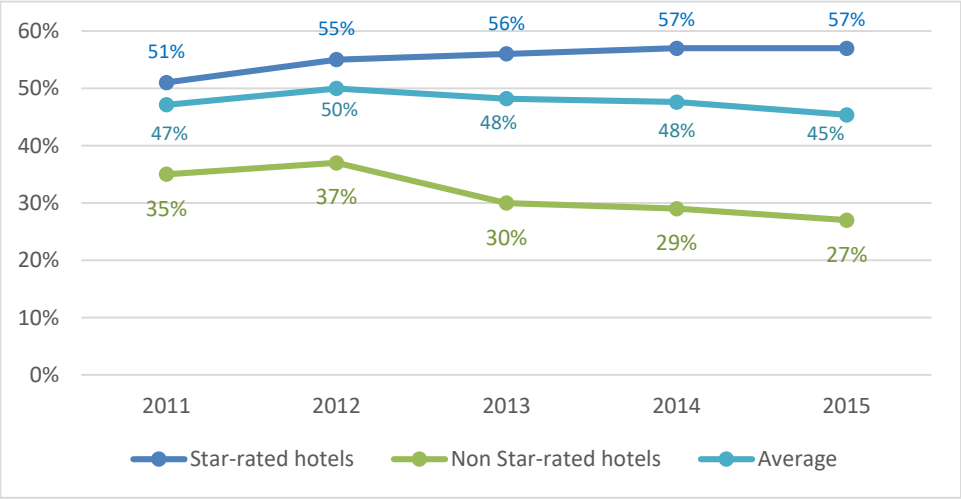
Based on 2015 figures from BPS Yogyakarta, travelers visiting Yogyakarta are more evenly spread between non-star-rated and star-rated hotels. 53% of overnight travelers stay in non-star-rated hotels while the remaining 47% choose star-rated properties.

In terms of occupancy performance, star-rated hotels out-performed non-star-rated hotels between 2011 and 2015:

- Star-rated hotel occupancy rose steadily from 51% in 2011 to 57% in 2015. Simultaneously as seen in Figure 36 hotel room volume increased significantly;
- Whilst occupancy dropped gradually for non-star-rated hotels from 35% in 2011 to only 27% in 2015; over the same period, the non-star-rated hotel room volume remained relatively stable.

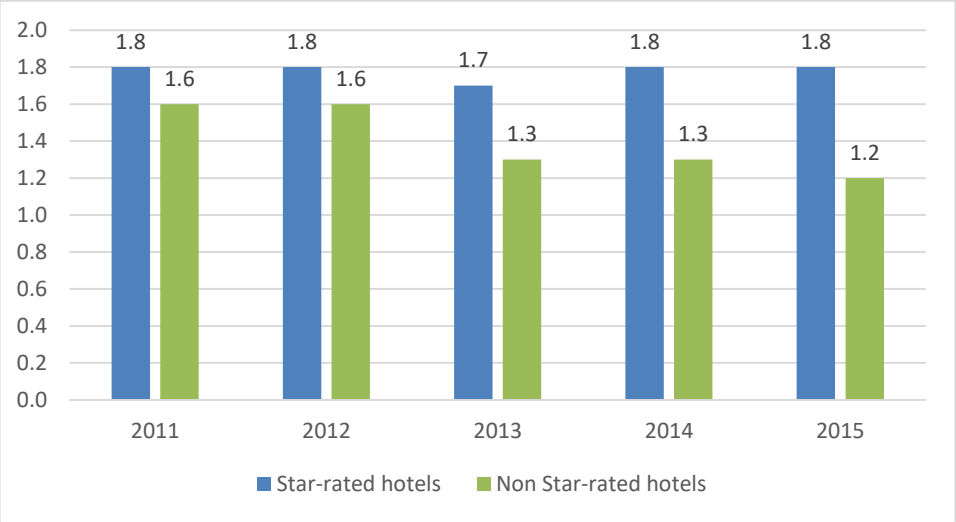
Star-rated hotels in Yogyakarta also out-performed the non-star-rated hotels in ALOS between 2011 to 2015. ALOS of star-rated hotels remained at around 1.7 to 1.8 days while non-star-rated hotels ALOS declined from 1.6 days to 1.2 days.

FIGURE 40: OCCUPANCY OF STAR & NON-STAR-RATED HOTELS IN DI YOGYAKARTA, 2011 – 2015



Source: BPS Yogyakarta

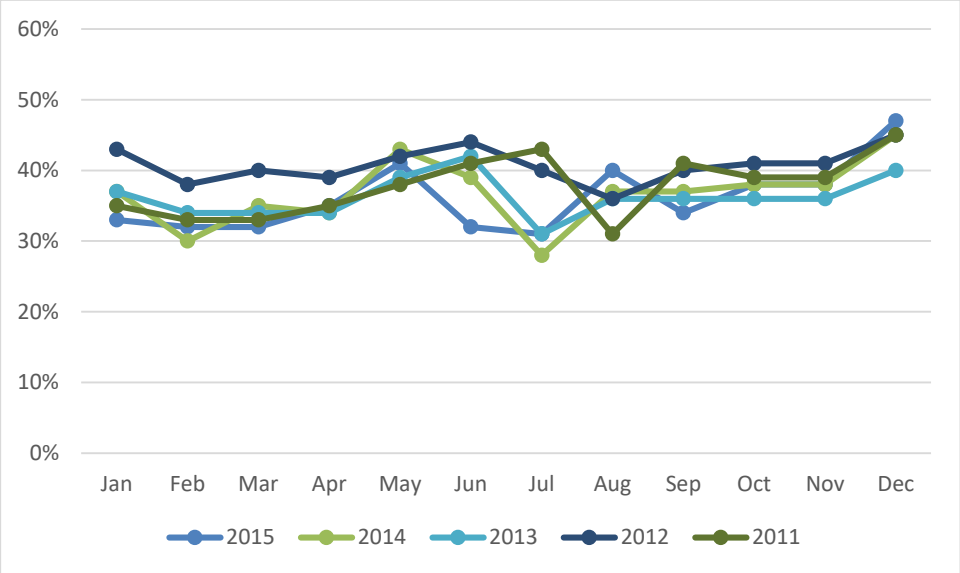
FIGURE 41: ALOS OF STAR & NON-STAR-RATED HOTELS IN DI YOGYAKARTA, 2011 – 2015



Source: BPS Yogyakarta

In terms of seasonality, the overall market hotel demand in DI Yogyakarta is less seasonal than that of the Kab. Magelang. The main reason is due to the broader demand base of the hotels in DI Yogyakarta. Apart from leisure demand that usually comes during public holidays or weekends, there are strong corporate and MICE demand to fill up the weekday and non-holiday gaps, resulting in more evenly distributed monthly occupancies throughout the year.

FIGURE 42: AVERAGE MONTHLY OCCUPANCIES OF HOTELS (STAR-RATED & NON-STAR-RATED) IN DI YOGYAKARTA, 2011 - 2015



Source: BPS Yogyakarta

5.3 HOTEL FACILITIES

5.3.1 FOOD & BEVERAGE

- Food and beverage demand is high in most hotels in Kab. Magelang. The main reason for this should be credited to the lack of quality standalone restaurants in the area so in-house guests eat at least two or sometimes up to three meals a day in the hotel. There are also walk-in patrons from nearby hotels or small high-spending tour groups. Most star-rated hotels report a food and beverage revenue of as high as 40% to 50% of their total revenue. Plataran Borobudur even has an off-site restaurant, in addition to the restaurant within the property, managed by the hotel to target day-trippers and walk-in guests, with a lower average check (IDR 120,000 or USD 9 compared to the hotel's IDR 500,000 or USD 37). Villa Borobudur has a popular offer of an inclusive package, accommodation, transportation plus 3 meals a day and snacks.
- Food and beverage is an important revenue center for most hotels in the Magelang area. Therefore, they put in significant efforts to provide the best quality of food using local produce, tradition cooking methods and in an artistic Javanese presentation. Although all hotels would feature local cuisines, hotels with a larger international composition would offer a selection of western dishes to cater to the needs of some international guests. In addition, as aforementioned, guests would dine up to 3 meals a day in the hotel, the hotels tend to offer a wider selection of food items to avoid repetition and boredom.
- The catering service provided by the homestays is usually homemade local food.

5.3.2 MEETING FACILITIES

- Most hotels in Kab. Magelang only have limited meeting space catering to 30 – 50 people. The size is also in line with the accommodation capacity of the hotels. Hotels with a wider range of meeting facilities include Manohara Hotel (2 meeting rooms with capacity of 150 and 50 people respectively), Plataran Borobudur (a conference center with a maximum capacity of 500 people) and Grand Artos Aerowisata (with 8 meeting rooms with capacities from 50 to 800 people). The usage rate of these meeting facilities is usually low.

5.3.3 OTHER FACILITIES

- Hotels in Kab. Magelang, especially the star-rated hotels, usually offers leisure facilities such as spa, swimming pool, fitness center, bikes with a view to target the needs of leisure guests.
- Transportation is an important service to guests, given the lack of quality public and private local transportation.
- Some hotels would even offer some exclusive experience. For instance, Villa Borobudur has its own vegetable and fish farm, Plataran Borobudur offer exploration around the nearby region using its own open safari bus or horses.

The accommodation facilities in Kab. Magelang and DI Yogyakarta can be categorized into three main categories.

5.3.4 STAR-RATED HOTELS

Kab. Magelang

There are 13 star-rated hotels with a total room inventory of 641 guestrooms in Kab. Magelang which shows little growth in the last 5 years. They are mostly small-sized hotels of around 15 to 35 rooms (such as Plataran Borobudur, Villa Borobudur, Saraswati), except for the medium-sized MICE hotel Grand Artos Aerowisata.

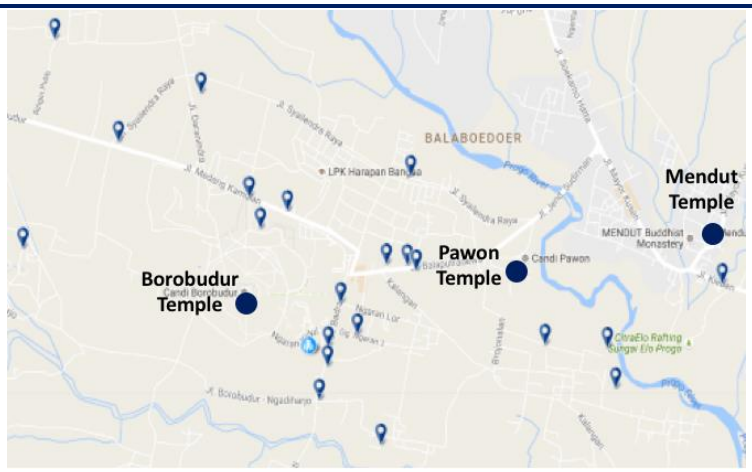
The guestrooms are usually built and decorated in local materials and style to bring out the authenticity. They are all full-service hotels with at least one restaurant and leisure facilities such as a gym and spa and transportation service for transferring guests to tourist attractions and the airport. Some of them offer meeting facilities, such as Plataran Borobudur with an off-site conference center to accommodate up to 500 guests. They may also have an activity team for arranging tourist activities, with the most popular ones being cultural village tours and sunrise tours.

Guests in the star-rated hotels tend to have a high usage of the hotel facilities, especially for food and beverage, as well as activities arranged by the hotels.

FIGURE 43: EXAMPLES OF STAR-RATED HOTELS AROUND BOROBUDUR

Source: left – Plataran Borobudur; right – Villa Borobudur

FIGURE 44: LOCATION OF HOTELS IN BOROBUDUR



Source: Booking.com

Kab. Magelang

Below describes some star-rated hotel market leaders of the Kab. Magelang:

Manohara Hotel

It is the nearest hotel to Borobudur Temple situated inside the Compound and being managed by TWC helps the Hotel have a wider marketing exposure. Its strategic location appeals to leisure guests, government visits, MICE groups and special interest groups such as Buddhist groups or conservation groups, contributing to an occupancy of above 80%. There is a clear need for expansion as it is always fully booked during weekends and peak season although expansion is unlikely to be approved as it is within the conservation zone.

Villa Borobudur

Financed by two Dutch investors but almost fully built and operated by staff from the local villages, Villa Borobudur is one of the top-rated hotels in terms of service and facilities. Its all-villa concept and location on an isolated hilltop give guests a high level of privacy. Besides investing in the hotel, the owners have also taken extra steps in promoting Borobudur as a cultural destination. They set up a website www.goborobudur.com as a promotion tool for Borobudur and a platform to showcase the attractions, accommodations, activities and events in the area. In addition, they are opening a tourist information center within walking distance of the entrance to Borobudur Temple to help visitors with transportation and tour enquiries. They even funded a film series by a professional movie director about a story of a local couple visiting various local attractions as a marketing tool for Borobudur.

Plataran Borobudur

The hotel is one of six Plataran Hotels developed by an Indonesian couple. Besides the authentic and professionally managed guestrooms, Plataran Borobudur has one of the most extensive food and beverage and meeting facilities in the area. It has one high-end Italian restaurant within the property and one off-site restaurant serving a mix of local and Asian cuisines. There is also a conference center with a capacity of up to 500 guests, next to a MICE hotel that is going to be opened by first quarter of 2017. It also offers the guests a wide range of activities including horseback riding, jeep tours, elephant rides, village tours, paddy ploughing, pottery making, etc.

Amata Borobudur Resort

The Hotel is a small boutique hotel with staff, from management to front line, mainly recruited from local residents of the surrounding villages. Despite its small scale (only 8 guestrooms), it offers guests a wide selection of facilities: all-day dining restaurant, swimming pool, spa, meeting room, bikes, transportation to Borobudur or other attractions, etc. Its high-quality hardware and professional management help it achieve an occupancy of 80%, significantly higher than market average.

DI Yogyakarta

Among the 85 star-rated hotels, there are quite a number of internationally branded properties such as MGallery by Sofitel, Melia, Hyatt Regency and Sheraton. These star-rated hotels are mainly medium sized ones with 150 to 300 guestrooms. They have full service facilities such restaurants, meeting facilities and a wide range of leisure facilities to target leisure, MICE and business guests.

FIGURE 45: EXAMPLES OF STAR-RATED HOTELS IN YOGYAKARTA

Source: left: Hyatt Regency Yogyakarta; right: The Phoenix Hotel Yogyakarta MGallery by Sofitel

5.3.5 NON-STAR-RATED HOTELS

Kab. Magelang

Nearly all non-star-rated hotels in the area are small sized hotels with an average room count of 10 to 30 rooms. Some of them are built in traditional style while some are quite modern. They usually have limited facilities such as a small restaurant and only a few offer leisure and meeting facilities. The usage of the leisure and meeting facilities is usually low.

FIGURE 46: EXAMPLES OF NON-STAR-RATED HOTELS AROUND BOROBUDUR

Source: left: Villa Sumbing Indah; right: Hotel Purnama Artha 1

DI Yogyakarta

Most non-star-rated hotels in Yogyakarta are small sized ones as well, with less than 40 guestrooms. Besides some standard budget hotels, there are quite a number of unique boutique hotels of which some are converted from historical buildings. Many non-star-rated hotels offer a wide range of facilities like restaurants, meeting facilities, leisure facilities like swimming pool, gym, spa, etc to support the needs of different target guests: business, MICE and leisure travelers.

5.3.6 HOMESTAYS

Kab. Magelang

All recorded homestays are located in 15 villages of Kab. Magelang, with Borobudur village, Candirejo village and Wanurejo village being the earliest developed tourist villages and with the highest concentration of homestays. According to the latest record in 2011, there were 245 establishments of homestays, with a total of 368 rooms. They usually offer bed only, with a room count of 2 to 4 rooms. As the homestays are built and operated by local villagers, they are usually built and decorated in traditional style but with a slight modern touch. Some of them would provide catering or a shared kitchen for guests to cook themselves. They will typically help with transportation arrangements.

FIGURE 47: EXAMPLES OF HOMESTAYS AROUND BOROBUDUR

Source: left: Efata Homestay; right: Tingal Laras Art House Homestay

As aforementioned, in most other parts of Indonesia including DI Yogyakarta, there are no specific statistics regarding homestays. Therefore, official records of homestay developments are unavailable for DI Yogyakarta.

5.4 CONCLUSION ON EXISTING HOTEL SUPPLY

To conclude, compared to the hotel market in DI Yogyakarta, the hotel market of Kab. Magelang is much smaller in scale and underperforming. From the above analysis, we can see that hotel development in Kab. Magelang is stagnant, given its low market-wide occupancies, distinct seasonality in demand and declining ALOS.

On the other hand, the hotel market of DI Yogyakarta is more mature and with relative sufficient demand and investment.

From the fieldwork and interviews with hotels and the travel trade in the area, the major reasons leading to the underperformance of the hotels in Kab. Magelang are:

- lack of activities in the area to create a reason for visiting Borobudur to stay overnight; and,
- the mature tourism city of Yogyakarta is only 60 to 90 minutes away, with a wider range of accommodation options, broader price range and supported by better tourism facilities such as restaurants, shopping and other tourist attractions.

Whilst Kota Yogyakarta will remain the center of accommodation for visitors to the 3 clusters of Yogyakarta, Borobudur and Prambanan-Boko, we have noted some limitations surrounding Borobudur which if corrected could provide opportunities for increasing ALOS in the region. These include development of, in order of priority:

- the Borobudur temple experience;
- the cultural aspects of the surrounding villages; and
- a broader range of lodging options that cater for a broader range of guests.

It is believed that to achieve the third, the first two must be developed first leading to a more multi-dimensional experience that may entice (1) more visitors or at least increased ALOS and (2) private tourism investment, drawn by the professionalization of the development and the potential of capturing some of the additional demand. The above efforts should be made with a focus in Kab. Magelang (Kec. Borobudur & Kec. Mungkid), as Yogyakarta is a more mature tourism area with sufficient private tourism investment.

6. SMES: SUPPORTING TOURISM INFRASTRUCTURE (AMENITIES)

The following discussion concerns existing small and medium sized enterprise tourism activities in the Destination.

6.1 INDEPENDENT FOOD & BEVERAGE

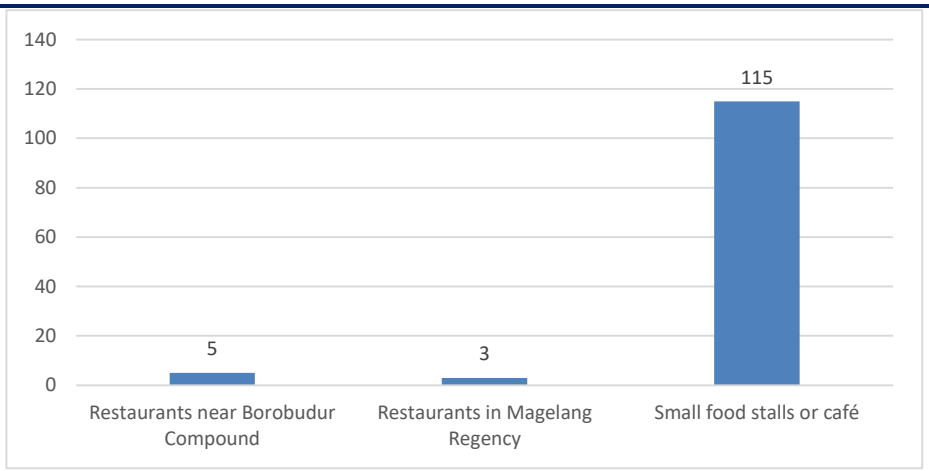
According to the Dinas Pariwisata Kab. Magelang, there are only 5 registered restaurants near Borobudur (including RM Nirwana Borobudur and RM Pak Dar), with capacities ranging from 10 to 200 seats. The average spend is estimated to be around IDR 70 to 100,000 per person (~USD 5 – 8).

Around Kab. Magelang, there are 3 more registered restaurants (Orang Utan Resto, BS Resto and Restoran Sekar Kedathon) which can accommodate 200 to 700 people each, with pricing of between IDR 60 and 110,000 per person (~ USD 4 – 9).

In addition, the 115 small food stalls and cafes (average seat capacity around 30 to 60) offer affordable food with average checks of around IDR 30 to 50,000 (~USD 2 – 3). Nearly all of the above independent restaurants are selling local Javanese or Indonesian cuisine.

Our interviews with travel agents and hotel operators of the area indicate that food and beverage is poorly executed and aimed at the mass bus-tour crowds with ample room for improvement in terms of quality and choice of food items as well as hardware and furnishing of restaurants.

FIGURE 48: NUMBER OF INDEPENDENT FOOD AND BEVERAGE OUTLETS IN KAB. MAGELANG



Source: Dinas Pariwisata Kab. Magelang

6.2 TRAVEL AGENCIES

6.2.1 MARKETS SERVED

The majority of visitors, both domestic and international, actually book through the travel agencies in Yogyakarta as they normally enter Borobudur via Yogyakarta. In this case, the travel agencies in Yogyakarta who sell the tour packages are also operators of the tours and transportation. Only a small percentage of these travel agencies would cooperate with operators in Kab. Magelang to provide tour services (mainly in peak season).

According to interviews with major travel agencies in Yogyakarta, Panorama Destination and Pacto, the sales usually come from their head office in Jakarta or Bali for both domestic and international visitors (through partners in foreign countries) but there are a few walk-in guests.

6.2.2 PRODUCTS OFFERED

The most popular option is the day tour to Borobudur and Prambanan. As both are UNESCO World Heritage Sites and only 1.5 hours from each other, most visitors prefer to visit both Temples in a day. In addition, the sunrise tour to Borobudur or Punthuk Setumbu is gaining popularity.

Besides visiting Borobudur, visitors that aspire to stay longer (usually international guests) or are on their second visit to the destination, would also explore attractions in the surrounding area such as organized village tours, hiking, a jeep ride to Mount Merapi or rafting.

In terms of tour preference, international visitors tend to be more interested in cultural exploration of the area while domestic guests like to join adventure activities such as rafting and cave tubing (as most of them are familiar with the Javanese culture already).

Apart from guided tours, some visitors opt for transportation packages (without a guide) offered by travel agents (such as the major operator named Kresna Tourist Service in Yogyakarta) at which guests are chaperoned from hotels to Borobudur and other attractions. In this case, the guests buy their own Borobudur entrance tickets at the ticket office.

6.3 TOURISM SERVICE PROVIDERS

6.3.1 GUIDES

Most guides serving the area come from travel agencies in Yogyakarta. As there is a significant percentage of international guests, most of the guides speak English and even some other European languages (as they are major source markets). In addition, some local residents from the villages in Kab. Magelang are trained as local guides. They usually have a good command of English and can give more comprehensive information of the area and the culture.

6.3.2 OTHER SME TOURISM SERVICE PROVIDERS

- Local transportation providers: car, bike, motorbike and horse cart. As most of these providers are sole proprietors and are not registered within Kab. Magelang, there are no official statistics showing their volume and overall handling capacity. It should be noted that these providers are mainly around the Borobudur Temple area and Kota Magelang to carry visitors sightseeing. Some of them cooperate with tour operators or hotels/ homestays.
- Attraction operators such as for rafting and cave tubing.

6.4 CONCLUSIONS ON SMES SUPPORTING TOURISM ACTIVITIES

It is noted that the tourism amenities, especially in Kab. Magelang, are insufficient and of substandard quality. Most of the local tourism service providers and travel agencies in Kab. Magelang are simply operators. Majority of the sales actually come from Yogyakarta where the visitors purchase the services. The independent food and beverage providers can only meet the basic dining needs of the visitors. For visitors with higher expectations, especially foreign visitors who expect a higher standard on service and food quality, often turn to dine in the hotel outlets.

Within the Destination the area surrounding Borobudur lacks depth in small business and if the cultural villages and experience is to be developed in the future the number and variety of SMEs must be developed further to meet increasing tourism needs.

7. INVESTMENT ANALYSIS

7.1 DIRECT INVESTMENT

7.1.1 KAB. MAGELANG

The data on Foreign Direct Investment (FDI) and Domestic Direct Investment (DDI) recorded by the Investment Board and Integrated Licensing Service (BPMPPT) of Kab. Magelang is combined (DDI + FDI) with no information on the composition of each. However, according to the interviews with the Dinas Pariwisata Kab. Magelang, it is apparent that the DDI in hotels and restaurants is greater than FDI in the area.

Between 2011 and 2015, the investment in hotel and restaurant projects has fluctuated, with a peak in 2013 at IDR 55.3 billion (USD 5.3 million) and 37 projects (Figure 49). Although the number of projects increased by 45% in 2015, the total investment amount dropped significantly by 75% to only IDR 5,697 million (USD 0.43 million). This may be caused by the increase of small scale homestays and restaurants projects in the area. It is an indicative sign of the destination's position on the investment cycle (see below). It should be noted that the exact investment amounts for hotels and restaurants respectively are not available in any official statistics.

FIGURE 49: REALISED FDI AND DDI IN HOTELS AND RESTAURANTS IN MAGELANG, 2011 TO 2015

Year	Number of Projects	Investment value (IDR million)	Investment value (USD million)
2011	21	16,800	1.93
2012	19	13,622	1.46
2013	37	55,305	5.32
2014	20	22,766	1.92
2015	29	5,697	0.43

Source: BPMPPT Magelang. Note: no explanation was uncovered as to the drop in value and increase in project number in 2015.

The **Central BKPM** investment figures for Kab. Magelang were different to the records of BPMPPT Magelang:

- DDI - no DDI from 2011 to H1 2016; and
- FDI - 2010: 1 project with an investment value of USD 1.6 million; 2011: 1 project with investment value of USD 75,000; 2012 to H1 2016: projects were recorded with no value.

It is noted that we have adopted the Central BKPM numbers.

7.1.2 DI YOGYAKARTA

According to the BKPM DI Yogyakarta (Figure 50), FDI on hotels and restaurants in DI Yogyakarta increased from 2010 to 2015, both in the number of projects and investment value[7]. The total number of FDI hotel and restaurant projects rose from 7 to 13 between 2010 and 2015. Investment amount grew from USD 28.1 million (IDR 255,169) to USD 99.3 million (IDR 1,324,342 million).

It is noted that the central BKPM investment figures for DI Yogyakarta were different to the records of BPMPPT DI Yogyakarta as seen in Figures 50 and 51 however we have adopted the Central BKPM numbers.

FIGURE 50: REALISED FDI IN HOTELS AND RESTAURANTS IN DI YOGYAKARTA, 2010 TO 2015

Year	Number of Projects	Investment value (USD million)	*Investment value (USD million) **
2010	7	28.1	*1.91*
2011	7	71.7	*0.33*
2012	10	108.5	*63.95*
2013	12	107.3	*21.69*
2014	12	106.2	*12.11*
2015	13	99.3	*1.36*

*Source: BKPM DI Yogyakarta & Central BKPM (column in light blue & italics) * These figures are included to show the central BKPM investment figures in comparison to the BPMPPT figures only.*

While the amount of DDI on hotel and restaurant projects in DI Yogyakarta only increased slightly from 22 projects to 25 projects between 2010 and 2015, the investment amount rose significantly at a CAAG of 15%, from IDR 643,773 million (USD 70.9 million) to IDR 1,321,221 million (USD 99 million), matching the FDI levels (Figure 51).

FIGURE 51: REALISED DDI IN HOTELS & RESTAURANTS, DI YOGYAKARTA, 2010 - 2015

Year	Number of Projects	Investment value (USD million)	*Investment value (USD million) **
2010	22	70.9	0.06
2011	22	80.9	-
2012	24	127.7	*35.67*
2013	--	--	*8.23*
2014	25	108.7	*7.89*
2015	25	99.0	*2.68*

*Source: BKPM DI Yogyakarta & Central BKPM (column in light blue & italics) * These figures are included to show the central BKPM investment figures in comparison to the BPMPPT figures only. In 2013, there was no DDI in hotels and restaurants according to the BPMPPT of Yogyakarta however the central BKPM recorded USD 8.23 million).*

[7] It should be noted that during the period 2010 to 2015, the real USD value actually rose due to the steady depreciation of the IDR against the USD.

7.1.3 ASSET CLASSES & SCALE

Currently, investment in Borobudur remains small to medium scale, mainly for accommodation (hotels and homestays), and only limited for restaurants and transportation facilities (cars, bikes, horse carts). Although there are some larger investment projects, such as Amanjiwo, Villa Borobudur and Plataran Borobudur with a luxury position, the scale of the properties are small (17 to 35 rooms).

7.2 KEY PLAYERS / INVESTORS

- Foreign investors: There are limited foreign investments in hotels in the area, namely Villa Borobudur (invested by two Dutch investors including Dr. Ingo Piepers who is also the General Manager of the hotel) and Amanjiwo (which is understood to have some Singaporean investment).
- Indonesian investors: They invest in both star-rated and non-star-rated hotels in the area, mostly through privately owned companies. For instance:
  - the owners of Plataran Group which owns Plataran Borobudur are an Indonesian couple Dewy Julia Pramitarini and Yozua Makes; and
  - PT Omah Budur invested in three hotels in the area including Amata Borobudur Resort, Hotel Catur and Hotel Sriti.
- TWC and UNESCO: They both play a crucial role in helping the sustainable development of tourist villages and homestays in the area, in terms of financial support, infrastructure and training. TWC also operates the Manohara Hotel which is located within the Borobudur Temple Compound.
- Local community: They build and operate the homestays in the villages. In addition, they make up the majority of staff (up to 80%) of the hotels.

7.3 INVESTMENT SENTIMENT: DOMESTIC & FOREIGN INVESTORS

7.3.1 FOREIGN INVESTORS INTERVIEWED[8]

Our interviews with foreign investors showed a proclivity for preferred investment in locations which are popular for their country's citizens. As seen in the baseline demand analysis, there are very few visitors from any of the key source markets from which we sought investment information such as China, Australia, Malaysia and Singapore. Although there were a reasonable number of Japanese visitors, the Japanese investors interviewed were particularly interested in key gateway cities only, particularly Jakarta and Bali.

Not surprisingly therefore, foreign investors canvassed on Borobudur were largely disinterested in the destination due to its poor accessibility and the lack of growth potential for the destination. That said there were some positive comments:

[8] Investment sentiment gleaned from interviews with 25 potential and existing foreign investors from Australia, China, Japan, Malaysia, and Singapore. The questions were aimed to better understand their thoughts on pros and cons of SEZs, the tourism investment climate in Indonesia, the future of tourism investment and possible investment opportunities in Borobudur & Yogyakarta.

- One Chinese investor indicated that Borobudur was a destination of interest, together with Lombok, due to their relatively better transport links which are considered a pre-requisite in advance of investment;
- One Singaporean investor acknowledged that it is "a unique location that cannot be duplicated" but "should be better marketed on the same lists with places like the Taj Mahal and Angkor Wat" then "I would invest there with an integrated resort type product";
- With improved PR and marketing plus accessibility it was a destination to keep observing; and
- One Malaysian investor may consider an upscale resort in the future.

7.3.2 DOMESTIC INVESTORS INTERVIEWED[9]

Not surprisingly the domestic investors interviewed had more to say about Borobudur and one had land and had researched the opportunity of investing in a hotel in Borobudur. Other of the investors had multiple investments in Yogyakarta (hotels, travel agencies, ground transport services) currently and were not averse to further investments within the Borobudur area in the future.

Comments included the following:

- Interesting and would look in more detail in the future;
- It is a good place gone wrong and needs to be upgraded. In other words, the destination is special however the management has let the quality deteriorate, detracting from the overall experience;
- It is not about the candi it is about the story, about the history, this has potential. In other words, the focus should be on the culture of the destination rather than a complete focus on the temple;
- The Yogyakarta population is not as wealthy as other areas such as Medan or Surabaya so any investments in 'attractions' at Borobudur will be reliant on visitors, rather than residents which limits the scale;
- Lack of hotels surrounding the temple and the high performance of some make it attractive for investment;
- There is increasing potential for religious MICE gatherings; and
- It is too close to Yogyakarta to generate significant room night demand with domestic guests who love the entertainment options in Yogyakarta. This sentiment was not unforeseen and will be explored further in the forecast demand section.

[9] Investment sentiment gleaned from interviews with 9 existing Indonesian tourism investors. The investors chosen had interests in various tourism assets including hotels, restaurants, ground transportation and travel agencies. The questions were aimed at gathering their thoughts on the pros and cons of SEZs, the tourism investment climate in Indonesia, the future of tourism investment and possible investment in Borobudur & Yogyakarta.

7.3.3 WHERE IS THE DESTINATION ON THE INVESTMENT CYCLE?

Borobudur

Borobudur is at the stagnating stage on the investment cycle and tipping towards deterioration which as seen by the investment figures and the interviews does not generate investment. The destination must now reinvigorate so that investors will take a second look at the potential and the deterioration can be halted and a new stage of investment encouraged.

DI Yogyakarta

Tourism investment in Yogyakarta is still on an upward trajectory but slowing. The large amounts spent on tourism amenities (we note the 19% growth in new rooms within the last 5 years) have led to an arguable oversupply of hotel rooms. There will be some market corrections required in the next few years before room night demand has an opportunity to catch up with the room night supply. It is believed that investment will slow until that time. In comparison to Borobudur however, Yogyakarta has a greater resilience due to its multiple source markets and demand generators (MICE, corporate, leisure) which facilitate reasonable room night demand 7 days a week. Currently Borobudur is more susceptible to seasonality.

To conclude, domestic and foreign investors are to a certain extent enthusiastic but at the same time cautious towards investing in tourism in the Destination. They are enthusiastic in investing in the area given the unique and world class tourism resources available as well as generous support from institutes such as TWC and UNESCO. But the stagnation in tourism development of the area surrounding Borobudur and underperformance of the hotels (especially in Kab. Magelang) make the investors cautious about extensive investments in the area. Therefore, based on current returns and asset performance and if the stagnation continues, the growth of FDI and DDI is expected to be at a low rate in the foreseeable future.

In the accompanying Indonesia-level report, there is further discussion focusing on the investment sentiment gleaned from interviews with existing Indonesian tourism investors and foreign investors. The investors chosen had interests in various tourism assets including hotels, restaurants, ground transportation, travel agencies and theme / amusement parks. Each of the Indonesian investors had investments in Indonesia, however, some of the foreign investors did not yet. The questions were aimed at gathering their thoughts on the pros and cons of SEZs, the tourism investment climate in Indonesia, the future of tourism investment and possible investment in the 10 priority destinations.

8. SKILLS ASSESSMENT

8.1 WHAT SKILLS EXIST?

Credited to the comprehensive and high quality tourism education, hotels and other tourist facilities in Borobudur and Kota Yogyakarta find it easy to get staff for entry, supervisory and even managerial positions.

Kab. Magelang: Most properties have at least 80% of staff from the local community, either from Kab. Magelang or surrounding villages. Besides practical and management skills, many hoteliers praise the good qualities and characters of the local Javanese who are polite, willing to serve and passionate about their own culture. These are more precious and crucial elements that create unique travelling experience for guests.

8.2 SKILLS GAPS[10]

- Training on marketing, especially social media marketing, could help enhance the image and exposure of the destination. It would also facilitate interaction and information sharing between the operators of hotels or homestays and potential guests.
- Continuous language training to facilitate a rise in international visitors. In addition to English and European languages, training in Chinese, Japanese, Korean, Indian and Arabic could help in the long run to welcome guests across the globe.
- Despite there being sufficient staff now to cater for the very limited number of tourism establishments, further development will require further skill enhancement at all levels. For instance, most hotels and accommodation facilities are small in scale in Kab. Magelang at the moment which require less manpower as well as yield management and marketing efforts. However, as the visitors rise in the future, the number and scale of various types of accommodation facilities will increase which require more and higher skilled labor.

8.3 TRAINING SCHOOLS

Vocational schools in Kab. Magelang and DI Yogyakarta such as SMK Negeri Magelang, SMK PiusX Magelang, SMK Negeri4 Yogyakarta and SMK Negeri6 Yogyakarta help provide basic hospitality training and language training for the locals. These schools offer hotel operational courses such as housekeeping, restaurant service and culinary. Some schools even have their own hotels for training the practical skills of their students (Edotel Umbulharjo and Edotel Kenari are school owned hotels of SMK Negeri4 Yogyakarta and SMK Negeri6 Yogyakarta respectively). These vocational schools, especially the ones in Kab. Magelang, are important talent source for entry level staff in hotels and tourism services in the Borobudur area.

[10] Gleaned from interviews with existing local investors in various assets including hotels, restaurants, travel agencies, and interviews with local hoteliers, restaurant managers.

In addition, for higher education, there are tourism universities both in Kab. Magelang and DI Yogyakarta (for example, Sekolah Perhotelan Magelang, Akademi Pariwisata Dharma Nusantara Sakti and Sekolah Tinggi Pariwisata Ambarrukmo Yogyakarta) to train students with higher level operational, management and communication skills that are necessary for supervisory and management roles. For instance, there are courses on accounting, public relations, cost control, information system in these universities.

Training Courses

Below are some of the vocational schools and courses offered:

- SMK Pius X Magelang (Courses: food processing, restaurant service, hospitality management)
- SMK Negeri 4 Yogyakarta (Courses: Receptionist, porter/doorman, reservation officer, housekeeping (laundry, public area, and room boy/room maid), telephone operator, order taker; Edotel Umbulharjo is the school owned hotel, used for training students' practical skill.)
- SMK Negeri 6 Yogyakarta (Courses: Front Office, Housekeeping, F&B Service; Edotel Kenari is the school owned hotel, used for training students' practical skill.)
- SMK Pi Ambarrukmo I Depok (70% practical, 30% theory; Courses: Housekeeping, F&B Service, Food Product/Kitchen, Front Office, Laundry, Language, Computer)

In addition, to groom professional hospitality leaders, there are also tourism universities in Kab. Magelang and DI Yogyakarta for the pursuit of higher education:

- Sekolah Perhotelan Magelang (Courses: Hotel Knowledge, Front Office, Housekeeping, F&B Service, Bar Operation, Work Ethics, Food Production, Pastry, Psychology of Service, English Conversation, English for Hotel, Hygiene & Sanitation, Job Interview)
- Akademi Pariwisata Dharma Nusantara Sakti (Courses: Hotel Accounting, Bartending, Hotel Engineering, Tourism Anthropology, Sales & Marketing, Business Ethics, Cost Control, Customs Immigration and Quarantine, MICE, etc)
- Sekolah Tinggi Pariwisata Ambarrukmo Yogyakarta (Courses: Public Relations, Tourism Introduction, Hospitality Information System, Business Strategy, Tourism Law, Quality Assurance, Supply & Property Management, Environment Impact)
- Sekolah Tinggi Pariwisata Ampta Yogyakarta (Courses: Hotel Administration, Front Office, Housekeeping, Food Product, Bartending).

Alternative Training Courses

In addition to educating the young generation, there are a range of tourism and hotel related training programs organized by the Dinas Pariwisata Kab. Magelang to ensure a continuous improvement of hospitality owners and staff. These training programs include the following:

- Human Resource Training for tourism attraction site developer/management
- Human Resource Training for tourism villages

- Human Resource Training for hotel owners/management
- Human Resource Training for HPI (Himpunan Pramuwisata Indonesia/Indonesian Tourist Guide Association)
- Human Resource Training to institutionalize homestays
- Human Resource Training for restaurant owners/management
- Human Resource Training for rafting tourism
- Human Resource Training for tourism statistics (calculation of hotel occupancy)

TWC and UNESCO

One of the key strategies of both TWC and UNESCO is to empower the local inhabitants so as to enhance their engagement and economic benefits from sustainable tourism development of the Borobudur area. Both organizations have been organizing various training to help the development of cultural villages that appeal to visitors. Training on service, culinary and other operational skills and language training are first priority at the moment. As a result, local villagers in the area gradually acquire skills related to hospitality which are used either in their own tourism related SMEs or joining the tourist service providers (hotels, restaurants) to provide quality and efficient service. Both TWC and UNESCO are committed to long-term engagement to help equip the local people with the necessary skills and resources for tourism development.

DESTINATION SWOT & VISION

9. DESTINATION SWOT

This chapter takes the form of a SWOT analysis to summarize the main findings on tourism supply and demand in the Destination.

9.1 STRENGTHS

- Abundant cultural and natural resources in the destination, with the potential to create a unique religious and historical circuit.
- Complementarity of the three main points of interest of the destination: Borobudur Temple, Pramabanan Temple and Yogyakarta City.
- Borobudur temple labelled UNESCO World Heritage site and continuous UNESCO assistance and sponsorship.
- Important and diversified accommodation.
- Sufficient high quality labor in the destination.
- Yogyakarta is well connected to domestic and international hubs.
- Good connectivity within the destination, especially between Borobudur and Kota Yogyakarta.

9.2 WEAKNESSES

- Little effort to value the cultural heritage of Yogyakarta City among foreign visitors
- Specific problems in Borobudur temple: lack of entrance regulation system, overcrowding, hawkers, poor visitor experience, lack of a common vision and clear mechanism to coordinate the various management parties.
- Limited choice of hotels, both star and non-star-rated and quality F&B within the temple vicinity does not encourage overnight stays in Kab. Magelang, nor visits to the neighboring cultural villages.
- Despite its UNESCO World Heritage Site status and much marketing efforts and resources put into Borobudur (e.g. TWC invested IDR 8.2 billion in 2014 on marketing and research of Borobudur, Prambanan and Ratu Boko), Borobudur is not receiving the same recognition as other attractions with similar status. International visitors in 2015 only accounted for 7% of total visitors of Borobudur Temple and 3% for the overall destination.
- Lack of a common vision and clear mechanism to coordinate the various management parties of Borobudur (Borobudur Studies and Conservation Institute, TWC and Kab. Magelang) for the conservation and promotion of the Borobudur area. Each party has its own mandates and objectives and responsible for different sections around the site.
- Some of the damage caused by natural disasters and vandalism by visitors are irreversible.
- Low occupancy levels of hotels in the area which reveals insufficient demand for hotels.

9.3 OPPORTUNITIES

- Significant potential of visits from Asian countries with an important Buddhist population (China, Thailand, Vietnam, Myanmar, Sri Lanka, Japan, Taiwan) if efforts are made to promote the destination.
- Potential in the surrounding area of the Borobudur temple compound for the development of cultural exploration (such as cultural villages and better connection with other cultural sightseeing spots).
- Potential adventure tourism (Mount Merapi, rafting).
- Greater urban tourism to Kota Yogyakarta (vibrant city life).
- Major improvements in connectivity: new international airport in Kulonprogo (60 kilometers from Borobudur), a special cruise dock at Port of Tanjung Emas in Semarang (100 kilometers from away) and revitalization of train routes connecting Yogyakarta – Borobudur and Yogyakarta – Semarang.
- Further depreciation of the Rupiah may limit domestic visitors from travelling abroad, preferring to stay in Indonesia for their holidays. It would at the same time make Indonesia an even more affordable destination for international guests.

9.4 THREATS

- Mount Merapi is the most active volcano in Indonesia and has erupted regularly since 1548. Volcanic activities of Mount Merapi and other surrounding volcanoes cause destruction to the Temple and affect the tourist activities of the area.
- Unregulated growth in visitors in the past had led to rapid deterioration of the Borobudur Temple and the surrounding environment according to Borobudur Studies and Conservation Institute and if no preventive measures are taken as soon as possible, the deterioration is likely to continue or even accelerate.
- Overcrowding also threatens the image of the site among international markets, especially Europeans, with increasing recommendations on user-generated content websites to avoid the site as an “overcrowded tourist trap”.

10. DESTINATION VISION STATEMENT

Figure 52 highlights that the combination of Kota Yogyakarta, Borobudur and Prambanan clusters defines the destination.

FIGURE 52 – KEY ATTRACTIONS & KEY TOURISM AREAS

Source: Google maps, Surbana Jurong

A = Borobudur Cluster
B = Prambanan-Boko Cluster
C = Yogyakarta Cluster

10.1 RECOMMENDED DESTINATION VISION

The combination of Kota Yogyakarta, Borobudur and Prambanan is an internationally recognized symbol of Javanese traditional culture.

Visiting the Borobudur Temple Compound is a peaceful and spiritual experience and integrated with the surrounding cultural villages. It is most often visited in combination with Prambanan and Kota Yogyakarta, which have regained their importance as key historical and cultural attractions.

MARKET DEMAND FORECASTS

11. FUTURE MARKET DEMAND ANALYSIS

11.1 INTRODUCTION: METHODOLOGY

The purpose of this section is to develop detailed projections for the scale, origin and characteristics of future visitor demand for the Borobudur-Yogyakarta-Prambanan triangle Destination.[11] The steps are:

- Assess and analyze potential market demand for the Borobudur-Yogyakarta-Prambanan triangle to define the most prospective market segments (based on the segment's ability to generate value for the destination in a sustainable manner), building on the baseline supply and demand analysis;
- Define two demand scenarios based on the conditions required for the development of the destination: a "best-case" scenario where these conditions are met and a "business as usual" scenario where they are not.
- Provide quantitative forecasts of future demand from source markets depending on the scenarios.

The next sections of the Report use this assessment of future demand to identify opportunities for the development of the Destination (accommodation, transportation, leisure activities, etc.) in terms of scale, location, and timing, and to assess public investment needs (transport and basic services and infrastructure).

11.2 PRIORITY MARKETS FOR THE DESTINATION

11.2.1 FOREIGN VISITORS

Among foreign visitors to the Destination, a strategic segment consists of **European** visitors (especially from the Netherlands, France, Germany and the United Kingdom). This segment is attracted by heritage sites, cultural discovery and Buddhism. The awareness of Borobudur is already well-established among European visitors as it is well covered by guide books and Internet sites. Europeans have a longer average length of stay in Indonesia and a higher propensity to visit several destinations, therefore they are likely to allocate part of their time to visit the Borobudur-Yogyakarta-Prambanan triangle, as part of a multi-destination trip in Indonesia.

Asian visitors to the Borobudur-Yogyakarta-Prambanan triangle are mainly from Malaysia and Japan (especially among visitors to the Borobudur temple). Surprisingly, China and India represent a small share of the visitors to the destination, compared with the absolute size of these markets and the significant number of visitors visiting Indonesia (Malaysian and Singapore). The Borobudur-Yogyakarta-Prambanan triangle has the potential to be included as a destination in two types of stays:

- For short-haul visitors (from Malaysia, Singapore and Thailand) the Borobudur-Yogyakarta-Prambanan triangle may be visited as part of a short, dedicated stay of 2 to 3 days. Direct air connections with these markets are crucial to attract this type of short stays.

[11] In previous section, the territorial scope of the destination has been redefined as the key tourism areas defined by the triangle formed by the Borobudur Cluster, Yogyakarta Cluster and Prambanan-Boko Cluster.

- Long-haul Asian visitors (from China, Korea, India, Thailand, Vietnam and Myanmar) may visit the Borobudur-Yogyakarta-Prambanan triangle as part of a longer multi-destination trip in Indonesia (the same as for European visitors).

Although an important market for Indonesia in general, **Australians** are not considered as a priority market for the Destination. Indeed, this segment has a lesser appetite for heritage sites and cultural visits, which is reflected in the weaker market share of Australians in the Destination (especially when compared with the importance of Australian visitors at the Indonesia level).

11.2.2 SEGMENTATION OF DOMESTIC MARKET

The **domestic market** may be divided into two categories:

- Leisure and business visitors staying in commercial accommodations; and
- Excursionists, as well as visitors visiting and staying with friends and relatives (VFR), visiting tourism attractions in the Borobudur-Yogyakarta-Prambanan triangle.

The economic impact of **day visitors and VFR** is very limited, but they must be taken into account as they represent an important share of visitors to the main cultural heritage attractions, in a context in which some of these sites are considered by those interviewed as close to saturation. When comparing statistics on visitors at several heritage sites in Indonesia, the situation appears atypical, as Borobudur is the only religious and heritage site to benefit from this increasing popularity amongst the resident population. For instance, students and schoolchildren represent 38% of the visitors to Borobudur temple.

Encouraging the population of Indonesia to visit Borobudur and Prambanan temples by offering extremely discounted tickets to Indonesian nationals may respond, for the Government of Indonesia and the local authorities, to a pedagogical objective (among schoolchildren) and cultural development objective (for the general population). It is not our task to discuss the merits of these objectives, however, we must take into account the consequences of the pursuit of these objectives for future demand projections: given an increasing population and levels of education, this source of demand is expected to continue to grow steadily in the years to come.

From a marketing perspective, to maximize economic spillovers, **domestic visitors staying in commercial accommodations** should be the priority market segment targeted. At present, this segment represents a very small share of domestic visitors, who are largely either day visitors or are staying with friends and relatives (in the Destination).

11.2.3 SEGMENTATION BASED ON THE MOTIVATION FOR VISITING THE BOROBUDUR–YOGYAKARTA–PRAMBANAN TRIANGLE

For the purpose of the demand forecast, we consider, in addition to the classic source market approach, another approach based on the main motivation of visit. Indeed, while Borobudur Temple Compound is considered as the principal attraction of the region and a "must see" in Indonesia, according to international tourism guides and interviewed tour operators, a significant proportion of visitors staying in the Borobudur–Yogyakarta–Prambanan triangle do not actually visit the temple.

For the demand forecast, it is therefore useful to consider that there are two markets for the Destination, based on the main motivation of visit and the way these segments perceive the destination:

1. A segment of visitors who visit the Destination primarily for the Borobudur temple. This segment is mainly composed of excursionists (locals) and foreign visitors. The main challenge for this segment is to increase the average length of stay and daily expenditure in the destination; and

2. A segment of visitors who visit the Destination primarily to enjoy Yogyakarta and the attractions available at a close distance, without going to Borobudur, with two sub-segments:

   - Domestic business visitors to Yogyakarta. The number of business stays in the Destination is principally shaped by economic activity. There is no supply constraint for this segment; and
   - Domestic and foreign leisure visitors who visit Yogyakarta. The main challenges for this segment is to increase the frequency of visits and, up to a certain point,[12] the average length of stay (essentially by convincing them to stay in Kab. Magelang as well).

11.3 SCENARIOS

Two scenarios are presented

- Business as usual scenario:
  - based on an "organic" development of the destination driven by the forces of the market;
  - no Government investment in public infrastructure; and
  - no measures are introduced to restrict and/or preserve access to heritage resources (especially the Borobudur Temple Compound);
- Best case scenario: significant Government efforts are carried out to further develop the Borobudur–Yogyakarta–Prambanan triangle as a sustainable cultural destination.

11.4 BUSINESS AS USUAL SCENARIO

11.4.1 SCENARIO SUMMARY DESCRIPTION

This scenario considers that there will be no structural change in the Destination offer. However, heritage resources, especially at the Borobudur Temple Compound, will be increasingly degraded by the absence of adequate visitor flow management.

12 There is little opportunity to increase further the average length of stay for domestic visitors beyond 2 nights (based on the behaviour of the Indonesian visitors staying at commercial accommodation: they have few vacation days and therefore favour weekend getaways). Malaysians and Singaporeans follow the same pattern as domestic visitors (they favour repeated weekend getaways in neighbouring destinations such as Indonesia). Long-haul visitors (principally Europeans) are more flexible, but their average length of stay in Indonesia is fixed, reason for which we also consider that there is little opportunity to increase further the average length of stay for foreign visitors beyond 2 nights.

Based on past trends, we deduce that there will be an organic growth of visitors at the Borobudur–Yogyakarta–Prambanan triangle, measured by visitors at commercial accommodations, as well as at the main attractions (Borobudur, Prambanan, Kraton…).

In this scenario, there is an organic growth of accommodation in Kab. Magelang (Kec. Mungkid & Kec. Borobudur) and DI Yogyakarta, which will be concentrated in Kota Yogyakarta (as is currently the case). As there is no structural change in the Destination's offer, the average length of stay and expenditure will remain similar to past trends.

11.4.2 MARKET RESPONSE

The expected market response is different for the 2 main segments of visitors to the Borobudur–Yogyakarta–Prambanan triangle.

- For the segment of visitors who visit the Destination primarily for the Borobudur temple:
  - Demand growth will be moderated by the decreasing attractiveness of the Destination, as domestic and international visitors staying at commercial accommodation are sensitive to the degradation of the monuments and visitor experience; and
  - In the long run, demand growth will gradually slow down, following demographic growth, negatively impacted by a lesser attractiveness.
- For the segment of visitors who visit the destination primarily to enjoy Yogyakarta and other attractions located at a close distance, without going to Borobudur:
  - In the long run, demand growth will be moderated by the demographic evolution of the Indonesian population as well as the evolution of foreign demand to Indonesia; and
  - The degradation of historical monuments will only partially affect the attractiveness of the destination, as heritage is only one component of its attractiveness, among many others: urban atmosphere and restaurants, night life, shopping, etc.

11.4.3 SEGMENT 1: VISITORS TO THE BOROBUDUR TEMPLE COMPOUND

Figure 53 presents the quantitative forecasts of domestic visitors to the Borobudur Temple in the Business as Usual scenario.

FIGURE 53. FORECAST OF VISITORS TO BOROBUDUR TEMPLE 2015-2041

		Projections			CAGR (%)		
	2015	2021	2026	2041	2016-2021	2022-2026	2027-2041
Total visitors of the Temple	**3,558,690**	**4,036,300**	**4,225,800**	**4,638,900**	**2.1%**	**0.9%**	**0.6%**
Domestic visitors	3,302,328	3,726,800	3,897,400	4,310,500	2.0%	0.9%	0.7%
Day visitors and VFR	3,137,212	3,536,300	3,693,000	4,058,100	2.0%	0.9%	0.6%
In commercial accommodation	165,116	190,500	204,400	252,400	2.4%	1.4%	1.4%
Foreign visitors	256,362	309,500	328,400	328,400	3.2%	1.2%	0.0%

Source: Horwath HTL

Reminder: baseline data for 2015 is estimated based on:

- Number of tickets sold to domestic visitors at Borobudur temple;

- Interviews with TWC estimating that 95% of domestic visitors to the temple are either locals or VFR; and
- Reasonableness check: 35% of domestic visitors are local school children.

The reasoning for each market segment for 2021, 2026 and 2041 is presented below:

Visits of Day Visitors and VFR to Borobudur Temple Compound

2016-2021	Estimate based on recent trend of rapidly slowing growth in visitors to Borobudur temple between 2013 and 2015 (CAGR 2.0%, compared to 11.4% from 2010 to 2013), further adjusted downwards (to CAGR 2.0%) to reflect growing strains on the Temple compound's carrying capacity.
2022-2026	Visitor growth estimated to slow further in line with demographic trends, converging to the population growth of Kab. Magelang and DI Yogyakarta (CAGR 0.9% for the 2020-2025 period).
2027-2041	Visitor growth continues to track long-term demographic trends, equal to projected population growth of Kab. Magelang and DI Yogyakarta (CAGR 0.6% for the 2025-2035 period).

Domestic Visitors staying in Commercial Accommodation

2016-2021	Estimate based on recent trend of slowing growth in visitors to Borobudur temple between 2013 and 2015 (2.4%).
2022-2026	Visitor growth slows relative to 2016-2021 period, reflecting decreased appeal of the Borobudur temple visitor experience (due to degradation and crowding) (CAGR 1.4%).
2027-2041	Same CAGR as for 2022-2026 (1.4%).

Foreign visitors to Borobudur Temple Compound

2016-2021	CAGR of 3.2%; estimate is based on recent trend of slowing growth in foreign visitors to Borobudur temple between 2013 and 2015 (CAGR 6.2%, compared to 13.3% from 2010-2013), adjusted downwards relative to the expected growth of total foreign visitors to Indonesia (7.0%, i.e. the Destination underperforms).
2022-2026	CAGR of 1.2%; estimate is based on continuation of past trends of visits to Borobudur temple between 2016 and 2021 (CAGR 3.2%) and adjusted downwards relative to the expected growth of foreign visitors to Indonesia (i.e. the Destination underperforms).
2027-2041	No growth in foreign visitors to the Temple (CAGR 0.0%) due to degradation of Temple visitor experience.

11.4.4 SEGMENT 2: NON-VISITORS TO THE BOROBUDUR TEMPLE

Figure 54 presents the quantitative forecasts of demand among non-visitors to the Borobudur Temple in the Business as Usual scenario.

FIGURE 54. FORECAST OF NON-VISITORS TO BOROBUDUR TEMPLE 2015-2041

	2015	*Projections*			CAGR (%)		
		2021	2026	2041	2016-2021	2022-2026	2027-2041
Total non-visitors of the Temple	**7,943,642**	**9,294,400**	**9,988,500**	**11,584,200**	**2.7%**	**1.5%**	**1.0%**
Domestic visitors	7,906,482	9,240,100	9,921,400	11,465,300	2.6%	1.4%	1.0%
In commercial accommodation	4,031,329	5,106,900	5,594,100	6,676,800	4.0%	1.8%	1.2%
At friends and relatives	3,875,153	4,133,200	4,327,300	4,788,500	1.1%	0.9%	0.7%
Foreign visitors	37,161	54,300	67,100	118,900	6.5%	4.3%	3.9%

Source: Horwath HTL

Reminder: baseline data for 2015 is estimated based on:

- Number of domestic visitors to Kab. Magelang and DI Yogyakarta (Source: Accommodation Survey); and
- Minus the number of tickets sold at Borobudur Temple Compound.

The reasoning for each market segment for 2021, 2026 and 2041 is presented below:

Domestic Visitors Staying in Commercial Accommodation

2016-2021 Estimate based on the trend of the previous 2 years, adjusted downwards (to CAGR 4.0%) due to reflect the national trend of domestic tourism (CAGR 2.0%)

2022-2026 Estimate based on projected growth of domestic visitors at national level (CAGR 1.8%), implying a constant market share for the destination.

2027-2041 Estimate based on projected growth of domestic visitors at national level (CAGR 1.2%), implying a constant market share for the destination.

Domestic Visitors Staying with Friends and Relatives

2016-2021 Estimate based on the forecast of the population growth of DI Yogyakarta (CAGR 1.1%), as this is considered the main catchment area for incoming VFR travelers who do not visit Borobudur Temple.

2022-2026 Estimate based on the forecast of the population growth of DI Yogyakarta (CAGR 0.9%).

2027-2041 Same assumption as for 2022-2026 (CAGR 0.7%).

Foreign Visitors

2016-2021 Growth is set equivalent to expected overall foreign visitor growth to Indonesia (CAGR of 6.5%), reflecting the expectation of an unchanged market share of the Borobudur-Yogyakarta-Prambanan destination.

2022-2026 Same rationale as for 2016-2021. CAGR is in line with projected national-level growth of foreign visitors (4.3%).

2027-2041 Same rationale as for previous period. CAGR is in line with projected national-level growth of foreign visitors (3.9%).

11.4.5 SYNTHESIS OF FORECAST FOR THE BUSINESS AS USUAL SCENARIO

Figure 55 presents the quantitative forecasts of demand among all visitors to the Borobudur–Yogyakarta–Prambanan triangle in the Business as Usual scenario.

FIGURE 55. FORECAST OF ALL VISITORS TO THE BOROBUDUR – YOGYAKARTA – PRAMBANAN TRIANGLE, 2015-2041 (BUSINESS AS USUAL SCENARIO)

	2015	Projections			CAGR (%)		
		2021	2026	2041	2016-2021	2022-2026	2027-2041
Domestic visitors	11,208,810	12,966,900	13,818,800	15,775,800	2.5%	1.3%	0.9%
Day visitors and VFR	7,012,364	7,669,500	8,020,300	8,846,600	2.0%	0.9%	0.6%
In commercial accommodation	4,196,445	5,297,400	5,798,500	6,929,200	4.0%	1.8%	1.2%
Foreign visitors	293,523	363,800	395,500	447,300	3.6%	1.7%	0.8%
Total visitors	**11,502,332**	**13,330,700**	**14,214,300**	**16,223,100**	**2.5%**	**1.3%**	**0.9%**

Source: Horwath HTL

11.5 BEST CASE SCENARIO

11.5.1 SCENARIO SUMMARY DESCRIPTION

The proposed scenario supposes that an integrated tourism masterplan and significant investments are carried out in Kota Yogyakarta, Prambanan – Boko (Kab. Sleman, Kec. Prambanan and Kab. Klaten, Kec. Prambanan) and Borobudur (Kab. Magelang, Kec. Borobudur and Kec. Mungkid).

11.5.2 INVESTMENTS IN KOTA YOGYAKARTA

- Yogyakarta is an increasingly attractive destination for both domestic and foreign visitors.
- No constraints or obstacles for further tourism development of Yogyakarta and the surrounding attractions (e.g. Prambanan).
- As a result, Yogyakarta will continue to develop organically and, as its attractiveness increases, private investment in related tourism amenities will follow.
- Improvement in heritage conservation and management, as well as upgrading of public spaces in tourism areas, are carried out to enhance the visitor experience and sustain the attractiveness of the destination.

11.5.3 INVESTMENTS IN KAB. MAGELANG (BOROBUDUR & SURROUNDS)

- Visitor Management Plan and investments at Borobudur Compound are carried out in such a way that:
  - Attendance at the compound increases without carrying capacity constraints;
  - Measures are taken to reduce capacity pressures on the Borobudur Temple (limiting and organizing access); and
  - Visitor experience is enriched, therefore the site becomes more attractive.
- Significant investment, capacity building, marketing and promotional efforts are carried out to develop the tourism amenities (e.g. accommodations, food and beverages, soft transportation, activities, community based management) in Borobudur and surrounding cultural villages.

- Planned development of varied accommodation in Borobudur and surrounding cultural villages are implemented. However, accommodation remains concentrated in Yogyakarta (the economic capital).

11.5.4 MARKET RESPONSE

Market response is different according to the 2 main segments of visitors to the Borobudur–Yogyakarta–Prambanan triangle.

For the segment of visitors who visit the Destination primarily for the Borobudur Temple

- Resident/day trippers and VFR segments will stop growing as measures, especially regarding entrance fees, are undertaken to reduce the share of this segment.
- There will be an increasing appetite for the Destination amongst domestic and foreign visitors (staying at commercial accommodation).
- In parallel, foreign visitors should diversify (not only Europeans, also Asian markets).
- In the long run, demand growth will gradually slow down due to demographic characteristics of the market segments.
- The average length of stay and expenditure in the Destination will increase, as new activities are proposed to retain visitors.
- As a result, there will be economic spillovers of the increased tourism demand, both in Kab. Magelang and DI Yogyakarta.
- We do not expect any substitution effects from Kota Yogyakarta to Kab. Magelang as the demand and the accommodation capacity will grow significantly in both locations.

For the segment of visitors who visit the Destination primarily to enjoy Yogyakarta and attractions located at a close distance, without going to Borobudur:

- Investments in Kota Yogyakarta will make it a more attractive stand-alone destination for domestic visitors who are not visiting the Borobudur Temple.
- There will be limited impact on the domestic segment regarding average length of stay. There will not be any substitution effect regarding the place of accommodation between Kab. Magelang and Kota Yogyakarta, as spending the night in Yogyakarta is the main motivation of stay for this segment. However, a proportion of this segment may spend one day or half a day in Borobudur in the future, as its attractiveness increases.
- The average length of stay of foreign visitors will increase, as they will increasingly choose to spend more time in the Destination to visit Borobudur and the surrounding cultural villages.

11.5.5 SEGMENT 1: VISITORS TO BOROBUDUR TEMPLE

Figure 56 presents the quantitative forecasts of demand among visitors to the Borobudur Temple in the Best Case scenario.

FIGURE 56. FORECAST OF VISITORS TO BOROBUDUR TEMPLE, 2015-2041 (BEST CASE SCENARIO)

	2015	*Projections*			CAGR (%)		
		2021	2026	2041	2016-2021	2022-2026	2027-2041
Total visitors of the Temple	**3,558,690**	**3,850,390**	**4,168,900**	**5,324,490**	**1.3%**	**1.6%**	**1.6%**
Domestic visitors	3,302,328	3,449,300	3,644,300	4,220,600	0.7%	1.1%	1.0%
Day visitors and VFR	3,137,212	3,235,300	3,378,700	3,712,800	0.5%	0.9%	0.6%
In commercial accommodation	165,116	214,000	265,600	507,800	4.4%	4.4%	4.4%
Foreign visitors	256,362	401,090	524,600	1,103,890	7.7%	5.5%	5.1%
Overnight visitors	256,362	400,800	524,200	1,103,200	7.7%	5.5%	5.1%
Cruise passengers	-	290	400	690	0.0%	6.6%	3.7%

Source: Horwath HTL

The reasoning for each market segment for 2021, 2026 and 2041 is presented below:

Day Visitors and VFR to Borobudur Temple Compound

2016-2021 Estimate based on the evolution of demographic trends in Kab. Magelang and DI Yogyakarta adjusted downwards (to CAGR 0.5%) as new measures taken at Borobudur temple (for example, increase in ticket price or the obligation to be accompanied by a certified guide) will decrease their desire to visit the monument again (the objective being to discourage local repeat visitors).

2022-2026 On the basis that sustainable visitor traffic management solutions have been implemented at Borobudur Temple by this point, visitor growth returns to the more "natural" growth rate consistent with demographic trends, and is thus set equal to the forecast for population growth of Kab. Magelang and DI Yogyakarta (CAGR 0.9%).

2027-2041 Estimate based on the forecast of the population growth of Kab. Magelang and DI Yogyakarta (CAGR 0.6%).

Domestic Visitors staying in Commercial Accommodation

2016-2021	Estimate based on continuation of past trends between 2013 and 2015 (CAGR 2.4%), adjusted upwards (CAGR 4.4%) considering the increasing attractiveness of Borobudur Temple and Kab. Magelang due to product diversification. In the 2016-2021 period, demand growth may be constrained by the airport under-capacity (6.1 million passengers per year versus an existing traffic of 6.3 million in 2015). The newly created products (cultural villages) will have a positive impact on the average length of stay, which increases by 1 day. The projected penetration rate of visits to the cultural villages among the segment is 20%.[13]
2022-2026	Same growth as for 2016-2021 (CAGR 4.4%) The newly created product (cultural villages) increases the length of stay by 1 day. The penetration rate of visits to the cultural villages among the segment rises from 20% to 30%.
2027-2041	Same growth as for 2022-2026 (CAGR 4.4%).

Foreign Visitors to Borobudur Temple Compound

2016-2021	Estimate based on forecast of foreign visitor growth at Indonesia level (CAGR 6.5%), adjusted upwards (to CAGR 7.7%) considering the increasing attractiveness of Borobudur temple and Kab. Magelang due to product diversification as well as the gradual diversification of the clienteles visiting the temple compound (growing proportion of Asian visitors). In the 2016-2021 period, demand growth is not constrained by airport capacity (only 120,000 additional visitors by air). The newly-created product (cultural villages) increases the average length of stay by 1 day. The penetration rate of visits to the cultural villages among the segment is 20%.
2022-2026	Estimate based on forecast of foreign visitor growth at Indonesia level (CAGR 4.3%), adjusted upwards (5.5%) considering the increasing attractiveness of Borobudur Temple and Kab. Magelang due to product diversification and the gradual diversification of the clienteles visiting the temple compound (greater proportion of Asian visitors over European visitors). The newly created product (cultural villages) increases the average length of stay by 1 day. The penetration rate of the visit of the cultural villages among the segment rises from 20% to 30%.
2027-2041	Same rationale as for 2022-2026 (CAGR 5.1%).

[13] 20% of the segment will be interested in visiting the cultural villages and stay up to 1 more day in the destination to do so, while the rest will not be interested in visiting the cultural villages, therefore their average length of stay will be the same as what is currently observed.

Foreign Cruise Passengers

2016 to 2041	The estimate of passengers at Semarang Port is based on the number of port calls at Semarang Port already scheduled for 2017 and 2018 and the global trends for the Asia market. It is estimated that 2% of the cruise passengers will make a one-day excursion to Borobudur.

11.5.6 SEGMENT 2: NON-VISITORS TO THE BOROBUDUR TEMPLE

Figure 57 presents the quantitative forecasts of domestic and foreign demand among non-visitors to the Borobudur Temple in the Best Case scenario.

FIGURE 57. FORECAST OF NON-VISITORS TO BOROBUDUR TEMPLE, 2015-2041 (BEST CASE SCENARIO)

		Projections			CAGR (%)		
	2015	2021	2026	2041	2016-2021	2022-2026	2027-2041
Total non visitors of the Temple	**7,943,642**	**9,597,700**	**10,617,600**	**13,516,400**	**3.2%**	**2.0%**	**1.6%**
Domestic visitors	7,906,482	9,541,800	10,548,600	13,394,200	3.2%	2.0%	1.6%
In commercial accommodation	4,031,329	5,408,600	6,221,300	8,605,700	5.0%	2.8%	2.2%
At friends and relatives	3,875,153	4,133,200	4,327,300	4,788,500	1.1%	0.9%	0.7%
Foreign visitors	37,161	55,900	69,000	122,200	7.0%	4.3%	3.9%

Source: Horwath HTL

The reasoning for each market segment for 2021, 2026 and 2041 is presented below:

Domestic Visitors Staying in Commercial Accommodation

2016-2021	Estimate based on the continuation of recent trends between 2013 and 2015 (CAGR 5.4%) and the expectation of an increased attractiveness of Kota Yogyakarta for weekend getaways (CAGR 5%), following investments to conserve heritage sites (e.g. museums, temples) and improve public spaces in tourism areas. Impact on ALOS from the newly-created product (cultural villages) is very limited: it increases the length of stay by 1 day but since the penetration rate of visits to the cultural villages among the segment is assumed at only 2.5%, only 2.5% of this segment will have an increased ALOS.
2022-2026	Estimate based on the forecast of domestic visitor growth at Indonesia level (CAGR 1.8%), adjusted upwards (to CAGR 2.8%) to take into account the increased attractiveness of Kota Yogyakarta. The newly-created product (such as the visit of the cultural villages) will help to increase the length of stay by 1 day, but since the penetration rate of visits to the cultural villages among the segment is assumed at 5%, only 5% of this segment will have an increased ALOS.
2027-2041	Estimate based on the forecast of domestic visitor growth at Indonesia level (CAGR 1.2%), adjusted upwards to CAGR 2.2% to take into account the increased attractiveness of Kota Yogyakarta.

Domestic Visitors Staying with Friends and Relatives

2016-2021	Estimate based on the forecast of the population growth of DI Yogyakarta (CAGR 1.1%).

2022-2026 Estimate based on the forecast of the population growth of DI Yogyakarta (CAGR 0.9%).

2027-2041 Estimate based on the forecast of the population growth of DI Yogyakarta (CAGR 0.7%).

Foreign Visitors

2016-2021 Estimate based on the forecast of foreign visitor growth at Indonesia level, adjusted upward to take into account the increased attractiveness of Kota Yogyakarta city (CAGR 7.0%). Impact of the newly-created product (cultural villages) is very limited since the penetration rate of visits to the cultural villages among the non-visitors of the temple segment is assumed at only 2.5%.

2022-2026 Estimate based on the forecast of foreign visitor growth at Indonesia level (CAGR 4.3%). Impact on ALOS from the newly-created product (cultural villages) is very limited since the penetration rate of visits to the cultural villages among the segment is assumed at only 5%.

2027-2041 Estimate based on the forecast of foreign visitor growth at Indonesia level (CAGR 3.9%).

11.5.7 SYNTHESIS FORECAST MARKET RESPONSE FOR THE BEST CASE SCENARIO

Figure 58 presents the quantitative forecasts of total demand among all visitors to the Borobudur – Yogyakarta – Prambanan triangle in the Best Case scenario.

FIGURE 58. FORECAST OF ALL VISITORS TO THE BOROBUDUR – YOGYAKARTA – PRAMBANAN TRIANGLE, 2015-2041 (BEST CASE SCENARIO)

		Projections			CAGR (%)		
	2015	2021	2026	2041	2016-2021	2022-2026	2027-2041
Domestic visitors	11,208,810	12,991,100	14,192,900	17,614,800	2.5%	1.8%	1.5%
Day visitors and VFR	7,012,364	7,368,500	7,706,000	8,501,300	0.5%	0.9%	0.6%
In commercial accommodation	4,196,445	5,622,600	6,486,900	9,113,500	5.0%	2.9%	2.3%
Foreign visitors	293,523	456,990	593,600	1,226,090	7.7%	5.4%	5.0%
Total visitors	**11,502,332**	**13,448,090**	**14,786,500**	**18,840,890**	**2.6%**	**1.9%**	**1.6%**

Source: Horwath HTL

11.6 ECONOMIC IMPACT (BUSINESS AS USUAL VS. BEST CASE)

Figure 59 presents the projected number of guest nights in the Borobudur–Yogyakarta–Prambanan triangle in the Best Case scenario (excluding day visitors), which would reach 44.6 million guest nights in 2021, 48.0 million in 2026 and 57.0 million in 204.[14]

[14] The number of guest nights has been calculated on the basis of the following ALOS observed in 2015
- 7 nights for domestic visitors in non-commercial accommodation (source Domestic Survey 2015)
- 1.4 nights for domestic visitors in commercial accommodation (source Accommodation Survey 2015)
- 1.8 nights for foreign visitors in commercial accommodation (source Accommodation Survey 2015)

FIGURE 59. FORECAST OF GUEST NIGHTS FROM VISITORS TO THE BOROBUDUR – YOGYAKARTA – PRAMBANAN TRIANGLE, 2015-2041 (BEST CASE SCENARIO)

		Projections		
	2015	2021	2026	2041
Total domestic visitors	**39,543,916**	**43,669,566**	**46,721,410**	**54,423,065**
At friends and relatives	33,843,082	35,853,299	37,518,270	41,459,832
In commercial accommodation	5,700,833	7,816,266	9,203,140	12,963,233
Foreign visitors	**542,467**	**925,336**	**1,256,188**	**2,597,278**
Overnight visitors	542,467	925,336	1,256,188	2,597,278
Total visitors	**40,086,383**	**44,594,901**	**47,977,598**	**57,020,343**

Source : Horwath HTL

Comparatively, in the Business as Usual scenario, the projected number of guest nights in accommodations, in the Borobudur–Yogyakarta–Prambanan triangle, would reach only 44.4 million guest nights in 2021, 46.8 million in 2026 and 52.5 million in 2041.

As presented in Figure 60, in the Best Case scenario, total visitors should generate an estimated total revenue of USD 1.4 billion in 2041 (USD 898 million in 2021 and USD 1.0 billion in 2026), which is 1.9 times the current expenditure of domestic and foreign visitors in 2015.

FIGURE 60. FORECAST OF EXPENDITURE FROM VISITORS TO THE DESTINATION, 2015-2041, IN CONSTANT USD THOUSANDS, BASE 2015 (BEST CASE SCENARIO)

		Projections		
	2015	2021	2026	2041
Total domestic expenditure	**668,300**	**766,700**	**836,700**	**1,018,500**
Day visitors	28,500	29,400	30,700	33,700
At friends and relatives	449,200	475,900	498,000	550,300
In commercial accommodation	190,600	261,400	308,000	434,500
Total foreign expenditure	**77,100**	**131,620**	**178,630**	**369,450**
Overnight visitors	77,100	131,600	178,600	369,400
Cruise passengers	-	20	30	50
Total expenditure	**745,400**	**898,320**	**1,015,330**	**1,387,950**

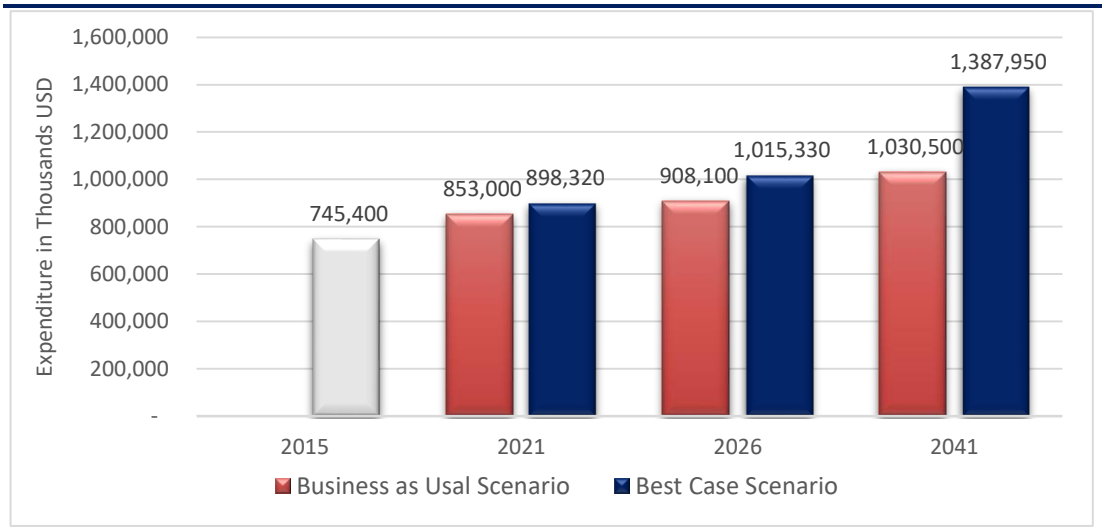
Source : Horwath HTL

The calculations are made based on the daily expenditure in constant US dollars 2015.[15]

[15] The average daily expenditure observed in 2015 are:
- USD 13.30 for domestic day visitors in non-commercial accommodation (source Domestic survey 2015)
- USD 33.40 for domestic visitors in commercial accommodation (source Domestic Survey 2015)
- USD 142.10 for foreign visitors (source Exit Survey 2015)

Comparatively, in the Business as Usual scenario, the revenue generated by the project demand is only USD 1.0 billion in 2041 (USD 853 million in 2021 and USD 908 million in 2026). The Best Case scenario generates USD 357 million additional revenue from tourism in 2041 than it would without the proposed public intervention and investment (Figure 61).

FIGURE 61. FORECAST OF ANNUAL VISITOR EXPENDITURE IN THE DESTINATION, 2021-2041



Source: Horwath HTL

INVESTMENT NEEDS

12. AMENITIES: KEY RECOMMENDATIONS

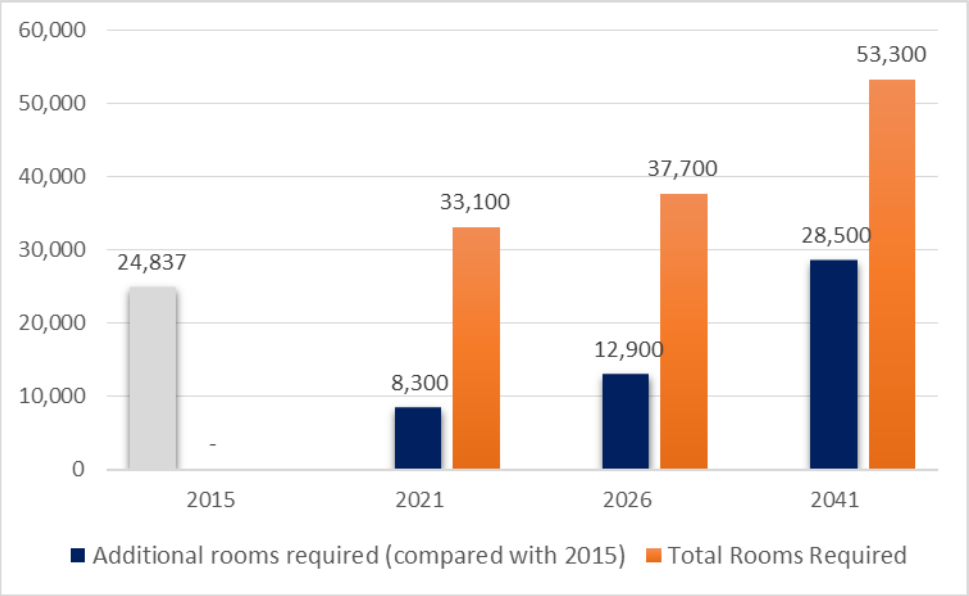
12.1 FORECASTING FUTURE SUPPLY NEEDS

The development of a sufficient accommodation capacity is essential to enable the development of short-stay tourism in the town of Borobudur and the surrounding villages. Dimensioning is based on the quantitative demand forecast presented in the section above.

Based on the forecast demand, the hotel inventory should have sufficient capacity to host an increasing number of room nights: 5.5 million in 2021, 6.3 million in 2026 and 8.6 million in 2041.

The total number of rooms available in 2015 is 22,594 in DI Yogyakarta and 2,243 in Kab. Magelang. The number of required rooms has been calculated based on the projected occupancy rate and the proportion of visitors at each destination, as shown in Figure 62.

FIGURE 62. BEST CASE SCENARIO, NUMBER OF ROOMS REQUIRED



Source: Horwath HTL based on BPS statistics and interview with local hoteliers

These projections are established with an assumption of an improvement of the occupancy rates in the Destination:

- In 2015, the occupancy was 33%[16] which is assumed to increase incrementally to 39% in 2014 based on increased maturity of the hotel market.

In the Best Case scenario:

- 33,100 rooms (6,600 additional rooms) are required in 2021. This is forecast to be split as 29,100 in DI Yogyakarta and 3,400 in Kab. Magelang (discussed in more detail in 14.1.2);

[16] Calculated based on inputs from Dinas Pariwisata Yogyakarta, Kab. Magelang and TWC

- 37,700 rooms (12,900 additional rooms) are required in 2026. This is forecast to be split as 33,400 in DI Yogyakarta and 4,300 in Kab. Magelang; and
- 53,300 rooms (28,500 additional rooms) would be necessary in 2041. This is forecast to be split as 45,600 in DI Yogyakarta and 7,700 in Kab. Magelang.

12.1.1 TYPE OF ACCOMMODATION RECOMMENDED

12.1.2 DI YOGYAKARTA

A broad range of hotels are recommended for the urban area of DI Yogyakarta.

Pipeline Hotel Projects

It is reported that the Yogyakarta hotel market will increase by around 4,500 rooms (STR Global) in the next few years. The positioning level of the hotel pipeline is not reported however it is reasonable to believe that hotels will be developed at all price points.

12.1.3 KAB. MAGELANG

Looking ahead, it is our recommendation that small and medium scale investment projects prevail so that the area retains its character. Supporting our recommendation, according to both TWC and the Dinas Pariwisata Kab. Magelang, any development close to the World Heritage Site of Borobudur, is carefully monitored and thus large scale tourism developments that cause disturbances to the environment and the local community are unlikely to happen.

Pipeline Hotel Projects

- Expansion of Manohara Borobudur into Zone III, in addition to the existing property in Zone II – site location not yet finalized but would be around 200 to 300 guestrooms. Conservation zone issues must be cleared prior to development.
- Plataran Borobudur is building a MICE hotel next to its conference center with 72 rooms and it is expected to open in the first quarter of 2017.
- Increasing numbers of homestays will be developed with the assistance of TWC, which is targeting 10 units of homestays with 3 rooms each per village in the coming years to cope with the rise in visitors. There are 20 villages, so this is a total of 600 rooms.

Hotel / Alternative Lodging Gaps (Gleaned from Interviews)

- Midscale star-rated hotels (50 to 100 rooms) overlooking the natural scenery of the area priced around IDR 1 million (USD 75) with good food and beverage and meeting facilities to target both leisure and MICE guests: Offering mid-price range star-rated hotels in addition to the mostly luxury hotels is crucial to target a wider market of international guests and middle to high spending domestic travelers. At the same time, by offering larger hotels it will help target potential MICE or leisure groups.
- Alternative lodging facilities in the villages / fields for camping / glamping (glamorous camping) or even tree houses with sufficient supplies of fresh water and power to provide a unique natural accommodation experience.
- Homestays
  - **Kota Yogyakarta**: homestays in Kota Yogyakarta are similar to hotels in the city and are demand driven. They are favored by price sensitive domestic guests & longer stay foreigners (to a limited extent). Limited potential in Kota Yogyakarta given the volume of hotels and weak performance.
  - **Borobudur**: it is believed to be a mix of supply / product driven and demand driven. Here homestays can be used as a driver of cultural tourism, increasing length of stay and enhancing the attractiveness of the whole destination.

12.1.4 RECOMMENDED LOCATION FOR NEW ACCOMMODATION

Figure 63 suggests a breakdown of the required accommodation by location.

FIGURE 63. RECOMMENDED ACCOMMODATION BY LOCATION

		Best Case scenario		
	2015	2021	2026	2041
Yogyakarta				
% of Boro. Temple visitors staying in DI Yogya	54%	50%	48%	45%
Room nights of visitors	173,859	270,200	348,983	680,535
% of non-visitors staying in DI Yogya	95%	95%	95%	95%
Room nights of non-visitors	2,554,455	3,495,810	4,097,825	5,694,015
Total room nights	2,728,314	3,766,010	4,446,808	6,374,550
Occupancy rate	33.1%	34.7%	36.5%	38.3%
Rooms required	22,594	29,700	33,400	45,600
Additional rooms required	-	7,100	10,800	23,000
Magelang				
Visitors	150,541	270,200	385,718	831,765
Non-visitors	134,445	183,990	215,675	299,685
Total room nights	284,986	454,190	601,393	1,131,450
Occupancy rate	35%	36.6%	38.4%	40.3%
Rooms required	2,241	3,400	4,300	7,700
Additionnal rooms required	0	1,200	2,100	5,500
Total Destination				
Rooms required	24,835	33,100	37,700	53,300
Additional rooms required	-	8,300	12,900	28,500

Source: Horwath HTL

Key assumptions include:

- % of Borobudur Temple visitors who stay in DI Yogyakarta - In 2015, 54% of visitors of Borobudur Temple stayed in DI Yogyakarta. This is forecast to reduce slowly as the Borobudur surrounds are enhanced (Best Case scenario);
- % of non-visitors to Borobudur Temple who stay in DI Yogyakarta - In 2015, 95% of non-visitors of Borobudur Temple stayed in DI Yogyakarta. This is forecast to remain the same; and
- Occupancy rates – estimates based on official statistics and fieldwork.

12.2 SUPPORTING TOURISM INFRASTRUCTURE

Key products and tourism-linked services are presented using a concentric pattern, focusing on the Borobudur Temple Compound first, and then on the wider territory of the Destination.

12.2.1 IMPROVING VISITOR EXPERIENCE OF BOROBUDUR TEMPLE

Our recommendations start from the principle that Borobudur Temple is above all a sacred, religious site. The strategy should therefore aim, by analogy, to create a phenomenon of re-sacralization of the experience of visiting the temple. Instead of being offered as a classic tourist attraction, easy to consume, Borobudur and its surroundings must be presented as a unique experience from a tourism, cultural and spiritual point of view.

The re-sacralization process should be achieved through a series of measures applied in a continuum before, during and after the visit:

Regulation and Limitation Measures

The objective is to create value by scarcity with regulations and limiting visitation. The operational measures proposed here should be discussed with TWC representatives and UNESCO.

- Optimize attendance levels over the year with the installation of quotas during peak periods of the year and increases in ticket prices. A maximum number of tickets sold can be fixed at least for the months of December and January as they are the months with the highest attendance.
- During these periods of high attendance, organize online ticket sales with limited visitor quotas (domestic and/or foreigners). Entrance is not guaranteed to those who have not bought their ticket online.
- Regulate access to the main monument itself by hour slides, and access limitations.
- Limit group visits to the Temple by requiring they be escorted by authorized guides.
- Distribute quotas of tickets to selected agencies, on condition they include the visit in a package with other attractions and/or an overnight stay in the destination.
- Schoolchildren and locals must be encouraged to visit the monument off peak.

Creation of an Introduction Centre

We propose to create a facility which would constitute a "buffer zone" placing visitors in the right condition to visit the temple. This facility should be created between the entrance of the site and the visit area with the aim of introducing the visitor to the site and to regulate entry.

- Information would be provided regarding the practicalities of visiting the site (in particular regulatory measures) and respectful behaviors to adopt. The distribution of clothes and special footwear suitable for the temple visit could also be organized in this space (to minimize damage to the monument).
- A narrative should be introduced in the scenography, introducing the spiritual dimension of the temple.

Creation of an "Initiation" Visitors Path or Itinerary

Currently there is no suggested or obligatory visit path to the compound and the monument, so visitors have a logical tendency to move primarily or even only towards the temple.

A suggested path would lead to the spread of visitors over a larger area of the compound, starting from the introduction location and leading to the museum, the gardens and of course the Temple.

These measures would decrease the time spent by each visitor on the main temple structure, and therefore the number of visitors on the temple structure at the same time, while maximizing the number of visitors in other parts of the compound. It could also contribute to increasing the average length of the visit, encouraging visitors to spend more money at the temple and stay overnight in the area.

Landscaping and Gardens

We propose that the green spaces surrounding the temple be better integrated into the visitors' path, before or after the temple visit. Here are some landscaping solutions which deserve a dedicated study:

- The creation of a botanical garden highlighting trees and their importance in the Buddhist religion; and
- The creation of a thematic vegetation path (for example on the concept harmonious cross-religion relationship).

Evening Cultural Shows

Unlike Prambanan with the daily Ramayana ballet, the Borobudur site does not offer shows on a regular basis, the only one identified being the Mahakarya which takes place once a year.

We suggest that TWC organize a daily show in the temple compound or in the immediate vicinity, either in the form of a permanent sound and light show or in the form of a dance performance.

12.2.2 WHAT SHOULD THE CULTURAL VILLAGES OFFER?

Our recommendations focus on the creation or the enhancement of "cultural villages" around Borobudur. This strategy has been initiated by TWC and presented in November 2016 in the "Road Map of Tourism Development in the Area of Joglosemar", focusing on 20 villages in the Kec. Borobudur.

It is expected that only a limited number of Borobudur Temple visitors will venture into the cultural villages, specifically those visitors who have more time and are looking for a different and complementary experience.

The demand of these visitors is paradoxical: they seek both the "authenticity" of an Indonesian village and at the same time quality infrastructure and services that do not exist in an authentic village. It is therefore above all crucial to propose an experience that will be perceived as authentic, in particular as it will be complementary to Borobudur.

As suggested by TWC, the elements of this experience can be:

- Walk or ride in the village and in the rice fields (by foot, coach, horse), accompanied or not with a local guide;
- Craft shops;
- Workshops (Culinary, sewing, puppet), depending of local skills;
- Gamelan concerts and dances; and
- Traditional restaurants as at the moment there is a limited number of restaurants for visitors in the surrounding area of Borobudur. The majority of hotel guests eat at their hotels up to 3 meals a day.

We recommend that complimentary offers are made in each village, with different villages proposing offers that correspond to their identity and the activities undertaken by their inhabitants. For example, the proposed "Blakondes" (cultural centers gathering both the community and visitors) may be a good idea in some villages, but not in all.

For similar reasons, we recommend that villages vary the capacity and accommodation type to the specific project developed in each village. For instance, the construction of community based accommodation adapted to groups should be available as well as homestays with shared facilities (laundry, bathroom facilities…).

12.2.3 WHAT SHOULD BE THE DEVELOPMENT PACE?

We recommend that the development of tourism in cultural villages be carried out gradually to support the development of a currently still weak demand. It seems preferable to begin to improve and augment the supply and supporting infrastructure within a few villages (3 to 5) that are easily accessible and already have a solid base.

It will be ideal to firstly promote a limited number of villages to influencers (guidebook editors, bloggers, Internet sites) and to include them in inbound agency familiarization tours. Secondly to disseminate best practices to other villages when the former has reached maturity.

13. STAFF REQUIRED & SKILLS NEEDED

The above demand and supply forecasts will have a net positive effect on employment within Kab. Magelang and DI Yogyakarta. Additional services and potential employment growth will occur in all tourism sectors.

There were few skills gaps identified following discussions with hotel managers[17] (discussed above in the Skills section), however the following were identified as needing improvement:

- Training on marketing, especially social media marketing, could help enhance the image and exposure of the destination; and
- Continuous language training to facilitate a rise in international visitors.

13.1 ACCOMMODATION STAFF REQUIRED

Based on the additional rooms required, Figure 64 provides an estimate of the number of staff required at entry level, supervisor and management levels by assumed hotel positioning.

Additional assumptions:

- % Total Rooms: the percentage of total rooms per rate category. For example, if the figure is 0.42 this means that 42% of total rooms are within this rate category. The hotel positioning is split into only 5 categories based on rates across the country, not specific to Kab. Magelang or Kota Yogyakarta where insufficient information is available from which to draw staffing ratio conclusions. The estimates are based on the data collected in the Horwath HTL Indonesia Hotel Industry Survey of Operations 2016;
- Staff / Room Ratio: staffing levels per room or full time equivalents (FTE) per room. For example, if the figure is 0.53 this means, that 0.53 FTE are required per room. The staff/room ratio is based on Yogyakarta figures for the 2 lower rate categories (< USD 40 and USD 40 – 80) and across the country for the remaining categories due to information limitations. The estimates are based on the data collected in the Horwath HTL Indonesia Hotel Industry Survey of Operations 2016; and
- The staffing level split or proportion of total staff within each of entry level, supervisor and management level are based on estimates from market research:
  - under USD 40 is 10% management and 90% entry level. It is assumed that this category includes homestays, smaller properties, family owned and less professionally managed properties. These are assumed to have a slightly different staff split between management (who are often owner relatives) and entry level, no supervisor level; and

[17] Gleaned from interviews with existing local investors in various assets including hotels, restaurants, travel agencies, and interviews with local hoteliers, restaurant managers.

- over USD 40 is 5% management, 10% supervisor and 85% entry level. The over USD 40 categories are assumed to typically include a higher proportion of star-rated hotels, greater professionalization, larger properties and are assumed to include 3 levels of staffing, entry level, supervisor and management levels.

FIGURE 64. ESTIMATED NUMBER OF STAFF BY HOTEL CATEGORY

	< USD 40	USD 40 - 80	USD 80 - 120	USD 120 - 240	> USD 240	Total
Staff / Room Ratio	0.53	0.88	1.15	1.56	2.70	
% Total Rooms	0.42	0.31	0.11	0.13	0.03	
Additional Rooms:						
Existing						24,835
2021	3,509	2,581	922	1,056	232	8,300
2026	1,945	1,431	511	585	128	4,600
2041	6,595	4,851	1,734	1,985	436	15,600
Total						53,300
Additional Staff:						
2021	**1,858**	**2,260**	**1,062**	**1,649**	**625**	**7,454**
Entry Level	1,672	1,921	903	1,402	531	6,429
Supervisor	-	226	106	165	63	560
Management	186	113	53	82	31	465
2026	**1,029**	**1,253**	**588**	**74**	**4**	**2,948**
Entry Level	926	1,065	500	63	3	2,557
Supervisor	-	125	59	7	-	191
Management	103	63	29	4	-	199
2041	**3,491**	**4,248**	**1,995**	**3,099**	**1,175**	**14,009**
Entry Level	3,142	3,611	1,696	2,634	999	12,082
Supervisor	-	425	200	310	118	1,053
Management	349	212	100	155	59	875

*Source: Horwath HTL *small potential rounding error in addition of rooms possible*

In other words, to 2021 it is forecast that an additional 7,454 staff will be required to meet the needs of the additional rooms projected. Between 2021 and 2026 a further 2,948 staff will be required and by 2041 a further 14,009 will be required. Total increase of between 20,000 – 25,000 staff.

13.2 ADDITIONAL DESTINATION STAFF REQUIRED

13.2.1 BOROBUDUR TEMPLE

In addition to the increase in visitors forecast for Borobudur the recommended additional services and augmentation of the Temple experience are expected to have a positive net effect on employment. Increases to the Temple compound projected are:

- 2015: 3,558,690
- 2021: 3,850,390 (8% total increase)
- 2026: 4,168,900 (further 8% total increase); and
- 2041: 5,324,490 (further 28% total increase).

This equates to a daily increase of around 4,800 visitors. It is believed that the following jobs will benefit the most:

- Authorized Guides: with the recommended push to make guided tours compulsory for groups and more available and professional for the general public this number will increase significantly from current levels.
- Introduction Lock & Museums: again, the creation of an introduction lock plus improvements to the existing museums will require additional staff to monitor and maintain the facilities.
- Landscaping & Gardens: with the creation of botanical gardens and a thematic vegetation path new grounds crew will be required.
- Cultural Events: the production of daily cultural shows or workshops, whether they be evening performances or daily batik workshops, will require additional staff.
- Tourism Flow Monitors: it is recommended that tourism flows be monitored more closely and this will require additional staff.
- Food & Beverage Outlets: the increased duration of visits to the Temple will also require the addition of food and beverage outlets and staff to keep visitors satiated.

Currently there are 520 staff at TWC Borobudur, 65 of whom are permanent staff and the rest are contracted or outsourced. These 65 staff includes management staff and some field operational staff. It is believed that this number could be tripled (the addition of around 1,000 people) to provide the additional staffing required to match the development recommendations and the increase in visitors.

13.2.2 BOROBUDUR CULTURAL VILLAGES

The development of the surrounding areas to create the augmented cultural experience as described above will also have a net positive effect on employment in the villages. Assuming 10% of temple visitors consume the cultural offerings outside of the temple compound, this equates to around 530,000 people per annum (1,450 per day) visiting the villages. The employment within the homestays and hotels was covered above however the many other tourism services should also be mentioned:

- Tour Guides: that can bring the cultural experience to life for visitors to the surrounding villages. If each of the 'targeted visitors' takes a daily tour, in groups of 5 to 10 this could create 300+ additional jobs.
- Transport (horse & cart, public transport): there are existing transport providers around Borobudur but catering for the additional 'targeted visitors' could increase transport needs by similar levels to tour guides at around 300+ additional jobs.

- Culture (arts & crafts, music, pottery): the development or nurturing of traditional cultural crafts and skills is a key component of the entire experience. The number of cultural positions is probably a little less with group sizes being slightly larger, perhaps around 150+ additional jobs.
- Food & Beverage: there are currently 5 restaurants near Borobudur and 115 food stalls. Should the 'targeted visitors' each eat 1.5 meals in the Borobudur area (some are staying overnight) this will require an additional 2,250 seats. Assuming an average size of 25 seats this is an additional 90 outlets. With an average of 5 staff in each restaurant this equates to around 450 staff. Actual staffing levels are likely to exceed this number.
- Retail: as an extension to the experience, souvenirs if produced and marketed correctly could also employ a large number of local people. The existing oleh oleh is basic, to say the least, much of which is imported. If an additional 50 retail stores open, which is pessimistic this will employ an additional 250 people minimum.
- Travel Agencies: there are currently 12 active travel agencies in Kab. Magelang. This number is unlikely to increase dramatically, nor is it very labor intensive so it is not expected to have a large effect on employment. That said, additional tour packages will be sold to cater for the new cultural experiences surrounding Borobudur.

The total additional staff required in the surrounding village is estimated to be around 1,500 people.

13.3 CONCLUSIONS ON STAFF VOLUME

In the Best Case scenario as described, the forecast volume of additional staff is around 24,000 hotel staff, 1,000 Borobudur Temple staff, 1,500 employees in the cultural villages and around 40% increase in the volume of current staff providing other tourism services (total visitors increases by 40% from 2015 to 2041).

14. TRANSPORT INFRASTRUCTURE BASELINE & NEEDS

BASELINE

14.1 ROAD TRANSPORT

14.1.1 EXISTING CONDITION

The existing network of roads in Jawa Tengah and DI Yogyakarta, includes National, Provincial and Kabupaten level roads. The total road length is 30,995 km in Jawa Tengah and 4,596 km in DI Yogyakarta as shown in Figures 65 and 66 respectively. In terms of road length by the category of roads, there is 1,638.5 km of National roads, 3,185 km of Provincial roads and 29,930.9 km of Kabupaten roads. Overall, National and Provincial roads are mostly in 'sufficient' and 'good' condition, but 28% of the Kabupaten and Kota roads are considered to be damaged (bad and very bad) in varying degrees. All national roads are paved while only 79% of the Provincial roads are paved.

FIGURE 65: ROAD CLASS AND CONDITION IN JAWA TENGAH IN 2015

	Jawa Tengah					
	National		Provincial		Kab/Kota*	
Road Condition (km)	Length	%	Length	%	Length	%
Good (IRI <= 4)	887.8	64%	2,230.0	87%	13,674.2	51%
Sufficient (4<IRI <8)	462.2	33%	335.6	13%	5,437.5	20%
Bad (8<IRI<=12)	40.6	3%	0.0		7,928.4	29%
Very Bad (IRI >12)	0.0		0.0		0.0	0%
Total	**1,390.6**		**2,565.6**		**27,040.1**	
Road Surface (km)						
Pavement	1,390.6	100%	1,966.2	77%	-	
Non Pavement	0.0		598.8	23%	-	
Total	**1,390.6**		**2,565.6**		**-**	

Source: Department of Public Works Jawa Tengah and DI Yogyakarta, 2016

FIGURE 66: ROAD CLASS AND CONDITION IN DI YOGYAKARTA IN 2015

	Yogyakarta					
	National		Provincial		Kab/Kota*	
Road Condition (km)	Length	%	Length	%	Length	%
Good (IRI <= 4)	220.7	89%	231.5	37%	1,852.9	64%
Sufficient (4<IRI <8)	25.8	10%	226.6	37%	598.5	21%
Bad (8<IRI<=12)	1.4	1%	141.7	23%	308.35	11%
Very Bad (IRI >12)	0.0		19.7	3%	131.03	5%
Total	**247.9**		**619.4**		**2,890.8**	
Road Surface (km)	247.9		619.4			
Pavement	247.9	100%	556.0	90%	2,642.7	91%
Non Pavement	0.0	0%	62.4	10%	248.12	9%
Total	**247.9**		**619.4**		**2,890.8**	

Source: Department of Public Works Jawa Tengah and DI Yogyakarta, 2016

14.1.2 EXTERNAL ACCESS ROAD

In Jawa Tengah, the road connecting Borobudur runs between Muntilan and Magelang via Keprekan and runs further west to Borobudur. The road is well paved with one lane in each direction and a total width of 7 meters. The section between Keprekan and Borobudur runs through extensive paddy fields. The road connecting Prambanan runs between Kartosuro and Klaten further west to Yogyakarta. The road is paved with two lanes in each direction and a total width of 18 meters.

In DI Yogyakarta, the road connecting Borobudur runs between Yogyakarta and Muntilan via Sleman and runs further north to Keprekan. The road connecting Prambanan runs between Yogyakarta and Klaten. Both the roads are well paved and relatively wide (about 30 m) with double lanes in each direction.

For those who arrive by cruise ship from Semarang port, Borobudur can be reached via a toll road from Semarang Port to Bawen, a distance of approximately 45km and next via the national road from Bawen/Ambarawa via Magelang to Borobudur (60km). The total travel time by private car from Semarang Port to Borobudur (105km) is approximately 3 hours.

14.1.3 INTERNAL ROAD ACCESS

Borobudur Area

With regards to the road conditions around Borobudur temple, a tour road has been constructed under the supervision of Kab. Magelang. Although mostly paved, the road is narrow (5-6 m) and passes through the local shops. As a result, part of these roads experience frequent traffic jams. Therefore, there is a need to develop a proper road network plan, with clearer hierarchy and function of roads, as well as to improve the local road capacity.

FIGURE 67: BOROBUDUR AREA ROAD ACCESS

Source: Google Earth Pro, study team analysis

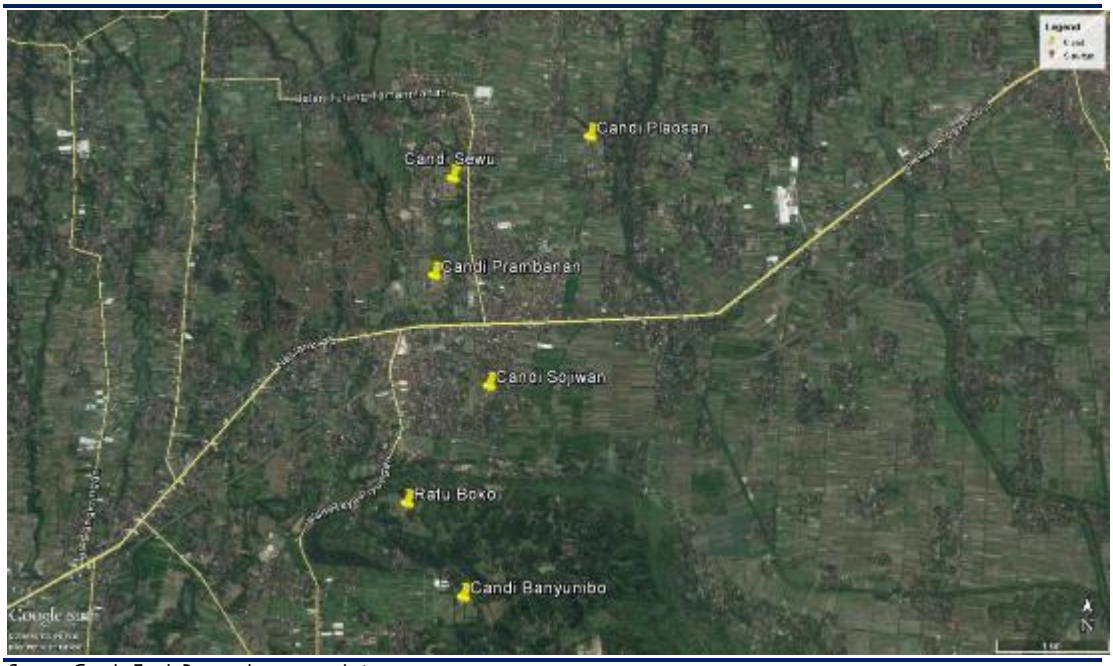
The following roads are the key local access roads in the Borobudur area.

- Main access road:
  - 9.9 km National roads Keprekan – Borobudur branching off from Yogyakarta to Magelang to go to Mendut. This road needs to be improved as the main access road to Borobudur Park.
- Minor access road:
  - 7.5 km Provincial road branching off that same road to go to Sawitan, which serves as the route for visitors from Semarang that could be a detour during peak traffic hours;
  - The present Provincial road linking Mendut, Pawon and Borobudur; and
  - 6 km Kabupaten road between Mendut and Ngawen.

Prambanan Area

The roads to Prambanan are National roads in good condition. The other roads connecting the temple areas with the National road are paved roads with good alignment and ample parking facilities near the temples.

FIGURE 68: PRAMBANAN AREA ROAD ACCESS



Source: Google Earth Pro, study team analysis

The following roads are the key local access roads in the Prambanan area.

- Main Access Road:
  - The 9.9 km section (019 – Janti-Prambanan) of the National road between Yogyakarta and Surakarta; and
  - The 1.5 km road linking the Prambanan Complex and Ratu Boko hill.
- Minor Access Road:

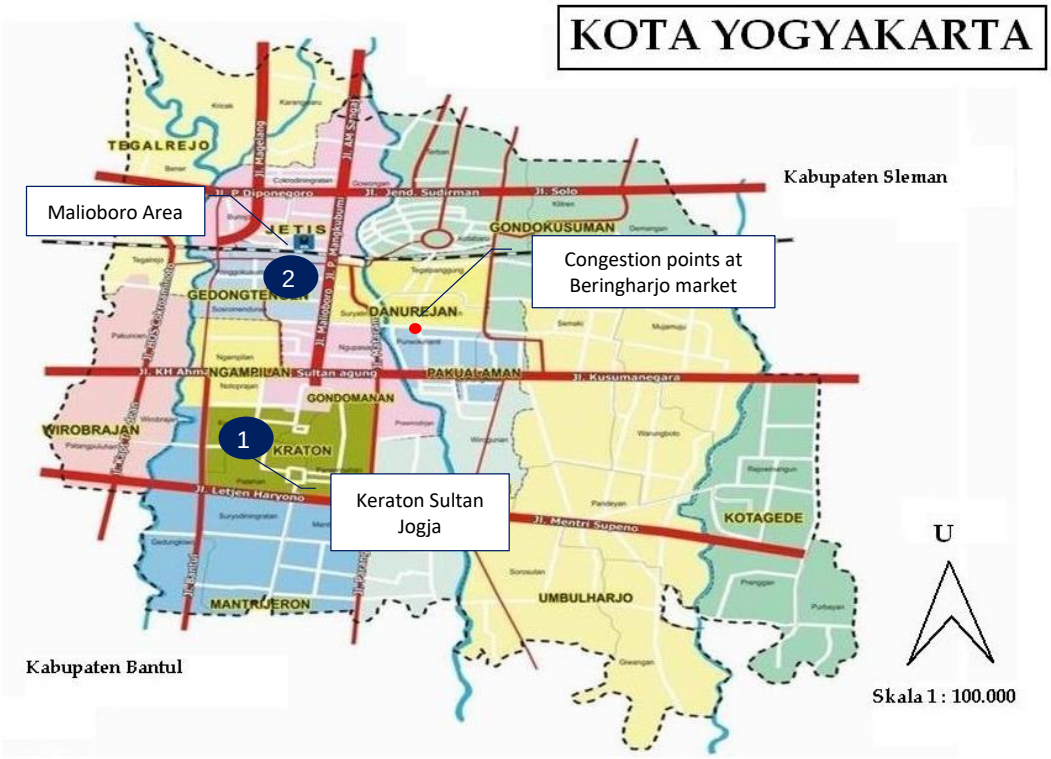
- North Route: 1.5 km route from the Prambanan Complex around the eastern temple remains (Sewu and Plaosan); and
- South Route: 2.5 km route from the Prambanan Complex around the southern temple remains (Sojiwan, Ratu Boko, Banyunibo).

Kota Yogyakarta

The roads to the key attractions in Kota Yogyakarta are Municipal/City roads in good condition. However, traffic congestion at Malioboro Road and Keraton Jogja (Sultan Palace) poses issues for tourism development as many tourist shops and hotels are concentrated along this road.

The road networks in Kota Yogyakarta can be seen in Figure 69. The areas in front of the Beringharjo market and in front of Alun-alun Jogja are the main congestion points. Congestion is occurring due to high-intensity activities that generate movement to and from the area.

FIGURE 69: JOGJAKARTA ROAD ACCESS



The following roads are the key local access roads in Malioboro and Keraton area.

- Main Access Road:
  - Jln. Sultan Agung 5 km road to Wates and Jln. Pangeran Mangkubumi 10 km road to Sleman.
- Minor Access Road:
  - 1 km Jln. Malioboro Road to Keraton Sultan Jogjakarta.

To reach Malioboro or Keraton, visitors can use public transportation such as 'Transjogja' buses or by foot. There is a large number of public transport options and it is easy to find throughout the day, delivering passengers to and from Malioboro. To support sustainable tourism development, the road along Malioboro is being redeveloped and upgraded with special attention to pedestrian traffic.

14.1.4 REGISTERED VEHICLES

In 2015, the number of vehicles registered was around 15 million in Jawa Tengah and 2.19 million in DI Yogyakarta.

Around 87% of the total number of vehicles are motorcycles in both provinces. Since an increase in the number of vehicles will cause further traffic congestion, it is necessary to manage traffic around the key attractions. The yearly changes in the number of registered vehicles show the upward trend in both provinces (Figures 70 & 71). This will have an additional impact on the general traffic movement.

FIGURE 70: NUMBER OF REGISTERED VEHICLES, JAWA TENGAH IN 2015

Year	Car	Bus	Truck	Motorcycle	Total	Growth
2011	700,388	74,651	562,759	9,139,555	10,481,143	
2012	775,299	77,500	596,141	10,068,510	11,521,288	9.93%
2013	855,565	79,816	633,305	11,111,071	12,683,723	10.09%
2014	938,383	82,341	670,078	12,147,806	13,842,639	9.14%
2015	1,021,007	86,352	840,599	13,076,199	15,024,157	8.5%

Source: Jawa Tengah Dalam Angka 2016 (BPS)

FIGURE 71: NUMBER OF REGISTERED VEHICLES, DI YOGYAKARTA IN 2015

Year	Car	Bus	Truck	Motorcycle	Total	Growth
2011	138,537	10,987	45,290	1,423,147	1,617,961	
2012	152,178	11,019	48,508	1,537,534	1,749,239	8.1%
2013	169,962	11,168	52,511	1,673,903	1,907,544	9.0%
2014	194,249	11,438	57,775	1,831,982	2,095,444	9.9%
2015	206,685	11,558	61,143	1,916,666	2,196,052	4.8%

Source: D.I Yogyakarta Dalam Angka 2016 (BPS)

14.1.5 VEHICLE OWNERSHIP

As shown in Figure 72, the motorization rate of both provinces is still low at 30 – 60 cars per 1,000 persons. However, the motorization rate of motorcycles is considerably higher for both provinces, with 380 – 550 motorcycles per 1,000 persons.

FIGURE 72: RATE OF MOTORIZATION IN JAWA TENGAH AND YOGYAKARTA

Year	Jawa Tengah				Yogyakarta			
	Car	Bus	Truck	Motorcycle	Car	Bus	Truck	Motorcycle
2011	21.4	2.3	17.2	279.3	37.7	3.0	12.3	386.8
2012	23.5	2.3	18.1	305.1	41.8	3.0	13.3	422.7
2013	25.7	2.4	19.0	334.0	47.3	3.1	14.6	465.6
2014	28.0	2.5	20.0	362.4	54.7	3.2	16.3	515.7
2015	30.2	2.6	24.9	387.2	58.9	3.3	17.4	546.1

Source: BPS, Surbana Jurong (calculated based on population and vehicle registration figure)

The above figures are likely to increase as per the socio-economic growth which will have an impact on the need for increased road capacity.

14.1.6 TRAFFIC VOLUME

The traffic volume on the main external access roads in the Borobudur-Yogyakarta-Prambanan triangle is as shown in Figure 73. The largest traffic volumes have been measured on the Yogyakarta ring road.

FIGURE 73 ROAD TRAFFIC VOLUMES AT ROADS SUPPORTING BOROBUDUR AND PRAMBANAN

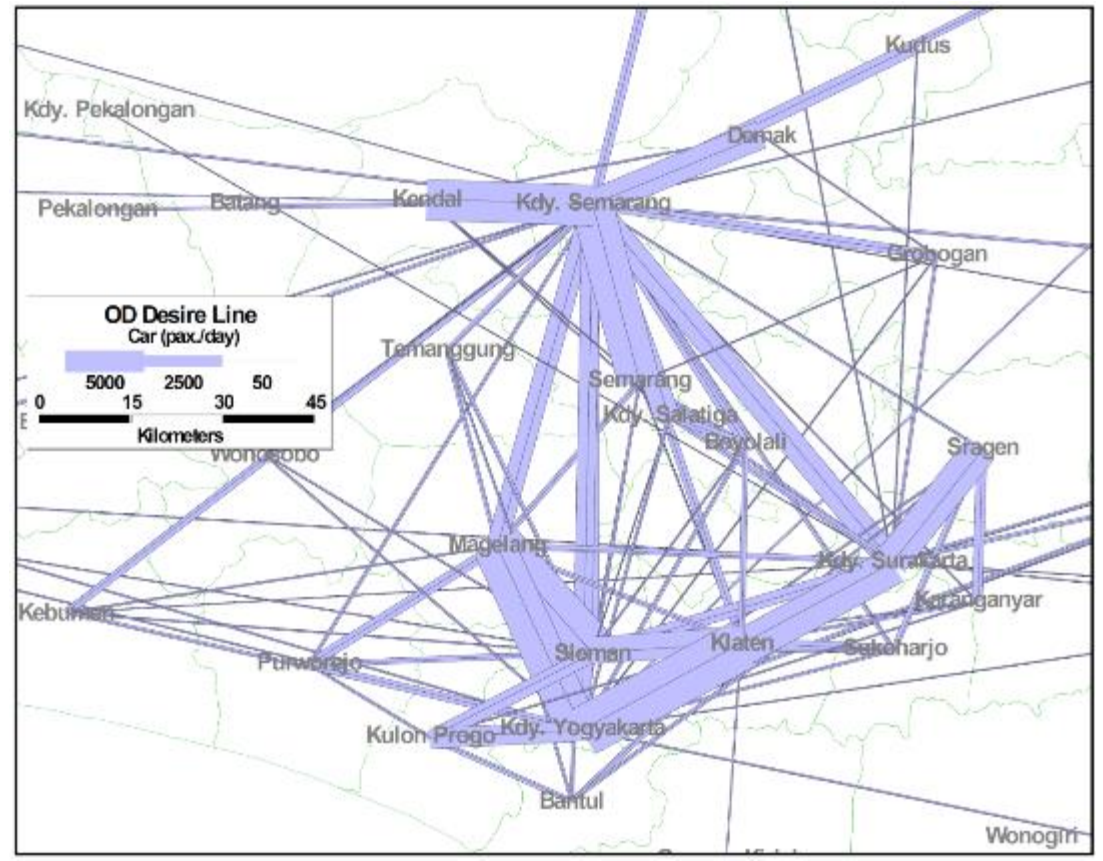
Section No	National Road	Length of Road (Km)	AADT 2015
1	FROM SEMARANG		
92	JLN. ACHMAD YANI (MAGELANG)	5	38,920
92	JLN. ELO SURABAYAN (URIP SUMOHARJO) (MA	2.58	29,565
92	JLN. SOEKARNO-HATTA (MAGELANG)	2.55	48,980
93	BTS. KOTA MAGELANG - KEPREKAN	8.35	55,071
A108	KEPREKAN - BOROBUDUR	9.89	17,658
2	FROM YOGYAKARTA		
94	KEPREKAN - BTS. KOTA MUNTILAN	1.18	45,962
94	JLN. PEMUDA (MUNTILAN)	3.61	70,814
95	MUNTILAN - SALAM (BTS. PROV. D.I. JOGJAK	7.11	61,558
15	TEMPEL/SALAM (BTS. PROV. JATENG) - BTS.	7.39	23,975
16	BTS. KOTA SLEMAN - BTS. KOTA YOGYAKARTA	5.64	65,419
16	BTS. KOTA - SP. JOMBOR (YOGYAKARTA)	2.21	52,240
18	JLN. ARTERI UTARA (YOGYAKARTA)	9.95	83,470
19	JANTI (YOGYAKARTA) - PRAMBANAN (BTS. PRO	9.9	83,965
19	BTS. KOTA YOGYAKARTA - JANTI (JOGJAKART	2.09	100,300
3	FROM SURAKARTA		
96	KARTOSURO - BTS. KOTA KLATEN	19.69	45,586
96	JLN. PERINTIS KEMERDEKAAN (KLATEN)	2.37	62,677
96	JLN. DIPONEGORO (KLATEN)	3.03	27,886
96	JLN. KARTINI (KLATEN)	2.3	19,556
97	BTS. KOTA KLATEN - PRAMBANAN (BTS. PROV.	10.69	18,533
97	JLN. SURAJI TIRTONEGORO (KLATEN)	1.85	23,696

Annual Average Daily Traffic (AADT)

Source: Interurban Road Management System Database, Ministry of Public Works, 2016

Figure 74 shows the desire line chart for passenger car based on the origin-destination survey of Joglosemar (Yogyakarta, Solo and Semarang). According to the results of the vehicle OD survey in 2008, it shows that trips are concentrated on two areas: around Magelang and Klaten connecting to Yogyakarta. The routes which are highly used by either visitors or daily commuters are Sleman – Magelang, Yogyakarta – Magelang and Yogyakarta – Klaten – Surakarta. It is important to note that although Borobudur is not in DI Yogyakarta, most visitors to Borobudur stay in DI Yogyakarta. Hence, it is important to improve these roads.

FIGURE 74: DESIRE LINES OF CAR PASSENGERS IN SEMARANG – SOLO – YOGYAKARTA CORRIDOR



Source: The Study on Development of Regional Railway System of Jawa Tengah Region, JICA, 2009

14.1.7 PARKING AREA

At the Borobudur and Prambanan complexes bus terminals and parking spaces are available at the main gates. Presently, the parking areas in Borobudur and Prambanan complex have sufficient capacity (Figures 75 & 76). Parking for Malioboro Street in Yogyakarta city center (Figure 77) has recently been relocated to Abu Bakar Ali Multi-story carpark. Prior to relocation, vehicles parked on the street or sidewalk along Malioboro road hampering the movement of pedestrians.

However, the parking facility at Abu Bakar Ali only provides 30 bus parking spots, which is insufficient during the holiday season according to local staff of Dinas Perhubungan Yogyakarta. Another parking facility which is located at Ngabean has a capacity of 25 bus parking spots. However, the occupancy is low due to the relatively long distance from the tourist attraction; especially considering there is no shuttle service from Ngabean to Malioboro.

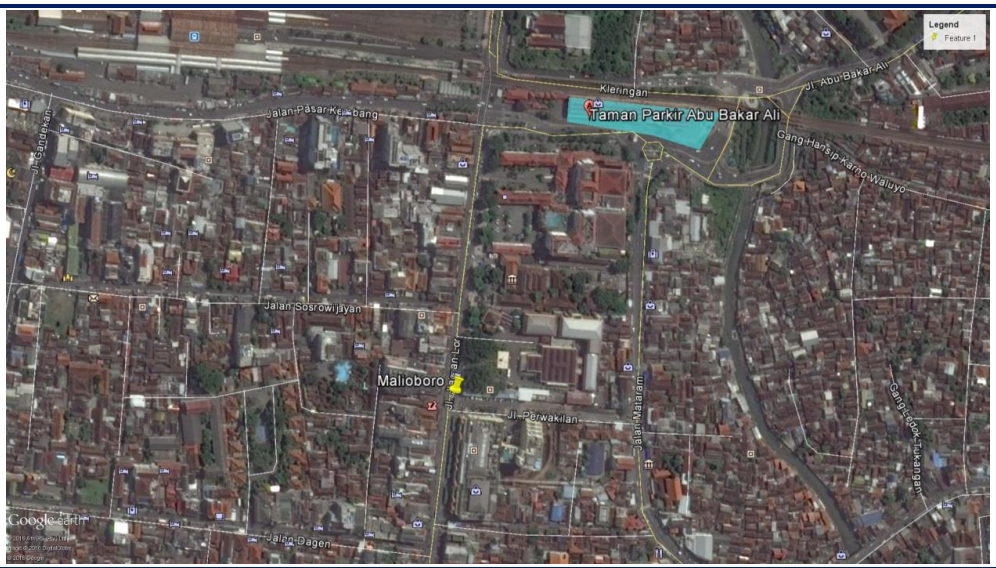
FIGURE 75: BOROBUDUR PARKING AREA

Source: Google Earth Pro, study team analysis

FIGURE 76: PRAMBANAN PARKING AREA

Source: Google Earth Pro, study team analysis

FIGURE 77: MALIOBRO PARKING AREA



Source: Google Earth Pro, study team analysis

14.1.8 ASSESSMENT OF EXISTING ROAD INFRASTRUCTURE

The main roads connecting Yogyakarta, Magelang, Semarang and Surakarta provide external road access to the destination area. Access roads to Borobudur branch off the national road between Yogyakarta and Magelang while Prambanan is located along to the national road between Yogyakarta and Surakarta. The traffic volumes on the key roads, existing road conditions and the adequacy of existing road infrastructure are summarized in Figure 78.

FIGURE 78: ASSESSMENT OF EXISTING KEY ROADS

Section	AADT*	VCR 2015	Existing Assessment
Yogyakarta- Muntilan: 30 km Travel Time: 1 hour	105,021	1.4	Well paved and relatively wide (about 30 m) with 4 lanes dual carriageways, current capacity not adequate.
Muntilan – Keprekan: 11.9 km Travel Time: 15 min	96,367	1.44	Well paved, 12 m wide, combination dual 2, current capacity not adequate.
Magelang – Keprekan: 11 km Travel Time: 15 min	85,551	1.15	Combination dual 1 and 2, well paved, current capacity not adequate.
Keprekan-Borobudur: 9.8 km Travel Time: 15 min	28,394	0.96	Dual 1, 7m wide, good road condition, current capacity not adequate.
Semarang – Ungaran –Bawen /Ambarawa Toll Road: 40 km Travel Time: 1 hour	No traffic volume info		Good condition, dual 3, current capacity adequate.
Ambarawa – Magelang: 38 km Travel Time: 1 hour	83,791	1.33	Combination Dual 1 and Dual 2, current capacity not adequate.
Klaten-Kartosuro — Yogyakarta: 98 km Travel Time: 2 hour	77,877	1.26	Well paved and 18m wide with dual two carriageways, current capacity inadequate.

**Annual Average Daily Traffic (AADT)*

Source: Indonesia Road Management System Database, Department of Public Works, Jawa Tengah, DI Yogyakarta 2016, Surbana Jurong

There is good road connectivity between Yogyakarta, Semarang and Surakarta to Borobudur and Prambanan; however, the majority of these existing roads have inadequate road capacity.

- **External Access:** While the external access roads facilitate tourism, these are largely catering to the regional traffic movements. An upgrade of these roads may be necessary, however not from a tourism development perspective.
- **Internal Access:** Keprekan-Borobudur is the main local road providing access to Borobudur. An upgrade and improvement of this road is important from a tourism development perspective.

14.1.9 PLANS FOR ROAD INFRASTRUCTURE: EXTERNAL ROAD ACCESS

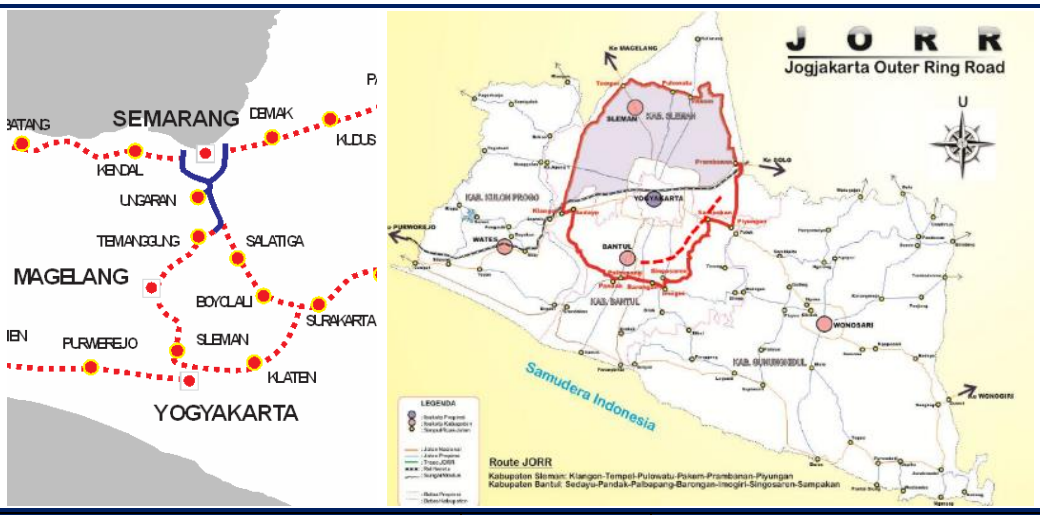
As part of Trans Java toll road, there is a proposal for a 104-kilometer toll road linking Bawen–Magelang-Yogyakarta and 40-kilometer-long toll road linking Yogyakarta and Surakarta. The feasibility study is in process for the Bawen-Magelang-Yogyakarta Toll Road section. The toll road is estimated to add capacity of about 9,200 vehicles per hour and improve the travel time between Semarang-Magelang-Yogyakarta. While this segment facilitates tourism, the main function is to serve the general traffic movement important for regional economic development.

As per the Ministry of Public Works, following are the 2 committed segments of toll road in the region:

- A segment of toll road between Kulon Progo and Yogyakarta is expected to be start construction by 2019. This segment will facilitate tourism.
- Another committed toll-road project linking Bawen–Salatiga-Solo is expected to be completed by 2019. This toll road is mainly serving the general traffic movements in and around the northern and eastern regions of DI Yogyakarta.

Additionally, there are Government plans to build a 111-kilometer long Yogyakarta Outer Ring Road. In the future, this road is expected to improve the visitor accessibility to various tourism attractions without passing through the core of Kota Yogyakarta. However, this road is primarily meant to facilitate commuter traffic in DI Yogyakarta and not tourism (Figure 79).

FIGURE 79: KEY ROAD PROPOSALS -TRANS-JAVA TOLL ROAD PROPOSAL (LEFT) AND YOGYAKARTA OUTER RING ROAD PROPOSAL (RIGHT)



Proposed Toll Road	Travel Time	Plan Status
Kulon Prugo-Yogyakarta	30 min	FS, 2019 start construction
Yogyakarta–Magelang	60 min	FS, Construction schedule unknown

Source: Bappeda D.I Yogyakarta

14.1.10 PLANS FOR ROAD INFRASTRUCTURE: INTERNAL ROAD ACCESS

According to Malioboro road development roadmap (see Figure 80), there is a plan to transform the existing road to be fully used by non-motorized transport by banning private vehicles bypassing the Malioboro area by 2018. Therefore, use of Malioboro road will be for pedestrians, non-motorized transport and public transportation only. In addition, development of a Malioboro outer road will cater to the traffic previously passing through Malioboro area.

FIGURE 80: MALIOBORO ACCESS PLAN

Source: Bappeda D.I Yogyakarta

14.1.11 PARKING AREA

There is an ongoing study to relocate the parking areas out of Zones 1 and 2 in Borobudur. It is necessary to provide sufficient parking space to cater for the number of future visitors. In the case of parking relocations for Borobudur, proper drop off points for visitor's arrival around the temple complex will be needed.

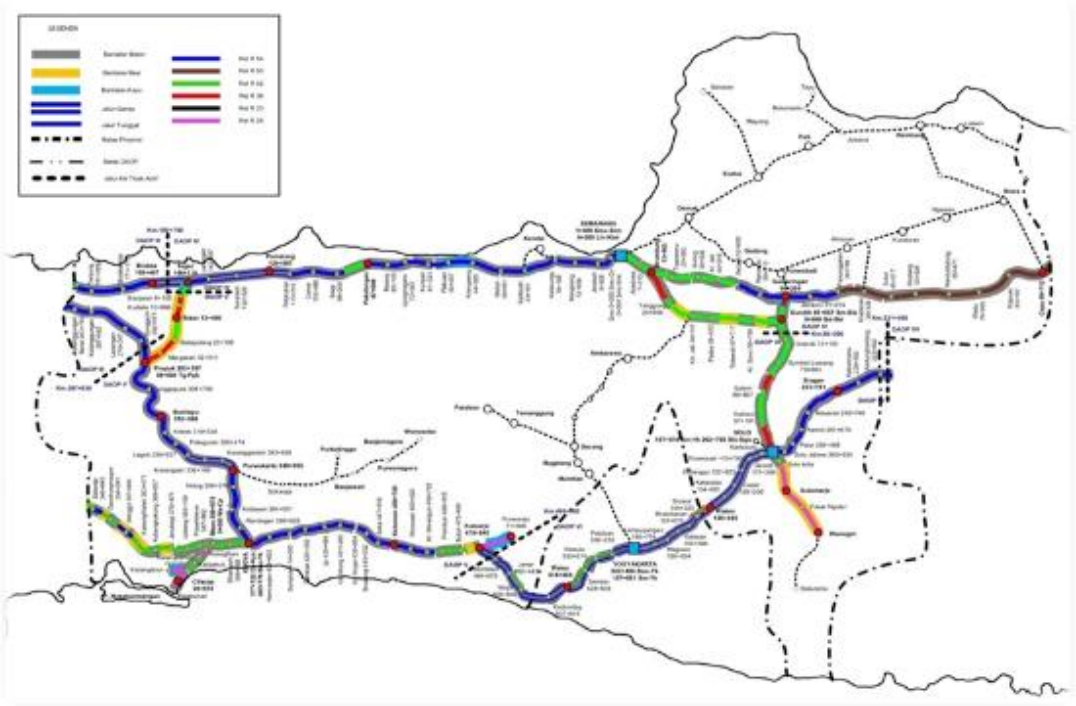
14.2 RAILWAY TRANSPORT

14.2.1 EXISTING CONDITIONS

The railway network comprises of the Java north trunk line running east to west (Cirebon – Tegal - Semarang - Surabaya); the Java south trunk line (Bandung – Kroya – Yogyakarta - Solo - Surabaya); the north-south lines linking these two trunk lines between Semarang - Solo and Cirebon - Purwokerto - Kroya; as well as the branch line between Kroya - Cilacap.

At present, the total railway length in operation is 894 km, and out of operation is 663 km (13 railway lines)[18]. They are controlled and maintained by three Railway Management Bureaus, or DAOP (or Daerah Operasi), which are under the control of PT. Kereta Api Indonesia (Persero). Figure 81 below shows the railway network in Jawa Tengah and Yogyakarta.

FIGURE 81: EXISTING RAILWAY NETWORK



Source: Local Transport Authority Jawa Tengah, 2016

[18] Presentation data from Dinas Perhubungan Jawa Tengah, 2016

While facing stiff competition from road and air transport with goods services, Java Railways plays an important role in the country's transport system, especially in the transportation of bulky goods. In terms of passenger transport to the tourism destination area, Kereta Api Indonesia operates the long-distance routes including, Yogyakarta – Jakarta, Yogyakarta – Malang, Yogyakarta – Surabaya, Yogyakarta – Solo, and Yogyakarta – Bandung. The operations of the railway in passenger and freight transport over the last five years in Yogyakarta region are summarized in Figure 82.

FIGURE 82: PASSENGER AND FREIGHT BY RAILWAY IN SPECIAL REGION OF YOGYAKARTA

Year	Passenger	Freight (Ton)	
		Fuel	Other
2011	3,051,414	159242	7206
2012	2,648,727	166154	11170
2013	2,629,513	214456	12465
2014	2,740,104	195929	13040
2015	3,543,139	190640	8910

Source: Train Company-Region VI, D.I. Yogyakarta

The passenger traffic handled has increased since 2013. This is caused by the improvement of the railway services and tariffs that were revised due to increased competition from air transport services[19]. Overall, the system supplements the road transport for general passenger movement, especially over long distances.

14.2.2 TOURISM RAILWAY

There is a tourism train that is operated via Ambarawa antique train museum. Passengers start their tour by using the colonial-era locomotives on a steam train journey to the mountain town of Bedono approximately 45km from Borobudur. This 9-km railway Ambarawa - Bedono is operated on the last remaining operational section of the route between Semarang – Ambarawa – Magelang – Yogyakarta (Figure 83). The railway was not commercially viable and the mountain section from Ambarawa to Magelang was closed in 1976.

FIGURE 83: AMBARAWA – BEDONO TOURISM RAIL SCENERY

Source: Image http://discoverindonesia.net/ Map by Rob Dickinson

[19] Interview with Dinas Perhubungan Yogyakarta, September, 2016

14.2.3 ASSESSMENT OF EXISTING RAIL INFRASTRUCTURE

The existing railway infrastructure connects Yogyakarta with Bandung and Jakarta to the West and Solo, Malang and Surabaya to the East; it is mainly serving long distance passengers and goods transport. Currently 10% of foreign visitors and 9% of domestic visitors use rail as a mode of transport to reach the destination area.

14.2.4 PLANS FOR RAIL INFRASTRUCTURE

As part of the Trans Java railway, there is a proposal to reactivate the track from Ambarawa – Magelang – Yogyakarta which will be connected to the future airport at Kulon Progo using the existing southern Java railway track as an interchange. In 2016, the Ministry of Transportation began conducting a feasibility study and basic design development of the railway connecting to the future international airport in Kulon Progo; including the location and design of the stations as well as urban railways. The proposal will facilitate visitors arriving at Kulon Progo airport with alternative options of transportation means to Yogyakarta and Magelang.

FIGURE 84: REACTIVATION OF EXISTING TRACK PROPOSAL (LEFT), YOGYAKARTA – MAGELANG LINE (RIGHT)

Source: Bappeda Jawa Tengah, The Study on Development of Regional Railway System of Jawa Tengah Region, JICA, 2009

14.3 AIR TRANSPORT

14.3.1 EXISTING CONDITION

There are three main airports in the study area; namely, Adi Sucipto International Airport in Yogyakarta, Achmad Yani International Airport in Semarang and Adi Sumarmo International Airport in Surakarta. All three airports are managed by Angkasa Pura I. Main characteristics of the three airports are summarized in Figure 85.

FIGURE 85: MAIN AIRPORT CHARACTERISTICS

Parameters	Adi Sucipto Airport Yogyakarta	Achmad Yani Airport Semarang	Adi Sumarmo Airport Surakarta
Frequency of Flights	4 International flights/ day 71 domestic flights/ day	3 International flights/ day 50 domestic flights/day	International flight ceased temporarily. 3 weekly flights to KL resumed in January 2017 31 domestic flights / day
Passengers Handled	6.3 million air passengers in 2015	3.6 million air passengers in 2015	1.4 million air passengers in 2015
Aircraft Movement	49,274 Aircraft movements in 2015	31,038 Aircraft movements in 2015	11,938 Aircraft movements in 2015
Distance from Airport to Borobudur	45 km (1.5 hours)	105 km (2.5 hours)	97 km (2 hours 40 min)

Source: Flightradar24.com, Angkasa Pura I

Adi Sucipto International Airport is situated close to the key attractions of Borobudur and Prambanan and is the major gateway to the destination area for both domestic as well as foreign visitors. Kota Yogyakarta is the hub of international air traffic connections and commercial activities attracting an increasing volume of tourist and aviation services. The airport is located 7.5 km east of Kota Yogyakarta, and the total number of flights operated per day as of October 2016 was 75 flights comprising 71 domestic flights and four international flights.

Achmad Yani International Airport, located 5 km west of Kota Semarang, the capital of Jawa Tengah, is also the prominent gateway for domestic visitors to Jawa Tengah. There are 22 flights per day between Semarang and Jakarta, eight flights per day between Semarang and Denpasar, and five flights per day between Semarang and Pangkalan Bun.

Adi Sumarmo International Airport located 14 km north-west of Kota Surakarta operates 13 flights per day from Solo to Jakarta, and 3 flights per day between Solo and Surabaya. Since January 2017 Air Asia resumed 3 weekly flights Solo-Kuala Lumpur.

Connectivity details of the three airports is shown in Figure 86.[20]

FIGURE 86: NUMBER OF FLIGHTS TO JAWA TENGAH AND YOGYAKARTA AIRPORTS (DAILY)

	Destination	Number of flights		
		Adi Sucipto Airport Yogyakarta	Achmad Yani Airport Semarang	Adi Sumarmo Airport Surakarta
Domestic	Balikpapan (BPN)	6	2	1

[20] Since 2015 Air Asia has ceased the operation of international flights from Solo – Singapore and recently in July 2016 Solo – Kuala Lumpur due to low passenger demand.

http://www.pikiran-rakyat.com/nasional/2016/07/19/air-asia-tutup-rute-solo-kuala-lumpur-375171

http://www.solopos.com/2015/08/06/penerbangan-solo-airasia-tutup-rute-solo-singapura-ini-alternatifnya-630477

	Bandung (BDO)	2	2	1
	Banjarmasin (BDJ)	2	1	0
	Batam (BTH)	2	1	1
	Denpasar (DPS)	8	2	2
	Jakarta (CGK)	27	22	13
	Jakarta (HLP)	7	4	6
	Ketapang (KTG)	0	1	0
	Lombok (LOP)	1	0	1
	Makassar (UPG)	3	0	1
	Medan (KNO)	1	0	0
	Palangkaraya (PKY)	0	0	1
	Palembang (PLM)	1	0	0
	Pangkalan Bun (PKN)	0	5	0
	Pekanbaru (PKU)	1	0	0
	Pontianak (PNK)	2	1	1
	Sampit Airport (SMQ)	0	1	0
	Surabaya (SUB)	8	8	3
	Destination	**Number of flights**		
		Adi Sucipto Airport	**Achmad Yani Airport**	**Adi Sumarmo Airport**
International	Kuala Lumpur (KUL)	2	1	3 weekly
	Singapore (SIN)	2	2	0

Source: Flightradar24.com

In 2015, there were 6.3 million passenger movements at Adi Sucipto, 3.6 million at Achmad Yani and 1.4 million at Adi Sumarmo. Adi Sucipto International Airport is the primary gateway to the tourism destination area as almost all foreign visitors arriving by air arrive at this airport. Hence, it is important to ensure the adequacy of the capacity to support tourism. The other two airports are recognized as important gateways for regional development; however, secondary gateways from a tourism development perspective.

Existing airport infrastructure conditions for the three airports are explained in Figure 87.

FIGURE 87: AIRPORT FACILITIES AT ADI SUCIPTO, ACHMAD YANI, AND ADI SUMARMO

Facilities	Adi Sucipto	Achmad Yani	Adi Sumarmo
Runway (Lm X Wm)	2200m x 45m	2680m x 45m	2600m x 45m
Taxiway (Parallel)	1680m x 15m	275m x 23m	100m x 23m
	500.0m x 23m	75m x 23m	184m x 23m
Loading Apron Requirements	8 narrow body	7 (5 narrow bodies, 2 'others')	10 (3 wide bodies, 7 narrow bodies)
Terminal building Capacity	6.1 million	3 million	3.8 million

Source: Aeronautical Information Publication, DGCA and PT. Angkasa Pura I

14.3.2 ASSESSMENT OF EXISTING AIRPORT INFRASTRUCTURE: ADI SUCIPTO INTERNATIONAL AIRPORT YOGYAKARTA

Existing Passengers Handling Capacity

As per existing airport annual capacity, Adi Sucipto International Airport can handle 6.1 million passengers. The existing passenger demand was 6.3 million in 2015 indicating the airport has exceeded its capacity. Considering Adi Sucipto International Airport is located in a densely urbanized area, there is no possibility of expansion. The airport will be replaced by the new Kulon Progo International Airport which is currently under construction.

Existing Runway Capacity

Based on the existing runway infrastructure assessment, the runway capacity has been estimated to cater for approximately 22 movements at peak hour. This indicates that the existing runway capacity is adequate and able to cater for current aircraft movements (approximately 13 movements). However, mixed use by military aircraft constrains capacity for civil aviation. The annual capacity of aircraft movements based on current operations is estimated to be 64,240. (Technical Details on Runway Capacity Analysis is presented in Appendix I). The limited runway length restricts the types of aircraft the airport can handle.

Summary of Existing Infrastructure at Adi Sucipto International Airport

Considering existing air passenger and aircraft movements, the adequacy of the existing airport infrastructure at Adi Sucipto International Airport is summarized in Figure 88.

FIGURE 88: EXISTING GAPS IN AIRPORT FACILITIES AT ADI SUCIPTO AIRPORT

Facilities	Adi Sucipto Airport	Assessment
Air Passenger Demand	6.3 million	Primary Gateway, Air passenger demand expected to increase significantly
Aircraft landing and Take Off Demand	49,274 aircrafts / year 13 Movements per hour	Primary Gateway, Aircraft movement expected to increase significantly
Runway (Lm X Wm)	2200m x 45m Estimated Capacity: 28 (or 22 in declared) movements per hour	Mixed military/civil use and limited runway length constrains capacity
Parallel Taxiway	Yes	Adequate to meet existing aircraft movement
Loading Apron Requirements	11 aircrafts in peak hour Capacity: 8 aircrafts stands for Civil Active apron: 8 stands	Inadequate
Terminal Building Capacity	6.1 Million at Adi Sucipto Airport	Inadequate

14.3.3 ASSESSMENT OF EXISTING AIRPORT INFRASTRUCTURE: ACHMAD YANI INTERNATIONAL AIRPORT SEMARANG

Existing Passengers Handling Capacity

As per existing airport annual capacity, Achmad Yani International Airport can handle 3 million passengers. In 2015 passenger demand was 3.6 million indicating the passenger terminal has exceeded its capacity. As per site conditions, it is possible to expand the airport infrastructure.

Existing Runway Capacity

Based on the existing runway infrastructure assessment, the runway capacity has been estimated to cater for approximately 16 movements in peak hour. This indicates that the existing runway capacity is adequate and able to cater for current aircraft movements (approximately 11 movements). (Technical Details on Runway Capacity Analysis is presented in Appendix I)

14.3.4 ASSESSMENT OF EXISTING AIRPORT INFRASTRUCTURE: ADI SUMARMO INTERNATIONAL AIRPORT SURAKARTA

Existing Passengers Handling Capacity

As per existing airport annual capacity, Adi Sumarmo International Airport can handle 3.8 million passengers. In 2015 the passenger demand was 1.4 million indicating the airport terminal capacity is sufficient and able to accommodate the spill over air traffic of Yogyakarta airport in the immediate future. Subject to a future demand assessment, further analysis is required before any decision is taken to proceed with an expansion or construction of a new terminal.

Existing Runway Capacity

Based on the existing runway infrastructure assessment, the runway capacity can cater for approximately 16 movements in peak hour. This indicates that the existing runway capacity is adequate and able to cater for current aircraft movements (approximately 7 movements). (Technical Details on Runway Capacity Analysis is presented in Appendix I)

14.3.5 FUTURE PLANS FOR AIRPORT INFRASTRUCTURE: NEW KULON PROGO INTERNATIONAL AIRPORT, YOGYAKARTA

The construction work on Kulon Progo airport is in progress. Following are the capacities of the key planned facilities in the new airport:

- Construction of terminal facilities including an apron for 28 aircraft stands in 2019, and an additional 24 stands in 2040;
- Construction of a terminal building with a passenger handling capacity of 15 million passengers per year by 2019, and 20 million passengers per year in its ultimate phase by 2040; and
- Runway 3250m x 45m plus parallel taxiway.

The current Adi Sucipto International Airport at Yogyakarta is operating beyond its capacity, however the new airport is not scheduled to be ready until 2019. Until then, the existing Adi Sumarmo International Airport at Solo serves the spill over air passenger demand as it has additional capacity.

14.4 SEA TRANSPORT

14.4.1 EXISTING CONDITIONS

Tanjung Emas Port is the biggest port in Jawa Tengah and has a strategic role in sea transport as a prime gateway to the economic activity in Jawa Tengah and DI Yogyakarta. The Port is under the management of PT. (Persero) Pelabuhan Indonesia (Pelindo) III headquartered in Surabaya, and has been designated as a First Class port in the governmental decision of No.724/KPTS.BL.382/PIII-92, December 23, 1992.

Many cruise ships from Australia, Singapore, USA and Europe operate at Tanjung Emas port. Main user groups are Australian tour groups on short excursions to places in Jawa Tengah such as Borobudur, Kota Semarang and Ambarawa.

In general, one day Borobudur tour packages are organized both for individuals or group for all cruise ship passengers docking at Semarang Port such as: Holland America Line, Westours, Discovery, Princess Cruises, Crystal Cruise, Renaissance, Sea Goddess, RCCL, Calypso, Hapag Lloyd, Silver Cloud, Nautica, Seven Seas, Royal Caribbean, etc. Figure 89 shows the cruise ship calls from November 2015 to April 2016.

FIGURE 89: SEASONAL ARRIVALS OF CRUISE SHIPS AT TANJUNG EMAS PORT IN 2015

Season	Cruise	GT	DWT	Flag	Origin	Visitors
January - April	Silver Wind	17,235	2,349	Bahamas	Tg Perak	80
	Crystal Symphony	51,044	7,942	Bahamas	Benoa Bali	619
	Aegean Odyssey	12,094	2,390	Malta	Singapore	261
	Aegean Odyssey	12,094	2,390	Malta	Benoa Bali	200
	Minerva	12,892	2,193	Bahamas	Benoa Bali	294
	Azamara Quest	30,277	3,376	Malta	Bangkok	647
	Silver Whisper	28,258	3,390	Bahamas	Benoa Bali	263
	Balomoral	43,537	4,916	Bahamas	Port Klang	542
	Rotterdam	61,849	6,354	Netherland	Jakarta	1151
	Amsterdam	62,735	-	Netherland	Benoa Bali	1004
	Seabourn Odyssey	32,346	3,000	Bahamas	Surabaya	448
	Dawn Princess	77,441	8,293	Bermuda	Makassar	1895
November - December	Pacific Venus	26,594	4,202	Japan	Singapura	203
	Lesoleal	10,992	1,708	France	Bangka	202
	Volendam	61,214	7,200	Netherland	Benoa	200
	Azamara Quest	30,277	3,376	Malta	Singapura	609
	Sun Princess	77,441	8,293	Bermuda	Makassar	2186

Source: Local Transport Authority Jawa Tengah

14.4.2 PORT INFRASTRUCTURE

Existing port facilities are shown in Figures 90 and 91. The 2.5-mile-long access channel between the offshore anchorage and the port basin is maintained to a depth of -10 MLWs for a width of 100m.

FIGURE 90: TANJUNG EMAS PORT LAYOUT

Source: Google Earth Map

FIGURE 91: TANJUNG EMAS PORT FACILITIES

No	Quay	Length (m)	Width (m)	Basin (M LWS)
A	Samudera	575	25	-10
B	Nusantara	490	20	-7
C	Pelabuhan Dalam 1	285	25	-5
D	Pelabuhan Dalam 2	244	33	-5
E	Pelabuhan Dalam Multipurpose	198	16	-6
F	CPO	20	5	-3
G	Curah Cair	16	8	-8

Source: Pelindo III

The length of the quay of Tanjung Emas is 575 m x 25 m suitable for sun class cruise ships. MS Dawn Princess is by far the biggest cruise ship calling at Tanjung Emas Port Semarang Indonesia with 77,441 GT and carrying roughly 2,000 passengers.

Recently, Pelindo III has upgraded the passenger terminal building with an area of 4,500 square meters. The passenger terminal has been completely repaired and improved since last April 2016. Interior detail was adapted from the building Terminal Gate Surya Nusantara (GSN) in the Port of Tanjung Perak Surabaya, which is referred to by the President as the standard of service for passenger ship terminals in Indonesia.

The passenger terminal can accommodate 2,000 to 2,500 passengers. In addition, the parking area of the passenger terminal is able to accommodate 200 vehicles.

14.4.3 ASSESSMENT OF EXISTING SEAPORT INFRASTRUCTURE

The existing port infrastructure (Samudera quay) is suitable for sun class cruise ships with 77,441 GT and carrying roughly 2,000 passengers. Pelindo III has upgraded the passenger terminal building with an area of 4,500 sqm, able to accommodate 2,000 to 2,500 passengers. The Port facilities are more than adequate to accommodate the projected cruise arrivals.

The proposed Semarang – Yogyakarta - Solo toll road will improve accessibility to Borobudur from Tanjung Emas Port. With improvement of inland transport connectivity, there is a possibility for the visitors to visit various attractions such as Borobudur and the lesser known Ambarawa, within a daytrip.

TRANSPORT INFRASTRUCTURE INVESTMENT NEEDS

14.5 FUTURE MODE OF TRAVEL

14.5.1 MARKET SHARE OF VISITORS

According to this market study, there will be no major shift in the market share of visitors in the future.

- Out of 13 million visitors in 2021, around 97% are estimated to be domestic; and out of 18 million visitors in 2041, around 94% are estimated to be domestic.

14.5.2 MODE OF ARRIVAL

The mode of arrival and visitor distribution pattern remains similar to the current context.

- Domestic visitors rely on land transport for travelling. In 2021 there is no significant change in the mode of arrival. In 2041, it is forecast that around 73% of domestic visitors will arrive by land and 18% by air and 9% by train. Hence, land transport remains the most important means of travel for domestic visitors. The domestic visitors arriving by rail are forecast to remain at current levels.
- In year 2041 around 70% of foreign visitors are forecast to arrive by air, 15% by road, 10% by train and 5% by cruise ship. The Kulon Progo airport will be the predominant gateway in the medium as well as long term, especially considering almost all foreign visitors will arrive at this airport.
- In the future, the majority of visitors will still use Yogyakarta as a base from where they travel to visit Borobudur and Prambanan, and hence the connectivity between Kulon Progo airport-Kota Yogyakarta will retain significant prominence for tourism.

14.5.3 TRANSPORT MODAL SPLIT

Based on the market study, private transport will remain the preferred mode of transport for visitors (Figure 92). The baseline modal split is forecast to remain the same for the destination area in assessing the impact of tourism on road infrastructure capacity.

FIGURE 92: FUTURE SCENARIO OF TRANSPORT MODAL SPLIT FOR DOMESTIC & FOREIGN TOURISTS

Domestic Visitor Share (%)			Foreign Visitor Share (%)		
Mode of Transport	2015	Future Scenario	Mode of Transport	2015	Future Scenario
Tour Bus	15%	15%	Tour Bus	30%	30%
Tour Van	10%	10%	Tour Van	40%	40%
Public bus/Railway	20%	20%	Public bus/Railway	10%	10%
Private car/Rental Car/Taxi	55%	55%	Private car/Car rental/Taxi	20%	20%
Total		**100**	**Total**		**100**

Source: Surbana Jurong and HHTL

Figures 93 and 94 present the distribution of visitors taking different modes of transport.

FIGURE 93: ESTIMATE OF TOURISM PASSENGERS BY TRANSPORT MODES IN 2021

Domestic Share				Foreign Share				
Peak visitor per day	103,456			Peak visitor per day	5,401			
Mode of Transport Arrival				Mode of Transport Arrival				
	Air	Train	Land		Air	Train	Sea	Land
Visitor	13,967	9,311	80,178	Visitor	3,511	540	270	1,080
Mode of Transport to reach tourism attractions				Mode of Transport to reach tourism attractions				
Tour Bus	2,095	1,397	12,027	Tour Bus	1053	405		648
Tour Van	1,397	931	8,018	Tour Van	1404		270	
Public bus	2,793	1,862	16,036	Public bus	351	135		
Private car	7,682	5,121	44,098	Private car	702			432
Total	13,967	9,311	80,178		4,125	635	1,269	317

FIGURE 94: ESTIMATE OF TOURISM PASSENGERS BY TRANSPORT MODES IN 2041

Domestic Share				Foreign Share				
Peak visitor per day	140,445			Peak visitor per day	15,575			
Mode of Transport Arrival				Mode of Transport Arrival				
	Air	Train	Land		Air	Train	Sea	Land
Visitor	24,578	12,640	103,227	Visitor	10,903	1,558	779	2,336
Mode of Transport to reach tourism attractions				Mode of Transport to reach tourism attractions				
Tour Bus	3,687	1,896	15,484	Tour Bus	3271	1,168		1,402
Tour Van	2,458	1,264	10,323	Tour Van	4361		779	
Public bus	4,916	2,528	20,645	Public bus	1090	389		
Private car	13,518	6,952	56,775	Private car	2181			935
Total	24,578	12,640	103,227		10,903	1,558	779	2,336

14.6 AIR TRANSPORT

14.6.1 FUTURE AIR PASSENGER DEMAND AND AIRCRAFT MOVEMENTS[21]

Of the 3 regional airports, the international airport at Yogyakarta is the primary gateway for the Destination, as the majority of visitors arrive at Yogyakarta. The initial airport infrastructure assessment concluded that airport capacities are inadequate for the two international airports at Yogyakarta and Semarang, and that Solo airport has excess capacity. Semarang Airport will be used mainly for general air passengers to Semarang, not by visitors of the Borobudur-Yogyakarta-Prambanan tourism destination area. The estimated air passenger demand for Yogyakarta Airport is 7.8 million passengers in 2021 and 13.2 million passengers in 2041. The new Kulon Progo airport which will be able to handle around 15 million passengers per year by 2019, and 20 million passengers per year by 2041. This new airport will be the primary gateway for the Destination in the future. However, construction of a new international airport is planned to be completed by 2019. Until completion, the existing Adi Sumarmo Airport of Solo could support overflow air passenger demand for the Destination.

14.6.2 AIRPORT INFRASTRUCTURE NEEDS

International Airport Capacity at Yogyakarta

Existing Adisucipto Airport in Yogyakarta is operating beyond its intended capacity. In 2021 and 2041, the passenger demand is estimated to increase further. Construction of the new airport is scheduled to be completed by 2019. The implementation of the new airport is important as the majority of foreign visitors arrive by air to Yogyakarta. Figure 95 is the summary of airport infrastructure needs identified according to the estimated passenger and aircraft demand in 2021 and 2041.

FIGURE 95: INTERNATIONAL AIRPORT INFRASTRUCTURE NEEDS, YOGYAKARTA

	Existing Adi Sucipto Airport (2015)	Kulon Progo Airport Plan 2019 & 2040	Short Term (2021)	Long Term (2041)
Air Passenger Demand	6.3 Million	NA	7.8 Million	13.2 Million
Aircraft landing and Take Off Demand	49,274 aircrafts / year 13 aircrafts in peak hour	NA	60,299 aircrafts/ year 16 aircrafts in peak hour	104,062 / year 27 aircrafts in peak hour
Runway (Lm X Wm)	2200m x 45m Estimated Capacity: 22 movements per hour	Phase 1 (2019): 3250m x 45m Estimated Capacity: 29 movements per hour	Capacity Adequate	27 aircrafts in peak hour, however, can be distributed in available slots.

[21] The Future Air Passenger Demand and Aircraft Movement are estimated at a broad basis to assess the airport infrastructure needs for tourism development. A separate detailed specific Airport Study needs to be conducted to look into the specific air passenger and aircraft demand for individual airports.

	Existing Adi Sucipto Airport (2015)	Kulon Progo Airport Plan 2019 & 2040	Short Term (2021)	Long Term (2041)
		Phase 2 (2040) : Runway extension 3600m x 45m Estimated Capacity: 29 movements per hour 107,305 aircraft movements per year		Hence, the capacity will be adequate until 2041
Parallel Taxiway	Yes	Yes	Adequate	Adequate
Loading Apron Requirements	Capacity: 9 aircrafts stands for Civil Active apron: 9 stands	Phase 1 (2019): Capacity: 28 stands Phase 2 (2041) : Capacity: 24 stands	13 Aircraft stands required Phase 1 Capacity Adequate	24 aircraft stands needed in 2041 Phase 1 Adequate Phase 2 would not be required to be constructed in 2040 (subject to future demand review)
Terminal Building	6 Million at Adisucipto Airport Over Capacity	Kulon Progo Airport Planned Capacity 2019: 15 million passengers per year 2040 : 20 million passengers per year	Capacity Inadequate until 2019, as the New Airport is planned to be ready in 2019. For the period until completion of the new Kulon Progo airport, the existing Adi Sumarmo Airport of Solo could take some demand of Adisucipto as it has sufficient capacity until 2019.	Phase 1 adequate Phase 2 would not require to be constructed in 2040 (subject to future demand review)

Based on the forecast future air passenger demand and aircraft movements, Phase 1 of the Kulon Progo Airport must be implemented in a timely fashion and should be adequate to support the short and long term air passenger demand for the Destination upon completion.

14.7 ROAD TRANSPORT NEEDS

14.7.1 FUTURE TRAFFIC VOLUME AND ROAD CAPACITY

Traffic analysis consists of general traffic generated by everyday commuters and traffic generated by visitors.

General Traffic Volume and Road Capacity

The traffic volume to and from the key attractions in the future will also be affected by the traffic increases as a result of other economic activities in Java. For the purpose of this study, the future traffic volume has been estimated based on forecast demographics and visitor arrivals.

The forecast number of vehicles in 2021 and 2041 in Jawa Tengah and Yogyakarta is shown in Figure 96 below based on an estimation of the future population.

FIGURE 96: VEHICLES FORECAST

	Jawa Tengah		Yogyakarta	
Year	No of Vehicles	Growth	No of Vehicles	Growth
2021	22,707,402	7.13%	3,063,632	5.71%
2041	43,748,117	3.32%	6,172,291	3.56%

Source: Surbana Jurong

Visitor Traffic Volume

The additional visitor traffic volume generated is an important component that will be distributed on the road network. Based on the provisional modal split for domestic and foreign visitors, the apportionment rate of each traffic facility and number of visitors per vehicle are per Figures 97 and 98:

FIGURE 97: VISITORS GENERATION TRAFFIC IN 2021

Domestic					Foreign				
	JOG	SRG	SOC	Pax / veh		JOG	SRG	SOC	Pax / vehicle
Tour Bus	340	69	34	35	Tour Bus	43	4	2	35
Tour van	567	115	57	14	Tour van	100	19		14
Public Bus	454	92	46	35	Public Bus	10			35
Private Car	10,918	2,205	1,102	4	Private Car	251			4
Total	12,279	2,480	1,240		**Total**	405	23	2	

JOG Yogyakarta, SRG Semarang, SOC Solo

FIGURE 98: VISITORS GENERATION TRAFFIC IN 2041

Domestic					Foreign				
	JOG	SRG	SOC	Pax / veh		JOG	SRG	SOC	Pax / vehicle
Tour Bus	469	88	44	35	Tour Bus	121	8	4	35
Tour van	782	147	74	14	Tour van	312	56		14
Public Bus	626	118	59	35	Public Bus	31			35
Private Car	15,053	2,839	1,419	4	Private Car	709			4
Total	16,930	3,193	1,596		**Total**	1,173	64	4	

JOG Yogyakarta, SRG Semarang, SOC Solo

The traffic volume generated by visitors (visitors and VFR) in comparison to general traffic is estimated to be less than 12% for the Jogja corridor (Yogyakarta-Magelang) and less than 5% for the Semarang corridor (Semarang to Magelang) and Solo corridor (Solo to Yogyakarta). The share of visitor traffic will reduce with respect to the general traffic. (Refer to Appendix II for Visitor Traffic Analysis)

FIGURE 99: SUMMARY VISITORS GENERATION TRAFFIC IN 2021

	ADT	PCE	Peak
Jogja corridor	12684	14223	1422
Semarang corridor	2503	2802	280
Solo corridor	1242	1389	139

FIGURE 100: SUMMARY VISITORS TRAFFIC VOLUME ESTIMATION IN 2041

	ADT	PCU	Peak
Jogja corridor	18103	20397	2040
Semarang corridor	3256	3654	365
Solo corridor	1600	1792	179

PCE : Passenger Car Equivalent was adopted from Djohar (1984) Passenger Car Unit value and Saturation Flow for Junctions in Bandung

Since the volume of visitor traffic is very small in comparison with general traffic, the impact on trunk roads is minimal. However, from a tourism perspective, it is important to maintain a good Level of Service on selected roads such as Yogyakarta-Prambanan and Keprekan-Borobodur which are the major access roads to the key attractions.

Road Performance

Road performance supporting the Destination is assessed by Level of Service (LOS), as a measure to indicate the effectiveness of proposed road infrastructure. LOS is categorized into six different classes, ranging from A to F, where A is the best. The IHCM 1997 has recommended that the LOS not be allowed to reduce to lower than "C" which is the accepted international standard. Figure 101 below presents LOS in relation to congestion as a V/C ratio (volume over capacity) for a given traffic density.

FIGURE 101: LEVEL OF SERVICE ROAD CAPACITY

LOS	V/C ratio
A	0.26
B	0.42
C	0.63
D	0.84
E	1.00
F	⩾ 1.00

The results of the future traffic volume analysis for the road segments supporting the key attractions are presented in Figure 102 below. (For details on calculations refer to Appendix II)

FIGURE 102: ROAD PERFORMANCE IN 2021 AND 2041

Section	VCR 2021	VCR 2041	Remarks
Yogyakarta- Muntilan	**2**	**4.3**	Inadequate capacity According to Ministry of Public Works the following toll road projects are committed: • Bawen – Salatiga - Solo expected to be completed by 2019 • New Kulon Progo Airport - Yogyakarta expected to start construction in 2019 Toll Road from Bawen-Magelang-Yogyakarta-Solo is planned and would be needed to improve inter-regional traffic movement as well as facilitate tourism.
Magelang – Keprekan	**1.72**	**3.64**	
Semarang – Ungaran –Bawen /Ambarawa Toll Road	No information available on traffic volume	No information available on traffic volume	
Ambarawa – Magelang	**2.15**	**4.5**	
Klaten-Kartosuro – Yogyakarta	**1.65**	**3.5**	

Muntilan – Keprekan	**1.3**	**2.93**	Inadequate capacity Expected to be improved by Toll Road implementation (unknown timeline).
Keprekan-Borobudur	**1.35**	**1.85**	Inadequate capacity Needs to be upgraded to dual 2 lanes.

14.7.2 ROAD INFRASTRUCTURE NEEDS

Following are the key infrastructure improvements needed for the Destination.

External Access

Based on the road capacity analysis, existing road capacity is inadequate to meet the estimated traffic volume within a desired Level of Service. It is expected that future construction of the Bawen-Magelang-Yogyakarta-Solo toll road will relieve some congestion; however, the road capacity for Bawen-Yogyakarta road needs to be improved urgently.

In addition, the new Yogyakarta outer ring road will improve future traffic conditions as an alternative route for motorists.

While these proposals will assist tourism, these roads are primarily meant to serve the general regional traffic and not specifically visitor traffic.

Local Access

Borobudur Road Access

- 9.89 km National road Keprekan – Borobudur branching off from Yogyakarta to Magelang to go to Mendut is to be widened and improved as the main access road to Borobudur. This should be expanded to a maximum dual lane road with minimal environmental impact.
- 7.5 km provincial road branching off that same road to go to Sawitan is also to be designated as an access road, as well as the route serving the visitors from Semarang. This should be expanded to a maximum dual two lane road with minimal environmental impact.
- The present provincial road linking Mendut – Pawon – Borobudur is to be improved by upgrading the cross section with pedestrian facilities for exclusive park use and an attractive passage created to Borobudur Temple.
- The 6 km route Mendut – Ngawen is to be designated as an archaeological excursion route by providing pedestrian facilities.

Prambanan Road Access

- The 9.9 km section (019 – Janti-Prambanan) of the present national road between Yogyakarta and Surakarta should be widened based on Bina Marga Standards with roadside improvements to make it a suitable access route to the park.
- The 1.5 km road linking the Prambanan Complex and Ratu Boko hill is to be designated and improved as a park road for exclusive use by visitors.

- The following two excursion routes should be designated for non-motorized transport facilities;
  - North Standard Route: 1.5 km route from the Prambanan Complex around the eastern remains (Sewu and Plaosan); and
  - South Route: 2.5 km route from the Prambanan Complex around the southern remains (Sojiwan, Ratu Boko, Banyunibo).

Malioboro Road Access

- Government plans to fully pedestrianize the Malioboro Area, supplemented with a proper bicycle network to operate as a parallel visitor network.

General Recommendations

- All the key roads connecting Kota Yogyakarta and the new Kulon Progo Yogyakarta Airport to Borobudur need to be well maintained, and its capacity will need to be designed based on likely socio-economic changes that DI Yogyakarta experiences in the future.
- In principle, visitors shall not be allowed to come into the archaeological park area in motor vehicles. From the parking terminal at the entrance to the park they shall be encouraged to change to secondary means of transportation or walk.
- Overall, there will be a need for a Detailed Master Plans to identify the different types of light transport systems (such as buggy) for the disabled/elderly visitors, and the pedestrian/ cycling routes for day trippers to tour surrounding temples in both Borobudur and Prambanan.

14.8 RAILWAY TRANSPORT

14.8.1 RAIL INFRASTRUCTURE NEEDS

Only 10% of visitors are estimated to use rail as a mode of transport to reach Yogyakarta in the future. There are proposed plans for a rail branch line connecting Yogyakarta with Borobudur. Rail plays an important role in long distance travel and regional transport; however, investment in a railway to Borobudur cannot be justified from a tourism perspective, as there is a plan to construct a toll road for the same connectivity which would provide faster (less than 1.5 Hr) and convenient service for visitors.

14.9 SEA TRANSPORT

14.9.1 FUTURE CRUISE DEMAND

Tanjung Emas Port received 17 cruise calls with 13,000 cruise passengers in 2016. According to the market study, Tanjung Emas Port is estimated to receive 25 and 45 cruise calls by 2021 and 2041 respectively. The estimated cruise passengers for 2021 and 2041 are around 19,000 and 35,000 respectively. Only 1% of the passengers took excursions to Borobudur in 2016, which is estimated to increase slightly to 2% by 2041. Since this number is very small, it will not have any significant impact on tourism infrastructure requirements.

14.9.2 SEA PORT INFRASTRUCTURE NEEDS

Considering the existing Port Infrastructure at Tanjung Emas, the port facility (sea side infrastructure, e.g. quay dimensions) is able to handle sun class cruise ships (usual passenger capacity 1,950 – 2,270), and its passenger terminal is able to accommodate 2,000 to 2,500 passengers. Hence, the current port infrastructure will be adequate.

15. BASIC CAPACITY INFRASTRUCTURE (AMENITIES)

BASELINE

15.1 KEY TOURISM AREAS

Joglosemar covers a vast area, spanning 2 provinces (Jawa Tengah and DI Yogyakarta), several regencies and 3 large cities, Yogyakarta, Semarang and Surakarta (Solo). Within the larger Joglosemar area, the key tourism areas with the highest potential for tourism development and propensity to generate revenue are the Yogyakarta – Borobudur - Prambanan triangle. Within this area, the basic infrastructure assessment is conducted for the following kecamatan in the key tourism areas:

- Kec. Kraton, Kec. Gedongtengen, Kec. Danurejan, Kec. Ngampilan, Kec. Kotagede and Kec. Gondomanan (Kota Yogyakarta);
- Kec. Borobudur and Kec. Mungkid (Kab. Magelang); and
- Kec. Prambanan (Kab. Sleman) and Kec. Prambanan (Kab. Klaten).

FIGURE 103: KEY TOURISM AREAS & KEY ATTRACTIONS

Source: Google Maps, HHTL, Surbana Jurong

15.2 WATER SUPPLY

15.2.1 EXISTING WATER SUPPLY CONDITIONS

According to the national service standards for public works and spatial planning (SPM Permen PU 01/PRT/M/2014) sustainable water supply is defined as having access to a safe and reliable water source that can supply at least 60l/cap/day. For the key tourism areas, the higher quality SNI 3-7065-2005 standard is assumed, meaning that the population and visitors in key tourism areas should have access to sustainable piped water supply which is defined as having a house connection and 24 hours water supply at 120l/cap/day for domestic users and 250l/cap/day for visitors staying overnight.

The national statistical office (BPS) has baseline information on service provision. BPS collects this information by sample surveys and aggregate data are available at the Provincial level and sometimes at the Kabupaten/Kota level. In practice it was not possible to arrive at a reliable baseline for water supply service provision in the key tourism areas because data were either not available or were only available at the Provincial level which is not sufficiently detailed to serve as a baseline for the key tourism areas.

As a proxy, data have been collected on population connected to piped networks of water supply companies (PDAM), because these data are widely available by PDAM at Kabupaten and Kecamatan level. It should be noted however that these data should be regarded as minimum number of people served by piped water supply, because apart from PDAM many local networks exist, often community operated, that deliver sustainable water supply.

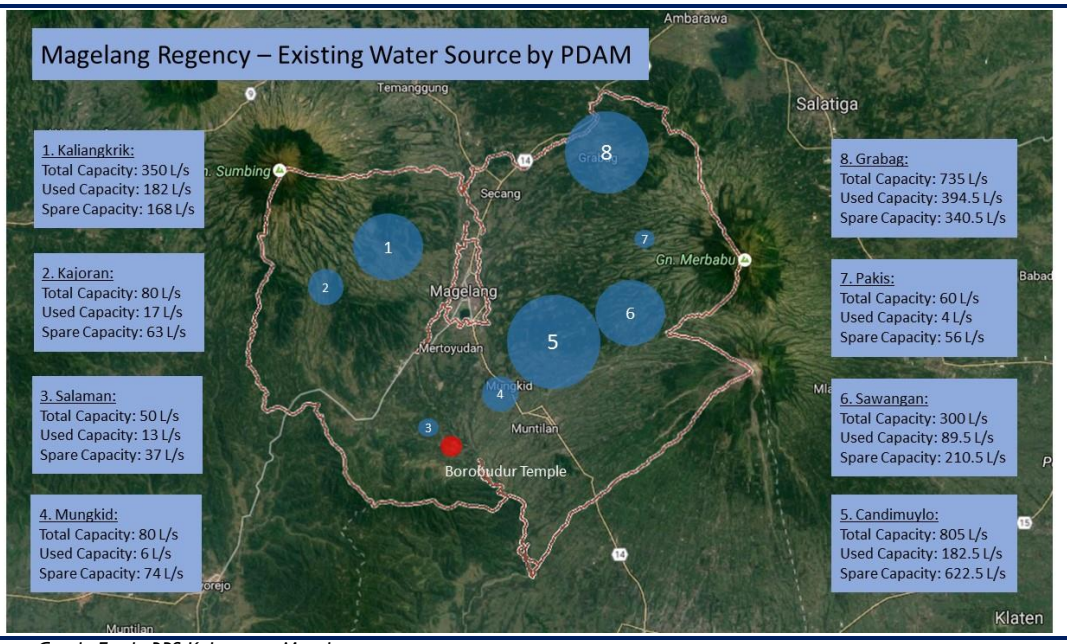
In the context of this study PDAM data as presented here should therefore not be taken as absolute figures for current water supply service levels but should be considered as an indication of variation in service levels between the several key tourism areas. More detailed study at Kecamatan level is needed to arrive at a thorough baseline for each of the key tourism areas.

PDAM (Perusahaan Daerah Air Minum, or the Water Company) water supply service covers 10.59% of households in Kab. Magelang, and 52.50% of households in Kota Yogyakarta.

In Kab. Magelang, PDAM is providing potable water from 8 water sources (Figure 104). As much as 2,490 L/s of water is available from these 8 sources, located at Kaliangkrik, Kajoran, Salaman, Mungkid, Candimuylo, Sawangan, Pakis, and Grabag. From the total capacity of 2,490 L/s, it is estimated that 2,300 L/s is to serve the water demand of Kab. Magelang, and the remaining goes to Kota Magelang. As much as 888.5 L/s (35.68% of the total raw water capacity) of water been produced from the existing raw water sources. This has given a spare capacity of 1,601.5 L/s.

In Kota Yogyakarta, PDAM water sources are from neighboring Kabupaten. Total production capacity of existing treatment facilities to serve residents of Kota Yogyakarta is 750 L/s.

FIGURE 104: EXISTING WATER SOURCE IN KABUPATEN MAGELANG



Source: Google Earth, BPS Kabupaten Magelang

In rural areas where piped water supply is not available, PAMSIMAS (Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat) is providing clean drinking water to the local communities. PAMSIMAS is one of the flagship programs of the Government of Indonesia in the provision of clean water and sanitation to rural communities through community-based approaches.

For Prambanan, the visitors are day trippers staying mostly around Kota Yogyakarta with some in Kab. Magelang. Considering there is no accommodation needs for the visitors to Prambanan (Kab. Sleman, Kec. Prambanan and Kab. Klaten, Kec. Prambanan), there are no investments expected with regards to water supply infrastructure in Prambanan from a tourism perspective.

15.2.2 ASSESSMENT OF EXISTING WATER SUPPLY INFRASTRUCTURE

Generally, capacity of the existing raw water sources is sufficient to serve domestic and tourism usage in Kab. Magelang and Kota Yogyakarta. In Kab. Magelang, there is a surplus of 1,601.5 L/s of raw water capacity and quality of water from these sources is considered "baik", or good[22]. Although there are abundant raw water sources, the coverage of the water supply network is low. Piped water supply only reaches 10.59% of the households in Kab. Magelang (14.98% in Kec. Borobudur), and 52.50% in Kota Yogyakarta.

[22] *Source: Interview and data from PDAM Tirta Gemilang, Kab. Magelang, received on 20 October 2016*

FIGURE 105: COVERAGE OF PDAM WATER SUPPLY

Key Tourism Area	PDAM Coverage (% of households served)
Kab. Magelang	10.59
Kec. Borobudur	14.98
Kota Yogyakarta	52.50

Source: BPS Magelang, Kota Yogyakarta, 2015

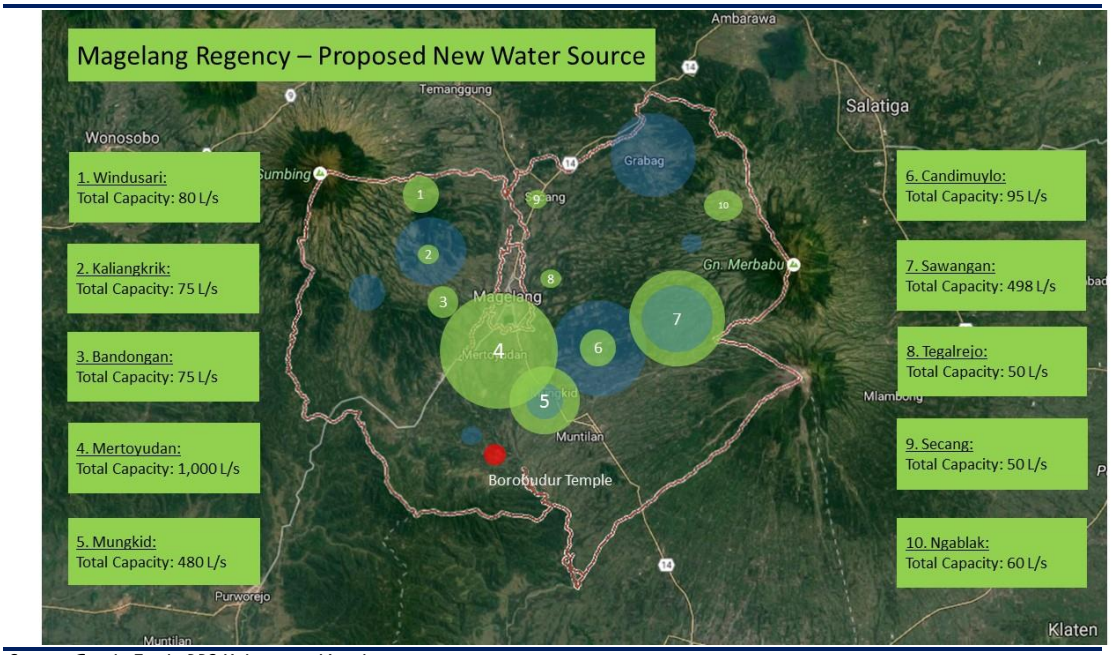
PDAM piped water supply has limited coverage around Borobudur. Residential settlements and villages surrounding Borobudur are assisted by PAMSIMAS or using community and private wells as their main source of water supply. During dry season, capacities of these water sources are insufficient to meet the demand.

15.2.3 FUTURE PLANS FOR WATER SUPPLY

Authorities of Kabupaten Magelang have identified and proposed ten (10) new water sources to support the potential growth in water demand. These water sources are located at Windusari, Kaliangkrik, Bandongan, Mertoyudan, Mungkid, Candimuylo, Sawangan, Tegalrejo, Secang, and Ngablak. As much as 2,463 L/s of raw water capacity is available from these sources. However, it is important to note that not all the available capacity will be utilized to fulfil domestic demand. A portion of it is to support other industries within the Kabupaten[23]. It is assumed that half of the raw capacity will be utilized for domestic and tourism usage in the analysis.

In Kota Yogyakarta, the PDAM has planned to expand its piped water network to serve more households. However, development of new water sources has not been made public.

FIGURE 106: PROPOSED WATER SOURCES IN KABUPATEN MAGELANG



Source: Google Earth, BPS Kabupaten Magelang

[23] *Source: Kabupaten Magelang Dalam Angka, 2006*

The identified new water sources with sufficient capacity are required not only to fill the existing gap, but also to support the potential growth of water demand. It is suggested that the water source in Mertoyudan (1,000 L/s) and Mungkid (480 L/s) could help to serve Kec. Borobudur due to its geographical location. Existing raw water sources should also be made full use of as 1601.5 L/s of raw water from the existing water sources has not been extracted. Additionally, expansion of existing water treatment facilities is recommended to increase the efficiency and capacity of water production.

15.3 WASTEWATER AND SANITATION

15.3.1 EXISTING WASTEWATER AND SANITATION CONDITIONS

According to the national service standards for public works and spatial planning (SPM Permen PU 01/PRT/M/2014) sustainable sanitation is defined as having access to a private or a communal (MCK) toilet connected to a septic tank or to a piped sewer system with downstream treatment facilities. If population density is higher than 300 inhabitants/ha an off-site sewer system is required with centralized wastewater treatment plant. Waste water treatment facilities must meet specified technical and effluent quality standards.

The national statistical office (BPS) has baseline information on service provision. BPS collects this information by sample surveys and aggregate data are available at the Provincial level and sometimes at the Kabupaten/Kota level. In practice it was not possible to arrive at a reliable baseline for sanitation service provision in the key tourism areas because data were either not available or were only available at the Provincial level which is not sufficiently detailed to serve as a baseline for the key tourism areas.

As a proxy, STBM (Sanitasi Total Berbasis Masyarakat) data have been collected, because these data are widely available up to Kecamatan level. It should be noted however that STBM data in general give a much too positive picture of current service levels because the STBM service level represents a much lesser quality than the level required in SPM Permen PU 01/PRT/M/2014. STBM's definition of adequate sanitation includes sanitation facilities which:

1. Avoid water contamination;
2. Avoid contact between human and feces;
3. Avoid contact between insects/ animals and feces;
4. Are not smelling unpleasant; and
5. Are easy to clean.

The STBM definition actually means that all sanitation facilities are included, even pit latrines and temporary structures, and only open defecation practice is excluded. Percentage of population served as indicated by STBM data is therefore much higher than population served in accordance with SPM Permen PU 01/PRT/M/2014 service level quality. In the context of this study STBM data as presented here should therefore not be taken as absolute figures for current sanitation service levels but should be considered as an indication of variation in service levels between the several key tourism areas. More detailed study at Kecamatan level is needed to arrive at a reliable baseline for each of the key tourism areas.

According to STBM data 78.51% of households in Kab. Magelang have access to adequate sanitation and in Kota Yogyakarta, all households have access to adequate sanitation. The most common collection and management system practiced is individual septic tank. Unfortunately, some residents still discharge their wastewater directly to lakes and other water bodies.

For Prambanan (Kab. Sleman, Kec. Prambanan and Kab. Klaten, Kec. Prambanan), considering there are no accommodation needs for visitors, no investments are expected with regards to waste water infrastructure from a tourism perspective.

15.3.2 ASSESSMENT OF EXISTING WASTEWATER & SANITATION INFRASTRUCTURE

Coverage of adequate sanitation as defined by STBM standards is tabulated in Figure 107:

FIGURE 107: COVERAGE OF ADEQUATE SANITATION

Key Tourism Area	Adequate Sanitation (% of households equipped with/ has access to adequate sanitation)
Kab. Magelang	78.51
Kec. Borobudur	80.20
Kota Yogyakarta	100

Source: Sanitasi Total Berbasis Masyarakat

According to STBM standards about 20% of households in Kabupaten Magelang are not equipped with adequate sanitation, meaning that based on the higher SPM Permen PU 01/PRT/M/2014 standards the percentage of population not served is at least 20% and probably more. The conditions in Kota Yogyakarta would seem satisfactory based on the STBM standards; however, the population densities are high in the key tourism kecamatan in Yogyakarta (Keraton, Gondomanan, Ngampilan, Gedongtengen, Danurejan and Kotagede). In case the population density is more than 300 inhabitants/ha SPM Permen PU 01/PRT/M/2014 standards for sustainable sanitation require an off-site sewer system with centralized wastewater treatment plant.

15.3.3 FUTURE PLANS FOR WASTEWATER AND SANITATION INFRASTRUCTURE

7 integrated wastewater treatment plants are proposed in Kab. Magelang. Among the 7 only 1 is proposed to be located at Borobudur (capacity and timeline are not known).

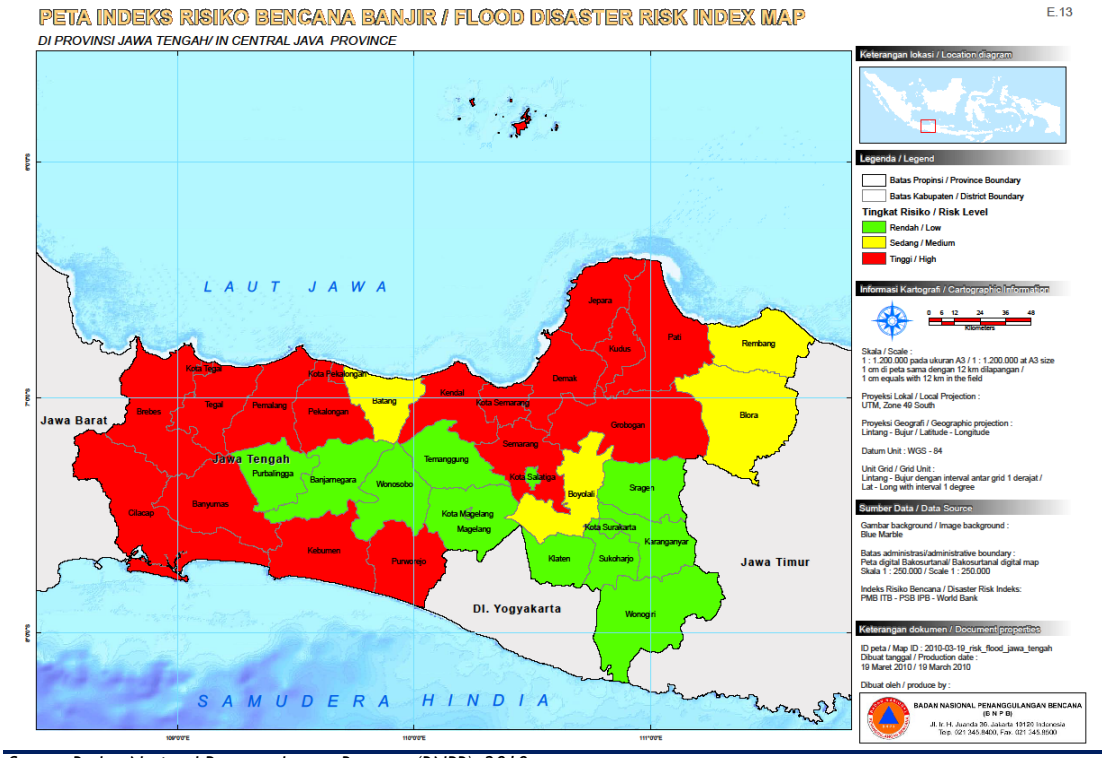
The proposed wastewater treatment facilities will help to promote a healthier living environment in Kab. Magelang, and Kec. Borobudur. At the meantime, immediate actions are required to provide sustainable sanitation for all the households in the key tourism areas.

15.4 DRAINAGE

15.4.1 ASSESSMENT OF EXISTING DRAINAGE AND FLOODING ISSUE

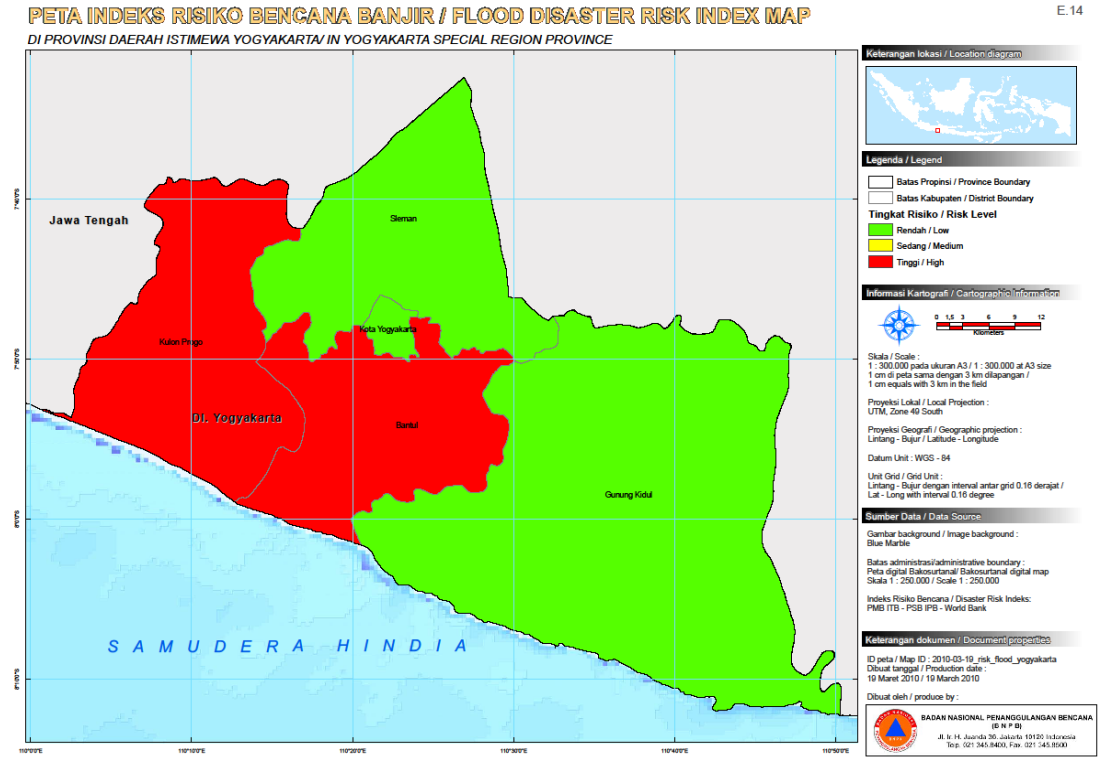
Kab. Magelang, Kota Yogyakarta, Kab. Sleman and Kab. Kletan are categorized as low risk flood zones. Flash floods occur at the built up and low lying areas in Grabag, Mertoyudan, Windusari, Mutilan, Sawangan of Kab. Magelang, and Kota Yogyakarta. However, water usually subsides quickly and doesn't cause direct impact on tourism activities.

FIGURE 108: FLOOD DISASTER RISK INDEX MAP (JAWA TENGAH)



Source: Badan Nasional Penanggulangan Bencana (BNPB), 2010

FIGURE 109: FLOOD DISASTER RISK INDEX MAP (DI YOGYAKARTA)



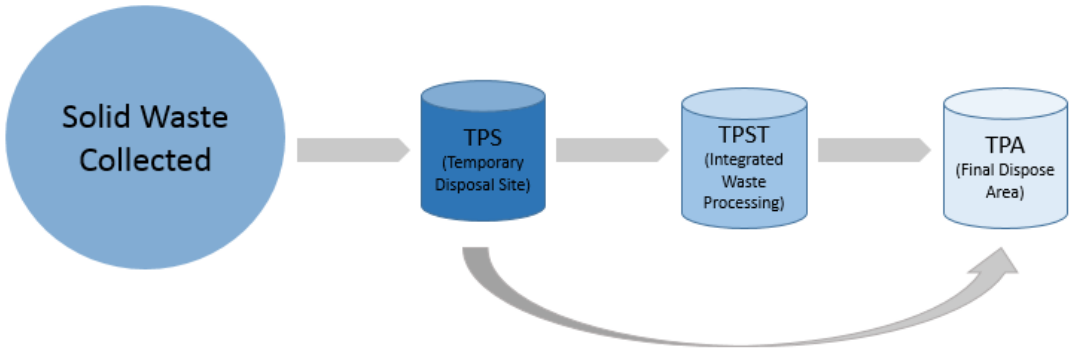
Source: Badan Nasional Penanggulangan Bencana (BNPB), 2010

15.5 SOLID WASTE INFRASTRUCTURE

15.5.1 EXISTING SOLID WASTE COLLECTION AND DISPOSAL CONDITIONS

Generally, solid wastes are collected manually and transported to TPS (Tempat Pembuangan Sementara, or Temporary Disposal Site). TPSs are located at residential and community centers. From TPS, waste is transported to TPST (Tempat Pengolahan Sampah Terpadu, or Integrated Waste Processing). Most of the TPSTs are located near to the markets and managed by kecamatan agencies. Segregation of waste takes place in TPSTs. However, TPSTs are not available in all places. The remaining waste is then transported to TPA (Tempat pembuangan Akhir, or Final Disposal Area). Procedures for solid waste collection and disposal are shown Figure 110 below.

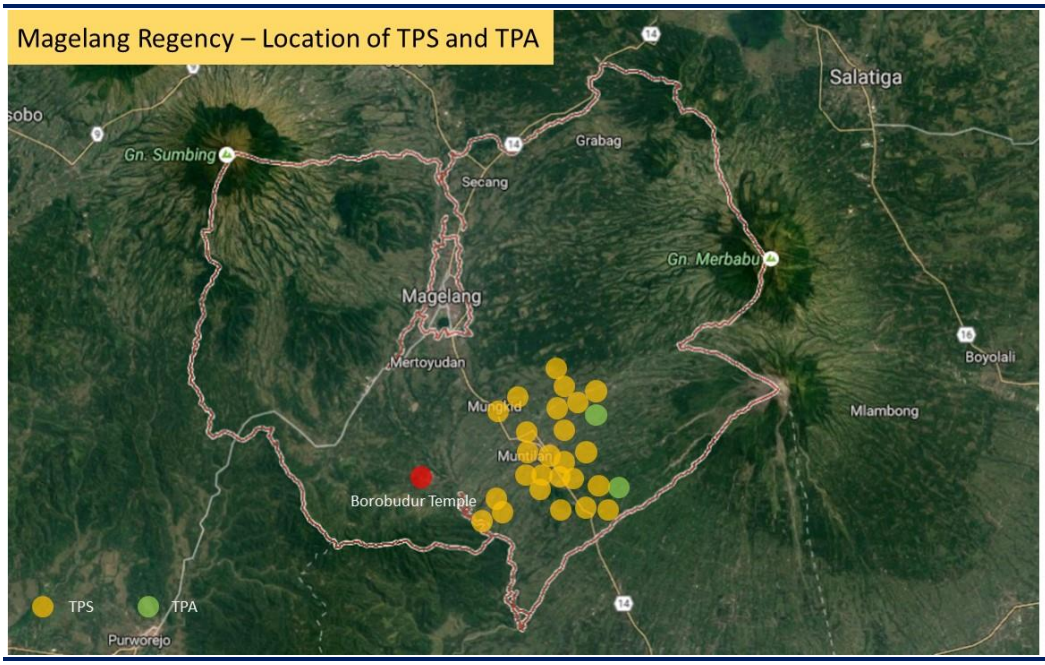
FIGURE 110: PRACTISE OF SOLID WASTE MANAGEMENT IN INDONESIA



Source: RTRW, Rencana Tataruang Wilayah

There are twenty-seven (27) TPS (Temporary Disposal Site) and two (2) TPA (Final Disposal Site) in Kab. Magelang. Big TPS are located in Kec. Muntilan, Salam, Borobudur, Mungkid, Grabag, Mertoyudan and areas where waste generation are significant. Solid waste collected from Kota Yogyakarta is transferred to TPA Piyungan located at Kab. Bantul.

FIGURE 111: TPS AND TPA IN KABUPATEN MAGELANG



Source: Google Earth

15.5.2 ASSESSMENT OF EXISTING SOLID WASTE INFRASTRUCTURE

According to the national service standards for public works and spatial planning (SPM Permen PU 01/PRT/M/2014) sustainable solid waste management is defined as having access to a solid waste collection services of at least twice a week and transport of waste collected to a transfer station or a processing unit. Solid waste management operations must be in accordance with national technical standards for management of solid waste facilities (Permen PU 03-2013) and for urban waste management techniques (SNI 19-2454-2002).

Existing service level data were collected for each of the key tourism areas at the Kabupaten/Kota level. More detailed and disaggregated data were not encountered. Note that in many Kabupaten the solid waste collection services are limited to the most densely populated and urbanized Kecamatans whereas rural areas are often not yet served. More detailed study is needed at Kecamatan level to arrive at a thorough baseline for the key tourism areas. Coverage of sustainable solid waste management is tabulated in Figure 112:

FIGURE 112: COVERAGE OF SUSTAINABLE SOLID WASTE MANAGEMENT

Key Tourism Area	Sustainable Solid Waste Management (% of households served)
Kab. Magelang	56
Kec. Borobudur	65
Kota Yogyakarta	85
Kec. Mungkid	65
Kec. Prambanan (Kab. Sleman)	60
Kec. Prambanan (Kab. Klaten)	70

Source: Local authorities and Dinas Kebersihan of each Kabupaten

Coverage (percentage of households served) in Kab. Magelang and Kota Yogyakarta is 56% and 85%, respectively. The existing solid waste management facilities are insufficient. Hence, it is essential for the authorities to widen the coverage of waste collection services. In areas where the amount of waste generation is significantly high, the numbers of garbage trucks and/or frequency of waste collection will need to be increased. Similar conditions happen in the temple compounds, particularly Borobudur Temple. The condition is worsened by the hawkers which generate a significant amount of waste and are not properly managed and regulated.

15.5.3 FUTURE PLANS FOR SOLID WASTE INFRASTRUCTURE

Two (2) final disposal sites (TPA) are proposed in Kab. Magelang however the type of disposal site, timeline and capacities of the proposed TPA are unknown.

The proposed new TPAs are necessary to improve the existing condition of solid waste management. The proposed TPA shall adopt the sanitary landfill approach, as the ultimate approach of providing sustainable solid waste management. In the short term, the authorities shall focus on closing the existing gap by making sure all solid waste generated is collected and disposed of at the designated TPA.

15.6 POWER SUPPLY

15.6.1 EXISTING POWER SUPPLY CONDITIONS

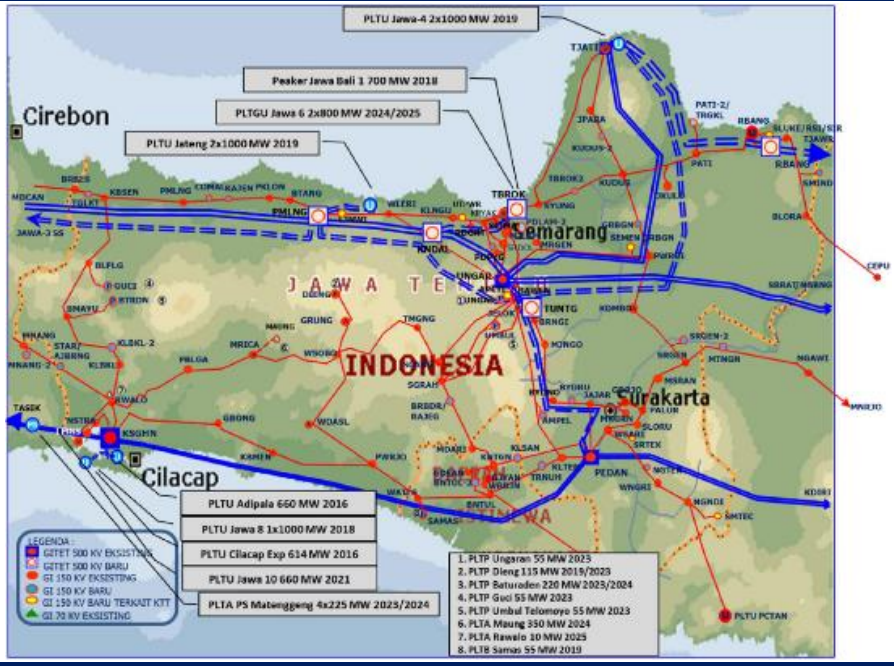
The existing power supply system in Jawa Tengah consists of:

- GITET (Extra High Voltage Main) Ungaran and PLTGU (Steam and Gas Power Plant)/ PLTU (Steam Power Plant) Tambak Lorok;
- GITET Pedan which is serving Kab. Magelang; and
- PLTU Cilacap.

Power is generated at power plants PLTU Tanjung Jati B, PLTGU/ PLTU Tambak Lorok, PLTU Cilacap, PLTP Dieng, PLTA Mrica, and other small power plants. Generated power is then transmitted and distributed through 500 kV and 150 kV grid systems.

Coverage of the PLN power supply to the key tourism Kota, Kab. and Kec. are satisfactory. Over 90% of the households are served by PLN (90.43% in Kab. Magelang, and 100% in Kota Yogyakarta).

FIGURE 113: POWER SUPPLY SYSTEM IN JAWA TENGAH



Source: The Ministry of Energy and Mineral Resources of the Republic of Indonesia, 2016

For Prambanan (Kab. Sleman, Kec. Prambanan and Kab. Klaten, Kec. Prambanan), considering there are no accommodation needs for visitors, no investments are expected with regards to power supply infrastructure from a tourism perspective.

15.6.2 ASSESSMENT OF EXISTING POWER SUPPLY INFRASTRUCTURE

Existing coverage of power supply network is tabulated in Figure 114:

FIGURE 114: COVERAGE OF POWER SUPPLY NETWORK

Key Tourism Area	PLN Coverage (% of households served)
Kab. Magelang / Kec. Borobudur	90.43
Kota Yogyakarta	100

Source: BPS Magelang and Kota Yogyakarta

There is no major issue with regards to the power demand in the key tourism areas, however, the services are concentrated in the urban areas. Hence, it will be important to expand and improve the power transmission and distribution networks to reach Kec. Borobudur and its surrounding villages.

15.6.3 FUTURE PLANS FOR POWER SUPPLY

Several plans are proposed by the authorities and PLN to improve the power supply conditions in Jawa Tengah:

- New power plants: substantial numbers of new power plants are planned to provide 11,195 MW of electricity;
- PLN has identified several potential sources that can generate power: 360 MW of potential capacity of hydropower, and 1.981 MWe of geothermal energy scattered across the Province; and
- Expansion and development of transmission and distribution networks.

Proposed new power plants are required to fulfil the existing and to support the potential growth of power demand. Proposed expansion and development of transmission and distribution networks should give priority to Kec. Borobudur.

15.7 TELECOMMUNICATION INFRASTRUCTURE

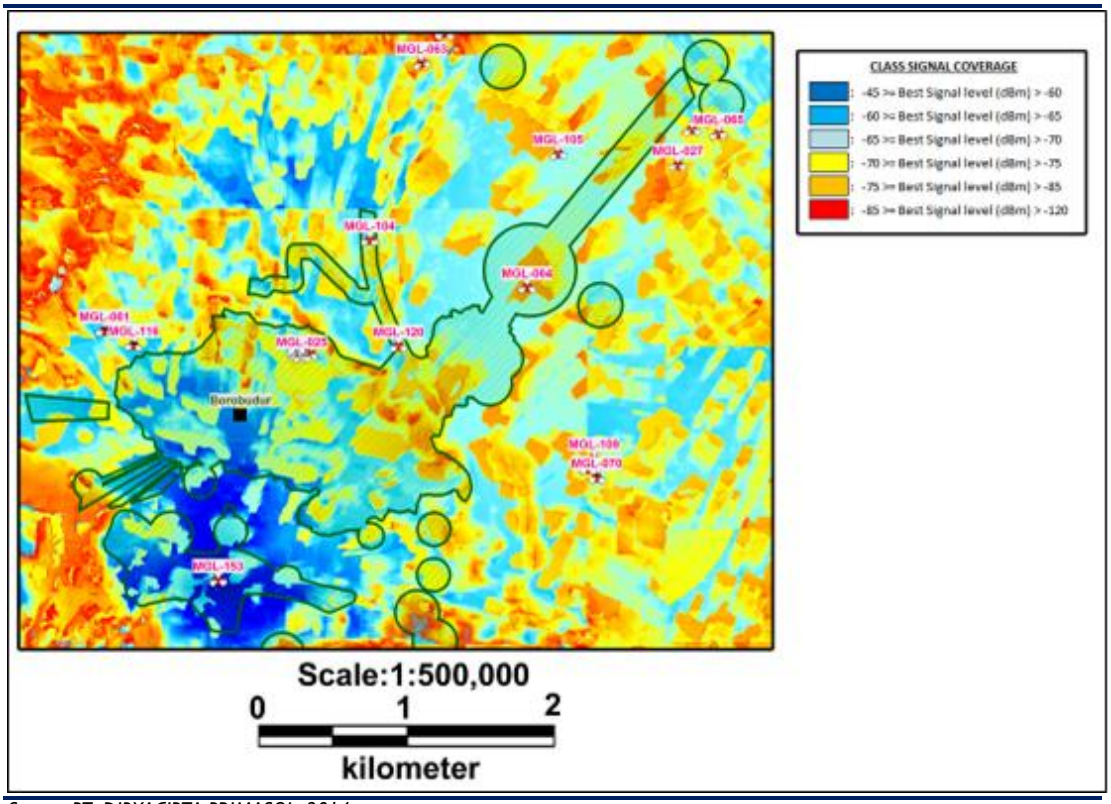
15.7.1 EXISTING TELECOMMUNICATION INFRASTRUCTURE

Coverage of internet accessibility among the residents varies between the key tourism areas. 87% of households in Kab. Magelang have no access to internet service, meanwhile, only half (49%) of households in Kota Yogyakarta have no access to internet service.[24] There is no major issue with regards to telecommunication infrastructure to serve visitors.

There are 211 telecom towers in Kab. Magelang. Among them, 15 are located in Kec. Borobudur. A study carried out by PT. DIBYACIPTA PRIMASOL in 2014 revealed that the coverage of mobile signals is satisfactory in Kec. Borobudur as shown in Figure 115. Kota Yogyakarta is well served with existing telecommunication facilities, and coverage of existing telecommunication infrastructure is satisfactory at other key tourism areas (Kec. Mungkid and Prambanan).

[24] *Source: Population Census 2010, World Bank*

FIGURE 115: COVERAGE OF MOBILE SIGNALS IN BOROBUDUR AREA



Source: PT. DIBYACIPTA PRIMASOL, 2014

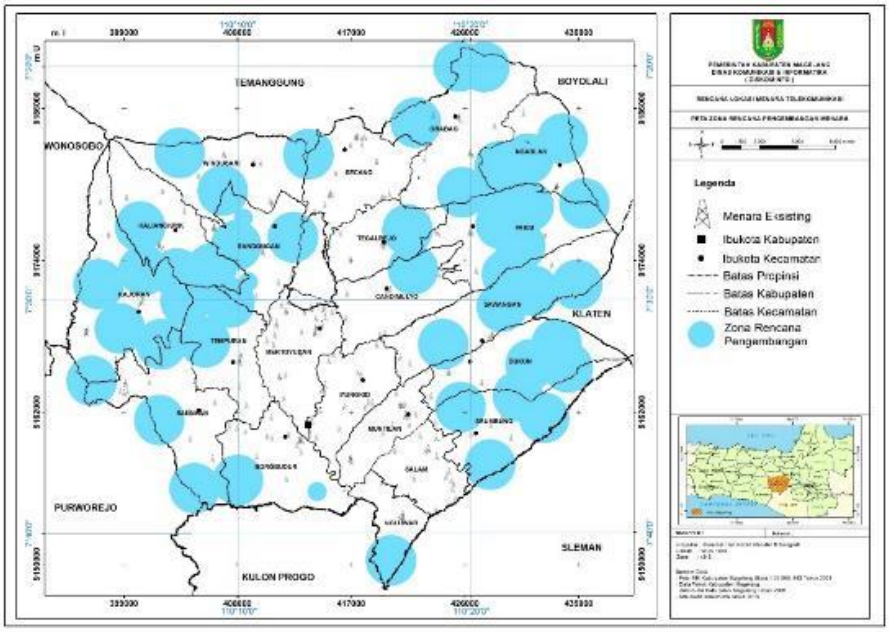
15.7.2 ASSESSMENT OF EXISTING TELECOMMUNICATION INFRASTRUCTURE AND FUTURE PLAN

There is no major problem with the existing coverage of telecommunication facilities in Borobudur. Key tourism areas are covered with sufficient mobile signals.

The authority/telecom companies are planning to have another 49 telecom towers in Kab. Magelang, 2 of which will be located in Kec. Borobudur. Figure 116 illustrates the planned expansion of telecommunication coverage.

Expansion of telecommunication infrastructure is necessary to cope with the rise of demand. However, it is important to note that development of telecom/ Base Transceiver Tower (BTS) is restrained by the Presidential Decree No. 58 / 2014, Borobudur landscape view "Pusaka Saujana" (cultural landscape heritage). The proposed telecom tower/ BTS should not have visual impact on the Borobudur heritage area (height is limited to 12m), to conserve and maintain Borobudur's status as a UNESCO World Heritage Site.

FIGURE 116: PROPOSED EXPANSION OF TELECOMMUNICATION INFRASTRUCTURE IN KABUPATEN MAGELANG



Source: DISKOMINFO, Kab. Magelang

15.8 SUMMARY OF EXISTING BASIC INFRASTRUCTURE

Summary of the existing coverage and gap of basic infrastructure is tabulated in Figure 117.

FIGURE 117: SUMMARY OF EXISTING BASIC INFRASTRUCTURE ASSESSMENT

Infrastructure		Existing Coverage	Existing Gap	Remarks
Water Supply (households served by PDAM)	Kab. Magelang	10.59	89.41	Very low PDAM coverage in Kab. Magelang and Kec. Borobudur. Relatively higher PDAM coverage at Kota Yogyakarta, but still unsatisfactory. Note that actual current coverage is higher because non-PDAM piped supply is not captured in the baseline.
	Kec. Borobudur	14.98	85.02	
	Kota Yogyakarta	52.50	47.50	
Wastewater and Sanitation (households equipped/ has access to adequate sanitation)	Kab. Magelang	78.51	21.49	Note that actual current sanitation coverage is lower because STBM standards are inferior to national standard SPM Permen PU 01/PRT/M/2014. Existing gap has to be closed at the soonest.
	Kec. Borobudur	80.20	19.80	
	Kota Yogyakarta	100	0	
Drainage	Both Kab. Magelang and Kota Yogyakarta are categorized as low risk flood zones			No direct and major impact on tourism activities
Solid Waste (solid waste generated collected and disposed at designated TPA)	Kab. Magelang	56	44	Insufficient solid waste management Existing gap has to be closed at the soonest at key tourism areas
	Kec. Borobudur	65	35	
	Kota Yogyakarta	85	15	

	Kec. Mungkid	65	35	Immediate actions are required at temples compound
	Kec. Prambanan (Kab. Sleman)	60	40	
	Kec. Prambanan (Kab. Klaten)	70	30	
Power Supply (households served by PLN)	Kab. Magelang	90.43	9.57	Satisfactory coverage at key tourism areas. The authority shall push towards 100% coverage
	Kec. Borobudur	90.43	9.57	
	Kota Yogyakarta	100	0	
Telecommunication	No major problem with the existing coverage of telecommunication facilities Key tourism areas are well covered with mobile signals			

In relation to all historical sites (including UNESCO World Heritage Sites Borobudur and Prambanan) It is crucial that any development including infrastructure facilities, should be carefully planned and should not compromise their continued preservation.

Availability of raw water sources is not an issue for Kab. Magelang and Kota Yogyakarta although piped water supply is low. In the short term, it is recommended to utilize the existing water sources by expanding the capacity of the existing water treatment plants. With the expansion of the water supply networks, the existing gap can be closed in the key tourism areas.

Most households in the key tourism areas have access to adequate sanitation, however, the existing gap (particularly at Kec. Borobudur) must be closed at the soonest to promote healthier living environment.

Solid waste management facilities are poor and insufficient and it is recommended that adequate and sufficient numbers of Temporary Disposal Site (TPS) be allocated, together with waste collection services. Sufficient numbers of rubbish bins and proper management of hawkers should be put in place in the temple compound.

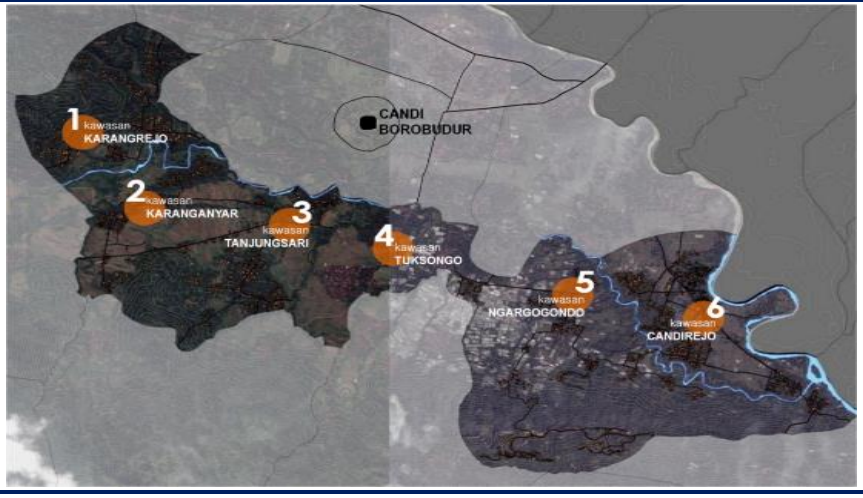
More than 90% of households in the key tourism areas are served by PLN. Expansion of power transmission and distribution systems are recommended not only to support tourism activity, but also to make sure that the rural community benefits.

Telecommunication infrastructure is satisfactory. Development of new power lines, telecom towers and Base Transceiver Stations (BTS) should take into consideration sensitivity of the view of the historical sites.

Both Kab. Magelang and Kota Yogyakarta are categorized as low risk flood zones. There is no direct or major impact of flooding events on tourism activities.

Six villages have been identified as potential areas for homestay development. These villages are located near to Borobudur and its surrounding temples, namely Karangrejo, Karanganyar, Tanjungsari, Tuksongo, Ngargogondo, and Candirejo, as shown in Figure 118.

FIGURE 118: HIGH PRIORITY VILLAGES SURROUNDING BOROBUDUR TEMPLE



Source: Laporan Antara, Perencanaan Kawasan Pariwisata Borobudur Provinsi Jawa Tengah

Condition of existing basic infrastructure of these villages is tabulated in Figure 119.

FIGURE 119: ASSESSMENT OF EXISTING BASIC INFRASTRUCTURE AT HIGH PRIORITY VILLAGES

Basic Infrastructure	Karangrejo	Karanganyar	Tanjung Sari	Tuksongo	Ngargogondo	Candirejo
Water Supply	Assisted by PAMSIMAS Main source of water = groundwater Capacities of raw water are sufficient, except during dry season					
Wastewater & Sanitation (% of adequate sanitation coverage by STBM standards)	71.18	65.09	97.06	65.36	74.37	78.94
Drainage	No major flooding events were recorded					
Solid Waste	Existing solid waste facilities are insufficient Most of the wastes are burnt/ buried					
Power Supply	Lower coverage as compared to the urban areas Improvement works are required					
Tele-communication	No major issue with regards to connectivity					

Basic infrastructure is inadequate in these villages, especially water supply, wastewater and sanitation, and solid waste infrastructure. Upgrading and improvement works are required at the soonest to close the existing gaps.

BASIC CAPACITY INFRASTRUCTURE INVESTMENT NEEDS

15.9 FORECAST POPULATION & VISITOR ARRIVALS

Basic infrastructure analyses are carried out for the short and long term with reference to the projected population and visitor arrivals as shown in Figures 120 and 121.

The population growth for Kab. Magelang is based on the growth rate produced by BPS for Jawa Tengah. The population growth for Kota Yogyakarta is based on the growth rate produced by BPS for DI Yogyakarta.

FIGURE 120: FORECAST OF POPULATION

Key Tourism Kabupaten	2015	2021	2041
Kab. Magelang	1,245,496	1,368,000	1,459,000
Kota Yogyakarta	388,627	388,627	388,627

Source: HHTL

The distribution of visitors staying at family & relatives by kapubaten is proportionate to the residential population distribution.

The forecast of VFR is presented in the Demand Forecasts.

The peak day visitors are estimated at three times the average number of visitors per day.

FIGURE 121: FORECAST OF PEAK VISITORS STAYING AT FAMILY & RELATIVES (VFR)

Key Tourism Kabupaten	2015	2021	2041
Kab. Magelang	10,115	10,788	12,499
Kota Yogyakarta	3,352	3,575	4,142

Source: HHTL

Visitors staying in commercial accommodation are assumed to be distributed in accordance with the existing and recommended location for new accommodation (Figure 122):

FIGURE 122: FORECAST OF COMMERCIAL ROOMS REQUIRED

Key Tourism Kabupaten	2015	2021	2041
Kab. Magelang	2,241	3,400	7,700
Kota Yogyakarta	22,594	29,700	45,600

Source: HHTL, guests per room = 2.0

Basic infrastructure demand projections are carried out based on the projected and number of visitor arrivals in the key tourism areas (Kab. Magelang and Kota Yogyakarta).

Basic Infrastructure Demand Projection = Domestic Demand (Population) + Overnight Guest Demand (VFR* + Commercial Accommodation**)

* VFR = Overnight guests staying at family and friends

** Commercial Accommodation = Overnight guest staying at commercial accommodation

15.10 WATER SUPPLY

15.10.1 FUTURE DEMAND

With reference to the projected population and visitor arrivals, and unit rate of water consumption (shown in Figure 126), water demand forecasts are tabulated in Figures 123 to 125. Note that these projections represent maximum requirements assuming that all piped water supply would be provided by PDAM. In reality many non-PDAM local piped water supply networks exist, often community operated, that deliver sustainable water supply.

FIGURE 123: WATER DEMAND PROJECTION (L/S)

			2015			2021	2041
			Demand	Served by PDAM	Not Served by PDAM		
Domestic	Magelang		1,442	153	1,289	1,900	2,026
	Kota Yogyakarta		450	236	214	540	540
Overnight Guest	VFR (staying at family & friends)	Magelang	10	1	9	13	15
		Kota Yogyakarta	3	2	2	4	5
	Commercial Accommodation	Magelang	10	1	9	20	45
		Kota Yogyakarta	105	55	50	172	264
Total			2,020	448	1,572	2,649	2,895

Source: Surbana Jurong

Figure 123 above showcases estimated water demand (L/s) by different categories of consumers in 2015 (with amount of water served and not served by PDAM). Projected water demand by different categories of consumers in 2021 and 2041 are also presented. Summary of existing and projected water demand for each of the key tourism kabupatens are tabulated in Figure 124; while the ratio of estimated water demand to support tourism activities with respect to overall demand is shown in Figure 125.

FIGURE 124: SUMMARY OF WATER DEMAND PROJECTION (L/S)

	2015	2021	2041
Magelang	1,462	1,933	2,086
Kota Yogyakarta	558	716	809
Total	2,020	2,649	2,895

Source: Surbana Jurong

FIGURE 125: ESTIMATED WATER DEMAND RATIO

	2015	2021	2041
Domestic	1,891	2,440	2,566
Visitor	128	209	329
% of visitor/ total	6.35%	7.89%	11.35%

Source: Surbana Jurong

Key Assumptions:

The average water demand for the study area is estimated by using unit water demand per capita for local residents and visitors. The SNI 3-7065-2005 standard has been used, meaning that the population and visitors should have access to sustainable piped water supply which is defined as having a house connection and 24 hours water supply at 120l/cap/day for domestic users and 250l/cap/day for visitors staying overnight. Our adopted water consumption rate in lpcd (liters per capita per day) for residents and visitors are tabulated in Figure 126. The projected water demands are then converted to L/s (litres per second). The unit rates of water consumption for different usage are expected to increase by 20% - 25% in 2021 due to the upturn in living standards and water accessibility; and then remain constant until 2041, considering sufficient water conservation approaches and awareness among residents. [25]

FIGURE 126: WATER CONSUMPTION RATE

Type of Usage		Unit Rate (lpcd)		
		2015	2021	2041
Domestic		100	120	120
Overnight Guest	VFR	85	105	105
	Commercial Accommodation	200	250	250

Based on the above considerations, total water demand in 2015 is estimated to be 2,100 L/s (1,462 L/s in Kab. Magelang and 558 L/s in Kota Yogyakarta). Out of the total demand, only 22.18% is provided by piped water supply. Water demand in 2021 and 2041 is estimated to be about 2,000 L/s and 2,100 L/s in Kab. Magelang, and 800 L/s and 900 L/s in Kota Yogyakarta. Total water demand in the key tourism kabupaten is estimated to be 2,700 L/s in 2021 and 2,900 L/s in 2041.

[25] *Reference: IS - 1172 (1993) - Code of Basic Requirements for Water Supply, Drainage and Sanitation De Stefano, L. Freshwater and Tourism in the Mediterranean. 2004. American Water Works Association Research Foundation, "Residential End Uses of Water", 1999.*

Existing water demand for tourism activities is about 7% of the overall water demand, and forecast to increase to 8% in 2021, and 12% in 2041. The ratio is relatively high as compared to other tourism destinations in Indonesia, because of the smaller population and very concentrated visitor accommodations in Kota Yogyakarta.

15.10.2 WATER SUPPLY INFRASTRUCTURE NEEDS

As described, the existing capacity of raw water sources serving Kab. Magelang is about 2,300 L/s. Considering 33% water loss during distribution, about 1,500 L/s of water is available to the end users. On top of the existing capacity, the PDAM has proposed new raw water sources with total capacity of 1,700 L/s. It is assumed that water loss in Indonesia be reduced to 20% by 2021 and 10% by 2041. With such assumptions available capacity of raw water sources to serve Kab. Magelang will be increased to 3,200 L/s in 2041 and 3,600 L/s in 2041.

As for Kota Yogyakarta, existing production capacity of water treatment facilities to serve demand of Kota Yogyakarta is about 750 L/s. Considering 33% water loss during distribution, about 500 L/s of water is available to the end users. On top of the existing capacity, the authority has proposed expansion of treatment facilities, with additional raw water sources of 400 L/s. This will increase the total production capacity to 1,150 L/s in 2021. It is recommended that water loss in Indonesia be reduced to 20% by 2021 and 10% by 2041. With such recommendations, available capacity of produced water to serve Kota Yogyakarta will increase to 900 L/s in 2041 and 1,000 L/s in 2041 (Figures 127 & 128).

FIGURE 127: ESTIMATED CAPACITY OF WATER SUPPLY

Kabupaten Magelang (excluding Kota Magelang)	**Existing**	**2021**	**2041**
Raw Water Source Capacity (L/s) [1]	2,300	2,300 + 1,700 (existing + proposed)	2,300 + 1,700 (existing + proposed)
Water Loss [2]	~33%	To reduce to 20%	To reduce to 10%
Total Water Supply Capacity (L/s) [4]	1,500	3,200	3,600
Kota Yogyakarta	**Existing**	**2021**	**2041**
PDAM Production Capacity (L/s) [3]	750	750 + 400 (existing + proposed)	750 + 400 (existing + proposed)
Water Loss [2]	~33%	To reduce to 20%	To reduce to 10%
Total Water Supply Capacity (L/s) [5]	500	900	1,000

Source: Surbana Jurong

[1] Water sources identified by PDAM
[2] Water loss during distribution
[3] Production capacity identified by PDAM
[4] Total water supply capacity, assuming full utilization/ production from the available raw water source, and water loss of 33% (existing), 20% (2021), 10% (2041)
[5] Total water supply capacity, assuming existing production capacity, and water loss of 33% (existing), 20% (2021), 10% (2041)

FIGURE 128: COMPARISON OF WATER DEMAND AND WATER SUPPLY CAPACITY (L/S)

Kabupaten Magelang	**Existing**		**2021**		**2041**	
	Demand (L/s)	Water Supply Capacity	Demand (L/s)	Water Supply Capacity	Demand (L/s)	Water Supply Capacity
Domestic	1,442	1,500	1,900	3,200	2,026	3,600

Overnight Guest	20		33		60	
Total	1,462		1,933		2,086	
Kota Yogyakarta	**Existing**		**2021**		**2041**	
	Demand (L/s)	Water Supply Capacity	Demand (L/s)	Water Supply Capacity	Demand (L/s)	Water Supply Capacity
Domestic	450	500	540	900	540	1,000
Overnight Guest	108		176		269	
Total	558		716		809	

Source: Surbana Jurong

As can be seen from Figure 127, there is no major concern with regards to the availability of raw water sources to fulfil water demand, provided:

- Water loss is reduced as assumed; and
- Proposals for new raw water sources and increases in production capacities are implemented.

As such, the following recommendations are made for the short term (2021):

- 100% piped water coverage to the key tourism areas;
- For the key tourism areas the higher quality SNI 3-7065-2005 standard is assumed, meaning that the population and visitors in key tourism areas should have access to sustainable piped water supply which is defined as having a house connection and 24 hours water supply at 120l/cap/day for domestic users and 250l/cap/day for visitors staying overnight.
- Expansion of the existing water supply network and construction of new networks to meet the above mentioned targets, particularly to reach and serve the residents of the 6 cultural villages;
- Expansion of existing water treatment facilities (if there is room for expansion) or construction of new water treatment facilities to utilize the existing water sources available. Focus shall be given to water sources which are located near Borobudur, namely Salaman (with 37 L/s spare capacity) and Mungkid (with 74 L/s spare capacity);
- Construction of new water treatment facilities to produce potable water from the identified new raw water sources. Focus shall be given to new water sources located at Mertoyudan (with 1,000 L/s capacity) and Mungkid (with 480 L/s capacity);
- Construction of water storage facilities for usage during dry season; and
- Effective and necessary efforts shall be put in place to reduce the water losses to 20%.

Recommendations for the long term (2041) are as below:

- Construction of new water treatment plant(s) to produce potable water from the proposed water sources;
- Expansion of the existing water supply network and construction of new networks to serve the potential growth of population and visitors;
- Effective and necessary efforts shall be put in place to reduce the water losses to 10%; and
- Construction of water storage reservoirs/ tanks for usage during the dry season.

15.11 WASTEWATER AND SANITATION

15.11.1 FUTURE DEMAND

With reference to the projected population and visitor arrivals, the forecast sewage generation is tabulated in Figures 129 to 131. Sewage generation is assumed at 80% of water supplied. Note that current coverage of adequate sanitation in this analysis relates to STBM standards. Actual current sustainable sanitation coverage is lower because STBM quality standards are inferior to national standard SPM Permen PU 01/PRT/M/2014.

FIGURE 129: SEWAGE GENERATION PROJECTION (L/S)

			2015			2021	2041
			Demand	Adequate Sanitation	Inadequate Sanitation		
Domestic	Magelang		1,153	905	248	1,520	1,621
	Kota Yogyakarta		360	360	-	432	432
Overnight Guest	VFR (staying at family & friends)	Magelang	8	6	2	10	12
		Kota Yogyakarta	3	3	-	3	4
	Commercial Accommodation	Magelang	8	8	-	16	36
		Kota Yogyakarta	84	84	-	138	211
Total			1,616	1,366	250	2,119	2,316

Source: Surbana Jurong

Figure 129 above showcases estimated sewage generation (L/s) by different categories of consumers in 2015 (with amount of adequate and inadequate sanitation as per STBM standards). Projected sewage generation by different categories of consumers in 2021 and 2041 are also presented. Summary of the existing and projected sewage generation for each of the key tourism kabupatens are tabulated in Figure 130; while the ratio of estimated sewage generation from tourism activities with respect to overall generation is shown in Figure 131.

FIGURE 130: SUMMARY OF SEWAGE GENERATION PROJECTION (L/S)

	2015	2021	2041
Magelang	1,169	1,546	1,669
Kota Yogyakarta	446	573	647
Total	1,616	2,119	2,316

Source: Surbana Jurong

FIGURE 131: ESTIMATED SEWAGE GENERATION RATIO

	2015	2021	2041
Domestic	1,513	1,952	2,053
Visitor	103	167	263
% of visitor/ total	6.35%	7.89%	11.35%

Source: Surbana Jurong

Total existing sewage generation is estimated to be 1,616 L/s in Kab. Magelang and Kota Yogyakarta combined. From total generated sewage 85% is discharged and managed by STBM standard sanitation facilities. Sewage generation in 2021 and 2041 is forecast to be 1,546 L/s and 1,669 L/s in Kab. Magelang, and 573 L/s and 647 L/s in Kota Yogyakarta. The total sewage generation is estimated to be 2,119 L/s in 2021, and 2,316 L/s in 2041. Existing sewage generation from visitors is about 6% of total sewage generation, and estimated to increase to 8% in 2021, and 11% in 2041.

15.11.2 WASTEWATER AND SANITATION INFRASTRUCTURE NEEDS

The following key projects for waste water and sanitation infrastructure are recommended for the short term (2021):

- 100% coverage of sustainable sanitation at the key tourism areas;
- In accordance with the national service standards for public works and spatial planning (SPM Permen PU 01/PRT/M/2014) sustainable sanitation is defined as having access to a private or a communal (MCK) toilet connected to a septic tank or to a piped sewer system with downstream treatment facilities. If population density is higher than 300 inhabitants/ha an off-site sewer system is required with centralized wastewater treatment plant. Waste water treatment facilities must meet specified technical and effluent quality standards.
- Installation of sufficient numbers of communal facilities (MCK) in the key tourism areas, with a focus on the 6 cultural villages;
- Small scale wastewater treatment plants are recommended at the proposed hotels/ resorts;
- Adequate public toilet and sanitation facilities (with septic tanks) shall be provided at key attractions, particularly Borobudur Temple, Prambanan Temple, Mendut Temple, and Pawon Temple; and
- Construction of sewerage networks shall be started for the proposed sewage treatment plants by the authorities.

Recommendations for the long term (2041) are as below:

- 100% coverage of sustainable sanitation as per SPM Permen PU 01/PRT/M/2014 standard in the key tourism areas, including off-site sewer systems for areas where population densities exceed 300 people/ha;
- Development of integrated sewage treatment facilities, including sewage treatment plants and sewerage networks in Kab. Magelang. This shall be carried out in accordance with the sewage treatment plants proposed by the authorities in Borobudur, Tegalrejo, Candimulyo, Muntilan, and Ngluwar. These proposed sewage treatment plants should be able to handle the sewage generated, which is about 1,700 L/s. Otherwise new sewage treatment plant(s) shall be planned; and
- Development of integrated sewage treatment facilities, including sewage treatment plants and sewerage networks in Kota Yogyakarta.

15.12 DRAINAGE

15.12.1 DRAINAGE INFRASTRUCTURE NEEDS

There is no major issue with regards to the drainage systems and flooding events in the key tourism areas. Maintenance and upgrading of existing drainage systems are necessary as more developments are expected. Improvements shall be planned and designed in accordance with the master planning of the region.

15.13 SOLID WASTE INFRASTRUCTURE

15.13.1 FUTURE DEMAND

With reference to the projected population and visitors, and rate of solid waste generation (as shown in Figure 135), forecast solid waste generation is tabulated in Figures 132 to 134:

FIGURE 132: SOLID WASTE GENERATION PROJECTION (L/DAY)

			2015			2021	2041
			Demand	Sustainable Management	Unsustainable Management		
Domestic	Magelang		2,802,366	1,566,242	1,236,124	3,078,000	3,939,300
	Kota Yogyakarta		874,411	743,249	131,162	874,411	1,049,293
Overnight Guest	VFR (staying at family & friends)	Magelang	16,183	9,045	7,138	17,261	23,998
		Kota Yogyakarta	5,362	4,558	804	5,720	7,952
	Commercial Accommodation	Magelang	15,685	8,766	6,919	23,800	64,680
		Kota Yogyakarta	158,158	134,434	23,724	207,900	383,040
Total			3,872,165	2,466,295	1,405,870	4,207,092	5,468,262

Source: Surbana Jurong

Figure 132 above showcases estimated solid waste generation (L/day) by different categories of consumers in 2015 (with amount of sustainable and unsustainable management). Projected solid waste generation by different categories of consumers in 2021 and 2041 are also presented. Summary of existing and projected solid waste generation for each of the key tourism areas are tabulated in Figure 133; while the ratio of estimated solid waste generation from tourism activities with respect to overall generation is shown in Figure 134.

FIGURE 133: SUMMARY OF SOLID WASTE GENERATION PROJECTION (L/DAY)

	2015	2021	2041
Magelang	2,834,234	3,119,061	4,027,978
Kota Yogyakarta	1,037,931	1,088,030	1,440,285
Total	3,872,165	4,207,092	5,468,262

Source: Surbana Jurong

FIGURE 134: ESTIMATED SOLID WASTE GENERATION RATIO

	2015	2021	2041
Domestic	3,676,777	3,952,411	4,988,593
Visitor	195,389	254,681	479,669
% of visitor/ total	5.05%	6.05%	8.77%

Source: Surbana Jurong

Key Assumptions:

The average solid waste generation for the study area is estimated by using solid waste generation rate units per capita for local residents and visitors. The adopted rate in L/c/d (litres per capita per day) for residents and visitors are tabulated in Figure 135. It is forecast that there will be no changes in the unit rate of solid waste generation over the short term (2021), but it will increase by 20% in the longer term (2041).

FIGURE 135: RATE OF SOLID WASTE GENERATION[26]

Type of Usage		Unit Rate (L/capita/day)		
		2015	2021	2041
Domestic		2.25	2.25	2.7
Overnight Guest	VFR (staying at family & friends)	1.6	1.6	1.92
	Commercial Accommodation	3.5	3.5	4.2

Total solid waste generation in 2015 is estimated to be about 2,835,000 L/day in Kab. Magelang, and 1,038,000 L/day in Kota Yogyakarta. From total solid waste generated, only 63.69% are collected and disposed at the designated TPA. Solid waste generation in 2021 and 2041 are forecast to be about 3,120,000 L/day and 4,028,000 L/day in Kab. Magelang, and 1,089,000 L/day and 1,441,000 L/day in Kota Yogyakarta. Total solid waste generation for the key tourism kabupaten are forecast to be 4,208,000 L/day in 2021, and 5,469,000 L/day in 2041. Existing solid waste generated from tourism activities is about 5% of the overall generation, and forecast to increase to 6% in 2021, and 9% in 2041.

15.13.2 SOLID WASTE INFRASTRUCTURE NEEDS

Sustainable solid waste management services shall be made available in all key tourism areas. According to the national service standards for public works and spatial planning (SPM Permen PU 01/PRT/M/2014) sustainable solid waste management is defined as having access to a solid waste

[26] *Reference: Standard for Setting of Town Environmental Sanitation Facilities, China and Ministry of the Environment and Water Resources, Singapore*

Kosuke. K, Tomohiro. T, Revisiting Estimates of Municipal Solid Wastes Generation per Capita and Their Reliability, 2015.

collection services of at least twice a week and transport of waste collected to a transfer station or a processing unit. Solid waste management operations must be in accordance with national technical standards for management of solid waste facilities (Permen PU 03-2013) and for urban waste management techniques (SNI 19-2454-2002).

As such, the following solid waste infrastructure projects are recommended to be undertaken immediately (2017):

- Committee(s) shall be formed, or strengthened (if equivalent committee(s) already exist) to look after the solid waste management at Borobudur Temple, Prambanan Temple, Mendut Temple, and Pawon Temple. Other than to provide sufficient solid waste management facilities, this committee(s) shall ensure strict solid waste management rules are followed by the hawkers at the temple compounds.

Recommendations for the short term (2021) are as below:

- 100% sustainable solid waste management (collection and disposal at designated TPAs) at all key tourism areas;
- Allocation of sufficient numbers of Temporary Disposal Sites (TPS), particularly the 6 cultural villages;
- Increase in the capacity of trash trucks and frequency of collection, particularly in the 6 cultural villages; and
- Expansion of existing Final Disposal Sites (if there is room for expansion) or allocation of new Final Disposal Sites (to adopt the sanitary landfill method) to cater for the amount of waste delivered.
- Education and enforcement are needed to create awareness among the residents on the importance of solid waste management and to forbid them from disposing of rubbish into the water bodies;

Recommendations for the long term (2041) are as below:

- 100% sustainable solid waste management (collection and disposal at designated TPAs) in the key tourism areas;
- The solid waste collection and disposal facilities shall be increased and expanded accordingly;
- Allocation of more Integrated Waste Processing Sites (TPST) will be needed so that solid waste is sorted and segregated before being transported to Final Disposal Sites (TPA). This can reduce the amount of waste delivered to Final Disposal Sites (TPA), and is also a more sustainable and environmental friendly approach; and
- Development of sanitary landfill site(s) with sufficient capacity. Location of the landfill sites shall be studied taking into consideration the future master plan of the study area, distance from the residential areas and tourism attractions, and the environmental sensitivity. It is recommended that the landfill site(s) shall be located at the south of Kab. Magelang (near Borobudur) to increase the efficiency of waste collection and transportation, and to also benefit Kota Yogyakarta.

15.14 POWER SUPPLY

15.14.1 FUTURE DEMAND

With reference to the projected population and visitor arrivals, and power consumption rate (as shown in Figure 139), forecast power demand is shown in Figures 136 to 138:

FIGURE 136: POWER DEMAND PROJECTION (MWH)

			2015			2021	2041
			Demand	Served by PLN	Not Served by PLN		
Domestic	Magelang		1,245,496	1,126,302	119,194	3,420,000	6,930,250
	Kota Yogyakarta		388,627	388,627	-	971,568	1,845,978
Overnight Guest	VFR (staying at family & friends)	Magelang	10,115	9,147	968	26,971	59,369
		Kota Yogyakarta	3,352	3,352	-	8,937	19,672
	Commercial Accommodation	Magelang	8,963	8,105	858	17,000	46,200
		Kota Yogyakarta	90,376	90,376	-	148,500	273,600
Total			1,746,928	1,625,908	121,020	4,592,975	9,175,069

Source: Surbana Jurong

Figure 136 above showcases estimated power demand (Mwh) by different categories of consumers in 2015 (with amount of power served and not served by PLN). Projected power demand by different categories of consumers in 2021 and 2041 is also presented. Summary of the existing and projected power demand for each of the key tourism kabupatens are tabulated in Figure 137; while the ratio of estimated power demand to support tourism activities with respect to overall demand is shown in Figure 138.

FIGURE 137: SUMMARY OF POWER DEMAND PROJECTION (MWH)

	2015	2021	2041
Magelang	1,264,573	3,463,971	7,035,819
Kota Yogyakarta	482,355	1,129,004	2,139,251
Total	1,746,928	4,592,975	9,175,069

Source: Surbana Jurong

FIGURE 138: ESTIMATED POWER DEMAND RATIO

	2015	2021	2041
Domestic	1,634,123	4,391,568	8,776,228
Visitor	112,805	201,408	398,841
% visitor/ total	6.46%	4.39%	4.35%

Source: Surbana Jurong

Key Assumptions:

The adopted rate Kwh (Kilowatt hours) for residents and visitors is tabulated in Figure 139. It is estimated that the unit rate of power consumption will increase in the short term (2021) and long term (2041).

FIGURE 139: POWER CONSUMPTION RATE[27]

Type of Usage		Unit Rate (Kwh)		
		2015	2021	2041
Domestic (per person), including VFR		1,000	2,500	4,750
Overnight Guest	Commercial Accommodation (per room)	4,000	5,000	6,000

Based on the above considerations, existing power demand is forecast to be 1,265,000 Mwh in Kab. Magelang, and 483,000 Mwh in Kota Yogyakarta. From total demand, 93.07% is fulfilled by the PLN power network. Power demand in 2021 and 2041 is estimated to be about 3,464,000 Mwh and 7,036,000 Mwh in Kab. Magelang, and 1,129,000 Mwh and 2,140,000 Mwh in Kota Yogyakarta. The total power demand in the key tourism Kabupaten is estimated to be 4,593,000 Mwh in 2021, and 9,176,000 Mwh in 2041. Power demand for tourism activities is within the range of 4% to 7% of the total demand.

15.14.2 POWER SUPPLY INFRASTRUCTURE NEEDS

There is no major concern with regards to power supply to support tourism activities, due to its relatively small demand compared to residents' demand. However, as most of the power sources are located far from the key attractions, sufficient power supply networks should be put in place.

As such, the following key power supply infrastructure projects are recommended for the short term (2021):

[27] *Reference: National Energy Council, Republic of Indonesia. Bin Su, Hotel Design and Energy Consumption, 2012.*

- 100% coverage of PLN power supply in Kec. Borobudur and Kota Yogyakarta; and
- Expansion of existing power transmission and distribution networks and construction of new networks to meet the above mentioned targets, particularly to the 6 high priority villages.

Recommendations for the long term (2041) are as below:

- 100% coverage of PLN power supply in Kab. Magelang and Kota Yogyakarta;
- Expansion of existing power plants (if there is room for expansion) and construction of new power plants to generate sufficient power. This shall be planned in accordance with the PLN Jawa Tengah's proposal; and
- Expansion of existing power supply networks and the construction of new networks to transmit and distribute generated power from PLN's power plants to support the potential growth in power demand.

15.15 TELECOMMUNICATION INFRASTRUCTURE

15.15.1 TELECOMMUNICATION INFRASTRUCTURE NEEDS

Expansion of the existing telecommunication coverage is required to cater for the additional population and visitor arrivals, particularly in the key tourism areas. This is important to ensure sufficient connectivity in case of emergencies, and for visitors to share their travel experiences. Collaboration between the authorities and the telecom companies is needed to improve the telecommunication infrastructure. Projected population and visitor arrivals shall be made known to the telecom companies so that upgrading and expansion of telecommunication facilities can be planned in advanced. Development of new power lines, telecom towers and Base Transceiver Stations (BTS) should take into consideration sensitivity of the view of the historical sites.

KEY RECOMMENDATIONS

16. WHAT WILL TRIGGER INVESTMENT?

Investment responds to actual increases or future anticipated increases in demand. To mobilize private investment, investors need to be convinced that the anticipated future increases in demand will materialize and that the process of investment will be satisfactory.

In the following sections we will provide:

- a recap of the existing supply and demand dynamics in the Destination together with our projections for visitor arrivals (as discussed in detail above);
- recommendations for improvements in the regulatory environment and destination management;
- recommendations on products and services that are suitable for development and management by SMEs; and
- recommendations on tourism driven infrastructure investments, both transport and basic capacity.

16.1 RECAP OF THE DESTINATIONS DEMAND & SUPPLY DYNAMICS

16.1.1 KEY ATTRACTIONS & KEY ACCOMMODATION AREAS

To recap the above findings, the combination of Kota Yogyakarta, Borobudur and Prambanan clusters defines the destination. Figure 140 highlights the existing identified key attractions and key accommodation areas.

FIGURE 140 – KEY ATTRACTIONS & KEY ACCOMMODATION AREAS

Source: Google maps, Surbana Jurong

A = Borobudur Cluster
B = Prambanan-Boko Cluster
C = Yogyakarta Cluster

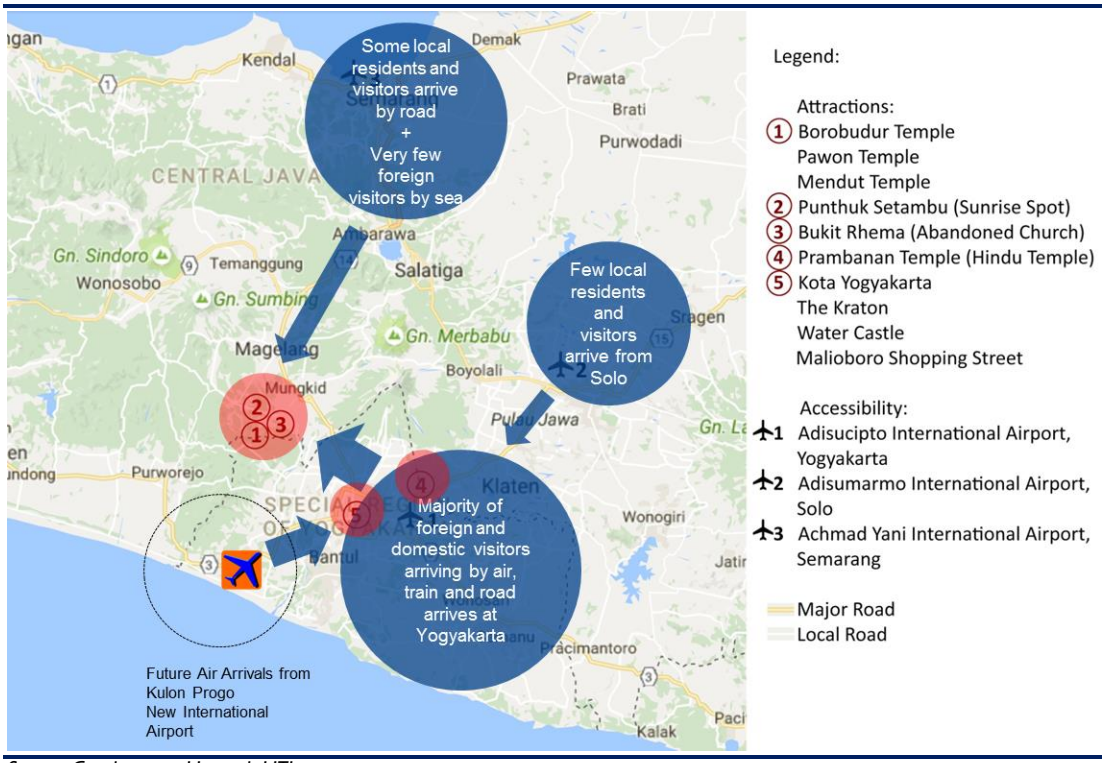
Source: Google maps, Horwath HTL

We have identified 5 key attractions as identified (numbered) in Figure 140 and 2 key accommodation areas, Kota Yogyakarta (Kec. Keraton, Gondomanan, Ngampilan, Gedongtengen, Danurejan and Kotagede) and Kab. Magelang (Kec. Borobudur and Mungkid).

16.1.2 VISITORS TO THE DESTINATION ARRIVE MAINLY BY AIR & ROAD

65% of international visitors arrive by air and 79% of domestic visitors arrive by land. It is estimated that 70% of visitors travel to Borobudur & Prambanan from Yogyakarta.

FIGURE 141 – MAIN ARRIVAL POINTS, DOMESTIC AND FOREIGN VISITORS (2015)



Source: Google maps, Horwath HTL

16.1.3 ACCOMMODATION SNAPSHOT

Accommodation is focused in the key accommodation areas of:

- Kota Yogyakarta: where around two thirds of hotels are non-star-rated, however the growth in star-rated hotels has been faster in the last 5 years. Tourists prefer staying in hotels in here for the wider choices of lodging facilities, more tourism support (restaurants, shopping area, tourist attractions, etc) and its central location to key attractions; and
- Kab. Magelang, specifically Kec. Borobudur and Kec. Mungkid: where non star-rated hotels are double that of star-rated hotels and is the only area that we are aware of where homestay volumes are recorded by the Dinas Pariwisata (although outdated).

Star-rated hotels in Yogyakarta outperform (1) non star-rated hotels and (2) hotels in Kab. Magelang due to the broader base of room night demand that includes corporate and MICE demand, not solely leisure.

16.1.4 INVESTMENT SENTIMENT

Domestic investors are attracted by the market potential of the Destination (particularly Yogyakarta) however they did comment that:

- Borobudur is too close to Yogyakarta to generate significant room nights from domestic guests who prefer the entertainment options in Yogyakarta; and
- Borobudur Temple is special, however the management has let the quality deteriorate, detracting from the overall experience.

Foreign investors are largely disinterested in tourism investments in Borobudur due to a lack of accessibility & limited growth potential.

16.1.5 SKILL LEVELS

Skill levels are good in the Destination at entry level, supervisory and management levels. There are a wide range of hospitality training options including SMK, universities and training courses run by the Dinas Pariwisata and TWC. The Destination would benefit from training for:

- PR, marketing & social media training;
- Homestay providers, given them "access to market" training; and
- Language skills.

16.1.6 FOREIGN VISITOR ARRIVALS & DEMOGRAPHICS

- There were an estimated 293,000 foreign visitors to the Destination in 2015 (2.6% of total visitors).
- Top source countries for the destination are the Netherlands, France, Japan, Malaysia and Singapore.

16.1.7 DOMESTIC VISITOR ARRIVALS & DEMOGRAPHICS

- There were an estimated 11.2 million domestic visitors in 2015, representing 97.4% of total visitors to the Destination.
- Domestic VFR + day visitors represented an estimated 7.0 million and those staying in commercial accommodation represented 4.2 million (some MICE but mostly leisure and corporate).
- Borobudur temple is the most visited attraction in the Destination, with 3.6 million visitors in 2015 of which only 7% were foreign (compared with 1.9 million in Prambanan).

16.1.8 THE DESTINATION'S IMAGE

Yogyakarta benefits from popularity at an international level both among the tourism travel trade and the general public. It is considered as both a cultural and an urban destination.

Borobudur also benefits from a very good awareness at an international level. Interestingly only 3% of international visitors to Indonesia visited Borobudur in 2015 and is largely ignored by Asians from China, India, Malaysia and Singapore (less than 2% of visitors).

Borobudur and Prambanan have the greatest satisfaction indices on TripAdvisor of all temples in Indonesia however, many complaints arise, both from the travel trade and the general public, regarding overcrowding, deterioration of the site, and a lack of varied accommodation choices and tourism amenities around Borobudur.

16.1.9 RECOMMENDED DESTINATION POSITIONING

The combination of Kota Yogyakarta, Borobudur and Prambanan is an internationally recognized symbol of Javanese traditional culture. Visiting the Borobudur Temple Compound is a peaceful and spiritual experience and integrated with the surrounding cultural villages. It is most often visited in combination with Prambanan and Kota Yogyakarta, which have regained their importance as key historical and cultural attractions.

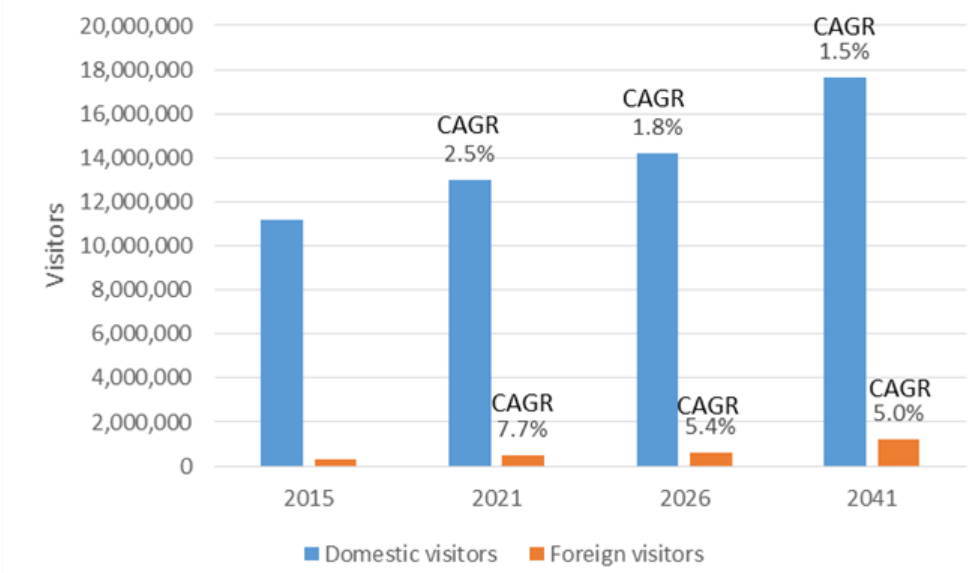
16.1.10 FUTURE DEMAND & SUPPLY

2 contrasted scenarios were developed to gauge the potential impact of investment to improve the destination:

- Business as Usual scenario which is represented by:
  - "Organic" development of the destination driven by market forces;
  - No significant level of government investment in infrastructure; and
  - No measures taken to restrict and or preserve access to the heritage resources (particularly the Borobudur Temple Compound)
- Best Case scenario which is represented by:
  - Significant Government efforts are carried out to develop the Borobudur – Yogyakarta - Prambanan triangle as a sustainable cultural destination; and
  - Visitor management plan for Borobudur Temple.

The repercussions on visitor arrivals of the Best Case scenario are shown in Figure 142.

FIGURE 142 – VISITOR ARRIVALS PROJECTIONS, 2015 TO 2041 (BEST CASE SCENARIO)

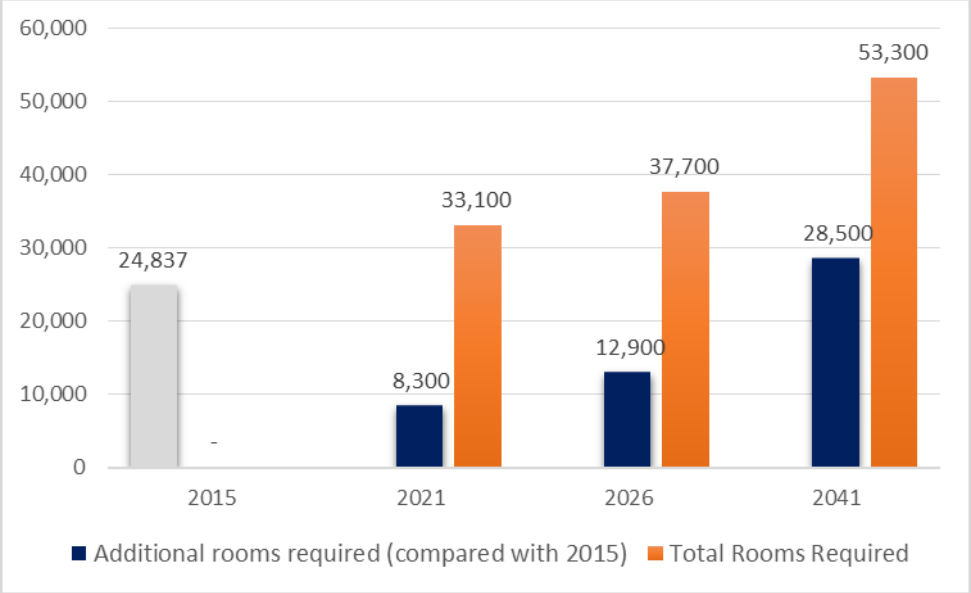


Source: Horwath HTL

Domestic and foreign visitors will generate an estimated total annual expenditures of USD 1.4 billion in 2041 (USD 898 million in 2021 and USD 1.0 billion in 2026), which is 1.9 times the annual expenditure of domestic and foreign visitors in 2015.

The additional visitor arrivals will have a direct impact of the number of hotel rooms required (Figure 143) and the number of staff required to operate the hotels (Figure 144).

FIGURE 143 – NUMBER OF ROOMS REQUIRED, 2015 TO 2041 (BEST CASE SCENARIO)



Source: Horwath HTL

FIGURE 144 – NUMBER OF HOTEL STAFF REQUIRED, 2015 TO 2041 (BEST CASE SCENARIO)

	< USD 40	USD 40 - 80	USD 80 - 120	USD 120 - 240	> USD 240	Total
Staff / Room Ratio	0.53	0.88	1.15	1.56	2.70	
% Total Rooms	0.42	0.31	0.11	0.13	0.03	
Additional Rooms:						
Existing						24,837
2021	3,509	2,581	922	1,056	232	8,300
2026	1,945	1,431	511	585	128	4,600
2041	6,595	4,851	1,734	1,985	436	15,600
Total Additional Staff:						53,300
2021	**1,858**	**2,260**	**1,062**	**1,649**	**625**	**7,454**
Entry Level	1,672	1,921	903	1,402	531	6,429
Supervisor	-	226	106	165	63	560
Management	186	113	53	82	31	465
2026	**1,029**	**1,253**	**588**	**74**	**4**	**2,948**
Entry Level	926	1,065	500	63	3	2,557
Supervisor	-	125	59	7	-	191
Management	103	63	29	4	-	199
2041	**3,491**	**4,248**	**1,995**	**3,099**	**1,175**	**14,009**
Entry Level	3,142	3,611	1,696	2,634	999	12,082
Supervisor	-	425	200	310	118	1,053
Management	349	212	100	155	59	875

Source: Horwath HTL

Of course, in addition to hotel staff, further staff will be needed to work in all supporting tourism facilities such as restaurants and travel agencies.

16.2 DESTINATION ENHANCEMENTS

The following destination enhancements will help foster investment which will facilitate the Destination reaching the projected visitor arrival levels:

- Enhanced attraction management to enhance the cultural experience;
- Augmentation of the cultural experience surrounding Borobudur (cultural villages);
- Sustainable tourism development which involves the local community;
- Integrated platform of information (both online and offline) containing comprehensive information about attractions, transportation, accommodations and activities of the area;
- Improved marketing efforts (to attract broader international markets, increase ALOS and daily spend);
- Infrastructure enhancement such as in waste management, sewage treatment and health care; and
- Destinations should have low crime rates, high security and a positive status amongst domestic and international visitors and the media.

16.3 LEGAL & REGULATORY ENVIRONMENT ENHANCEMENTS

The following legal and regulatory environment enhancements will also help foster investor confidence and drive both domestic and foreign investment to the Destination:

- Continual improvement in providing a transparent and simple investment procedure;
- Regulations to enforce tourism-related stakeholders to be conscientious about sustainability;
- Zoning regulations and enforcement around the attractions to maintain Destination integrity;
- On-going support to potential investors by 1) simplifying registration process, 2) provide more comprehensive guides and parameters regarding legal frameworks and tax incentives, 3) security of tenure for investors; and
- Regulations to encourage the prioritization of the local work force to help build communities.

16.4 SME DEVELOPMENT INTERVENTIONS

For forecasts to be met, there must be a significant increase in businesses serving the tourism sector, many of which will be small and medium enterprises (SMEs). They will deliver services supporting the larger investments. To encourage sufficient SME development to meet the demand the GoI may need to mobilize assistance specifically targeted at SMEs.

In Indonesia, according to data from the Kementerian Koperasi dan Usaha Kecil dan Menengah, SMEs account for 99.99% of the total number of existing businesses, employ 97% of the labor force, contributing 57 % of the country's GDP[28]. SMEs are integral to the success of a destination, as they play significantly role in creating local employment and engaging local people in tourism industry, with the potential to foster long-term and sustainable economic development.

However, SMEs are more financially constrained than larger firms, which hinder their development.

16.4.1 OPPORTUNITIES FOR SME IN THE DESTINATION

This vision for the Destination provides opportunities for SMEs in the following business areas:

- Small hotels & homestays operated by local people to cope with increasing arrivals;
- Art galleries showcasing local culture and artwork;
- Handicraft workshops where visitors can learn to make traditional crafts and purchase souvenirs;
- Specialist tour guides for Borobudur, Prambanan and for the Kota Yogyakarta attractions;
- Retail, both shop front and online platforms, for the sale of local handicrafts and attractions' branded souvenirs in nearby cities such as Solo and Semarang;
- Regular bazaars for the various home industries to sell and showcase their work;
- Travel agencies focusing on the key attraction clusters and surrounding destinations; and
- Borobudur Cluster: quality restaurants serving local cuisines and snacks.

[28] Global Business Guide: "Indonesia's Microfinance Sector Overview: Key Component for Sustainable Growth"

16.4.2 POSSIBLE SME DEVELOPMENT INTERVENTIONS

Our research has uncovered many different SME support programs used nationally and the following section will outline a few of these programs that could be implemented in Borobudur.

The Ministry of Cooperatives and Small and Medium Enterprises undertakes, amongst other things, the following 2 programs to encourage the development of SMEs:

- Kredit Usaha Rakyat (KUR) is the main program of the Usaha Kecil dan Menengah (Small and Medium Sized Enterprise) function of the Ministry. The KUR (low interest rate program) is currently offering loans at 9% which is understood to be the best effective rate in the market.
- Beginner's entrepreneur program / training course is also currently being implemented. The program being developed is funded by the federal government with a budget of IDR 100 billion. Beginner entrepreneurs (SMEs) will receive business licenses for export (manufacturing) and retail at no cost.
    - The program started in 2015 offering tourism training courses. Select courses were introduced in 2016 and in 2017 they intend to increase the number of courses. In 2016, the program ran a human resource development for tourism course in Bali.
    - They are developing further courses for tour guides, home stay and other tourism entrepreneurs.
    - Bandung and Yogyakarta are planned as the next course locations.
    - The program aims to encourage 2% (4.6 million) of Indonesians to become entrepreneurs.

TWC and UNESCO are also active in helping the local inhabitants to set up tourism-related business. For instance, TWC is setting up an economic center in each village in the Borobudur area according to the specialty of the specific village. Each economic center will help coordinate tourism activities in the village (internal transportation, workshops, sightseeing, F&B service, accommodation, festival and events, etc.).

Besides giving support for infrastructure and training, TWC also manages the revenue gained and reinvests it into the economic center. TWC is committed to helping the development of these economic centers until they can be independently run and self-sufficient. Villagers are encouraged to set up tourism-related businesses related to their specialties to bring out the uniqueness of the area.

TWC is also trying to preserve the local culture by protecting the ownership of the land. In the past, investors from other cities have bought the land easily from the locals. TWC is encouraging villagers to make good use of their land such as developing homestays and thus indirectly discouraging the selling of their land (and ensuring long term cash flow). As a result, it may be harder for non-local investors to buy land in the area.

TWC and UNESCO also provide sponsorships for the local community to start or improve their tourism related businesses.

Other possible SME development interventions include:

- Development of community co-operatives (e.g. village co-operatives for cultural villages) to improve efficiency through shared access to management and development systems and product supply lines such as pooling resources, reservation systems and marketing activities. Village co-operatives could be funded to create an online platform displaying the various activities, events, routes and accommodations of the cultural villages which can be accessed by both FITs and tour operators for enquiries and reservations.
- SME Training Support for the local communities:
  - Hospitality training on service, language skills, hygiene, culinary and use of information technology for locals at the cultural villages.
  - Production of high quality handicrafts using traditional skills, patterns and local materials (bamboo, cane, stones, silver, or even volcanic ash) which would increase the local products appeal to visitors.
- Recruiting and retaining young talent is a challenge for SMEs, particularly in smaller towns in Kab. Magelang however a steady flow of fresh talent is critical to the future success of SMEs. Options to encourage young talent include:
  - Study awards covering tuition fees, allowances, a sign-on bonus and job opportunities can be introduced by local schools to encourage students to join SMEs upon graduation; and
  - Government supported internship programs. Internship program in accommodation or tourist facilities in the Borobudur area can be launched for tourism university students in Yogyakarta to bring in more dynamic and new ideas to the destination.
- Government support schemes to minimize various types of pollution such as water and air pollution as well as solid wastes. There is also a push across Indonesia to improve energy efficiency so as to support a more sustainable tourism industry.
- Government programs for infrastructure that supports SME development such as:
  - Basic infrastructure e.g. power and water;
  - Childcare services; and
  - Public facilities such as footpaths, parks and public transport.

16.5 KEY RECOMMENDATIONS FOR TRANSPORT INFRASTRUCTURE INVESTMENT

The key recommendations on investments needed for transport infrastructure are presented below.

Road Infrastructure

External Access

Yogyakarta is a destination base where most visitors arrive and stay overnight. From Yogyakarta, both Borobudur and Prambanan Temple can be accessed by good quality roads within 1-1.5 hours, which is adequate from a connectivity perspective. However, from a capacity point of view, the roads need to be improved. Expansion of the road network, especially construction of new toll roads between Yogyakarta, Solo and Semarang, is planned for the medium term to improve overall connectivity in this important economic region. Improved overall regional road connectivity will facilitate tourism development, because most domestic visitors arrive by bus or car. Tourism related traffic on these inter regional roads is small compared to overall traffic volume (Joglosemar corridor), and hence, the investment is not needed for these trunk roads from a tourism perspective.

Local Access

Ongoing and planned GOI road improvement plans will facilitate tourism development, but mainly serve the need of overall urban and regional development. The existing roads are comparatively well provided however the main access route Keprekan – Borobudur branching off from Yogyakarta – Magelang National road to Mendut and further to Borobudur is the most important access to Borobudur and needs to be widened and improved as the main access road to Borobudur Temple.

Further to this, it can be seen that access roads to key attractions such as Ratu Boko are connected by gravel roads in deteriorated condition. They need to be improved for tourism promotion and development to revive tourism resources in this region. In view of this, the access road to Ratu Boko, Pawon, Plaosan and Ngawen must be upgraded.

Hence, the roads providing direct access from the main national road network to Borobudur and Prambanan/Ratu Boko temple sites need upgrading and will need investments for improvements in the development of bicycle lanes, footpaths, parking facilities, and landscaping.

Railway Infrastructure

There is good track maintenance for Ambarawa – Bedono, which is used for tourism excursions. Additionally, there is a proposal to reactivate the track from Ambarawa – Magelang – Yogyakarta which will be connected to the future airport at Kulon Progo providing alternative options to travel to Borobudur by rail. However, investment in railway facilities for the track from Ambarawa – Yogyakarta is not needed from a tourism perspective as there is a plan to construct a toll road in the immediate future facilitating convenient and faster commutes for visitors.

Airport Infrastructure

From the 3 airports within the study boundary, the majority of international flights scheduled from and to the Destination are to Adi Sucipto Airport in Yogyakarta. However, the airport is already operating beyond its intended capacity, and urgent capacity improvement is needed.

The construction works at Kulon Progo airport are presently in progress, with phase 1 of the airport planned to handle 14 million passengers by 2019 and with an ultimate capacity of around 20 million passengers per year by 2041. As per the forecast air passenger demand, phase 1 of the Kulon Progo airport will be adequate to handle the air passenger demand in the Destination and no investments will be needed from a tourism perspective.

Sea Port Infrastructure

As the existing port infrastructure at Tanjung Emas Port is adequate to handle the estimated cruise capacity, no investments will be needed for port improvement.

16.6 KEY RECOMMENDATIONS FOR BASIC INFRASTRUCTURE INVESTMENTS

Ensuring hygienic conditions and a clean environment is a prerequisite for tourism development. The provision of adequate basic services, especially water supply, waste water and solid waste management is not yet up to standard in Borobudur. The population of Yogyakarta is far better served, but improvement and upgrading of existing facilities are required.

- Wastewater, sanitation, and solid waste management is insufficient in Kab. Magelang Kec. Borobudur. Kota Yogyakarta has better coverage, but improvement works must be carried out, considering the importance of tourism to this specific region. Wastewater and solid waste generation are less than 5% of total generation in Kab. Magelang, but could reach as high as 35% in Kota Yogyakarta. Investments will be needed to resolve current deficiencies in wastewater, sanitation, and solid waste management for the resident population in key tourism areas will need investments for improvements in solid waste management.
- About 90% of the population in Kab. Magelang and 50% of the population in Kota Yogyakarta have no access to piped water services. Water demand for tourism activities is less than 5% in Kab. Magelang. The ratio is much higher in Kota Yogyakarta, close to 35%. 100% piped water supply is essential at Kota Yogyakarta due to its highly concentrated hotels and accommodations and almost equal demand compared to domestic usage. Investments will be needed to improve water coverage in the key tourism areas.
- Improvements in power supply and telecommunications infrastructures is required to provide better and more reliable service, and to cater for the potential demand growth, however, these are not hampering further tourism development.
- Drainage and flood control is not an issue in this destination area. Low lying areas at Kab. Magelang and Kota Yogyakarta experience flash flooding, but this does not impact tourism activities.

16.7 RECOMMENDATIONS FOR MASTER PLANNING

16.7.1 EXISTING SPATIAL MASTER PLANS & REGULATORY FRAMEWORK

To ensure sustainable urban growth and tourism development, it is important to have a detailed spatial plan and development guidelines for tourism attractions where the development pressures are increasing at a rapid pace.

Indonesia has an established system for spatial planning and most of the destinations have a spatial plan from the Regency, Province or the City. As per the national Spatial Planning Act (Law No. 26/2007 amends Law No. 24/1992), the provincial governments and district governments (kabupaten and kecamatan) are authorized to implement spatial planning. The Rencana Tata Ruang Wilayah (RTRW) and the Rencana Detail Tata Ruang (RDTR) are the two major spatial plans prepared at the regional level (Province and Regency) and local level (Districts or Special Areas within Regency and Kota) respectively.

While the RTRW serves as the Concept Spatial Plan providing broad directions for Provinces or Regencies, the RDTR serves as the Detailed Spatial Plan indicating detailed land uses such as residential uses by density, commercial uses, mixed uses, government uses, industrial uses, social facilities, etc, for the City or other special areas within the Regency.

The RTRW is managed by the Provincial or Regency level Bappeda. It has been observed that the RTRW is prepared for the time horizon of 20 years. It is important to review the Spatial Plans considering the changing socio-economic conditions and infrastructure needs, including new tourism targets and plans. As discussed in the previous sections on Transport Infrastructure and Basic Services Infrastructure, there are several individual sector plans being prepared by the respective authorities, some of which are critical; while others such as proposed reactivation of rail infrastructure are not needed from a tourism perspective as there is a plan to construct a toll road in the immediate future facilitating convenient and faster commutes for visitors.

Based on the infrastructure needs assessment, the critical plans need to be incorporated into the revised RTRW. This will remove duplication and provide unified planning direction to the respective implementing agencies to execute development programs towards the common vision and goals.

This section assesses the availability of spatial plans and regulations to ensure that the tourism assets are protected. Heritage being the main tourism asset in the Destination, it is critical to have regulation ensuring protection of heritage areas.

Following is the status of RTRW and other key regulatory Spatial Plans available for the Destination.

- The RTRW is available for Jawa Tengah (2009-2029) and DI Yogyakarta (2009-2029), hence providing broad spatial directions for identified key attractions in Borobudur and the surrounding areas; Prambanan area; and Kota Yogyakarta. The RTRW is also available for Kab. Magelang (2010-2030), Kota Yogyakarta (2010-2029), Kab. Klaten (2011-2031), and Kab. Sleman (2011-2031).

- In addition to RTRW, there exists a Borobudur Spatial Plan for the Borobudur area and surrounding under the Presidential Decree No. 58 Year 2014. The spatial plan is an operational and coordination tool with respect to the Province and Regency RTRW, to ensure the preservation of Borobudur area as a national and world cultural heritage site.
- At the point of study, there is no approved RDTR for Borobudur, Prambanan (Sleman and Klaten Regencies), and Kota Yogyakarta. In the absence of such Detailed Spatial Plan, there could be some inaccuracies in boundaries, especially with regards to the protected area delineations. RDTR is also essential to regulate urbanization, especially in tourist attraction areas and their immediate surroundings.

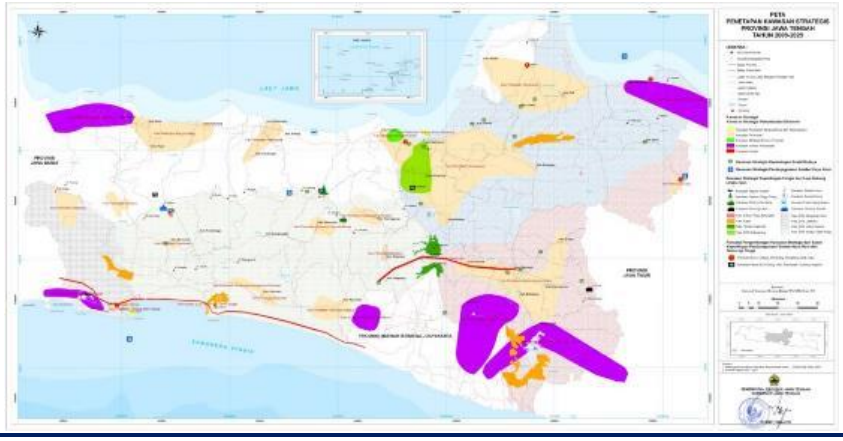
Further to these spatial plans other heritage initiatives include Heritage Area Management Zones and Regulations; UNESCO's Monev study to regulate Borobudur heritage; relocation of parking and vendors in Borobudur (ongoing study by TWC); and Prambanan Temple Local Area Plan.

This key spatial plans and heritage initiatives are explained further below.

16.7.2 RENCANA TATA RUANG WILAYAH (RTRW) JAWA TENGAH MASTER PLAN 2009-2029

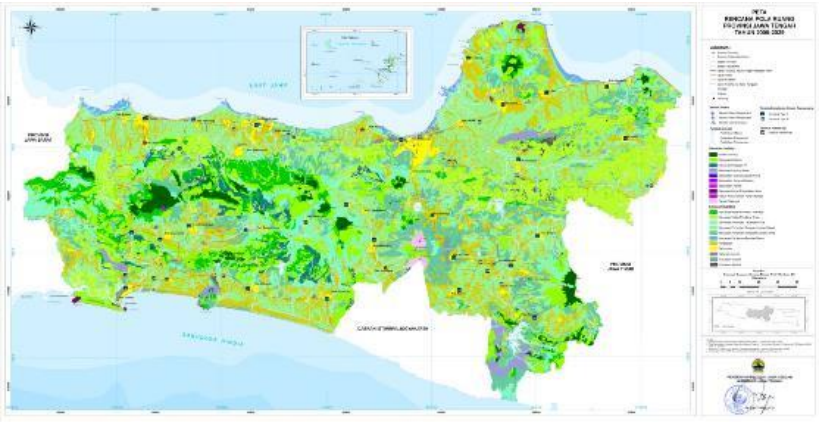
- The RTRW Jawa Tengah Master Plan (Figure 146) is the regional level spatial plan prepared for Jawa Tengah. It provides broad directions on development structure with strategic areas for urbanization, and infrastructure such as major roads, airports, and ports within the province. One key proposed connectivity includes the Borobudur-Solo road link.
- The plan, as part of local regulation (Peraturan Daerah No. 6 Year 2010), indicates several tourism development zones within the province. In addition, the plan clearly indicates the environmental protection zones such as protected forest and nature conservation areas; as well as the hazard map.
- The plan covers the broad zoning intentions for these zones controlling the permitted activities, minimum green open space needed, and highlighting enforcement mechanisms such as incentives, disincentives and penalties.

FIGURE 145: STRATEGIC AREA MAP FOR JAWA TENGAH 2009-2029



Source: Bappeda Jawa Tengah

FIGURE 146: RTRW MASTER PLAN FOR JAWA TENGAH 2009-2029

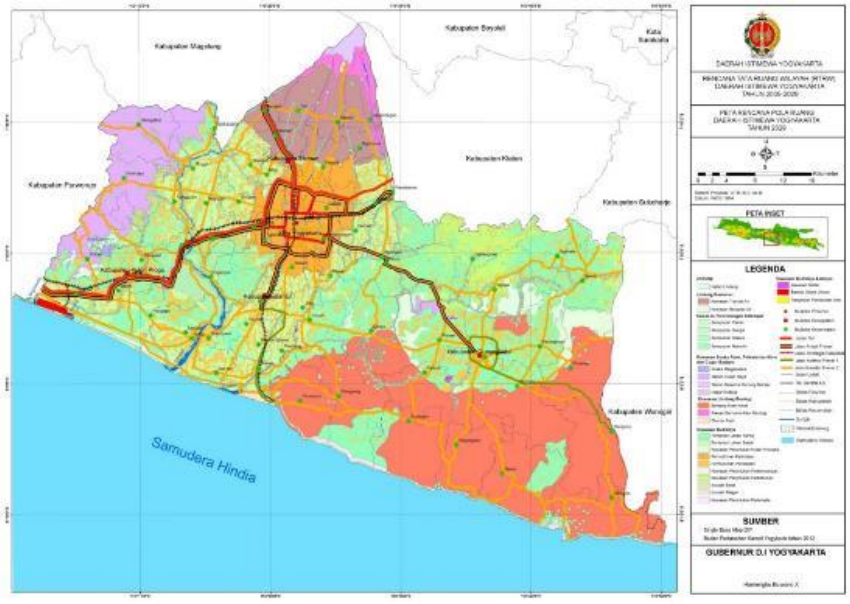


Source: Bappeda Jawa Tengah

16.7.3 RENCANA TATA RUANG WILAYAH (RTRW) DI YOGYAKARTA MASTER PLAN 2009-2029

- The RTRW DI Yogyakarta Master Plan (Figure 147) is the regional level spatial plan prepared for DI Yogyakarta. It provides broad directions on development structure with strategic areas for urbanization, and infrastructure such as major roads, railways and airports within the Province, including the toll road proposed to connect Kulon Progo airport to Borobudur.
- The plans indicate direction and zoning regulations for special regions (referring to Constitution No. 13 Year 2012 and No. 11 Year 2010 regarding cultural heritage). In addition, the plan provides indications as well as classifications of several service centers/hubs within the province.

FIGURE 147: RTRW DI YOGYAKARTA MASTER PLAN 2009-2029

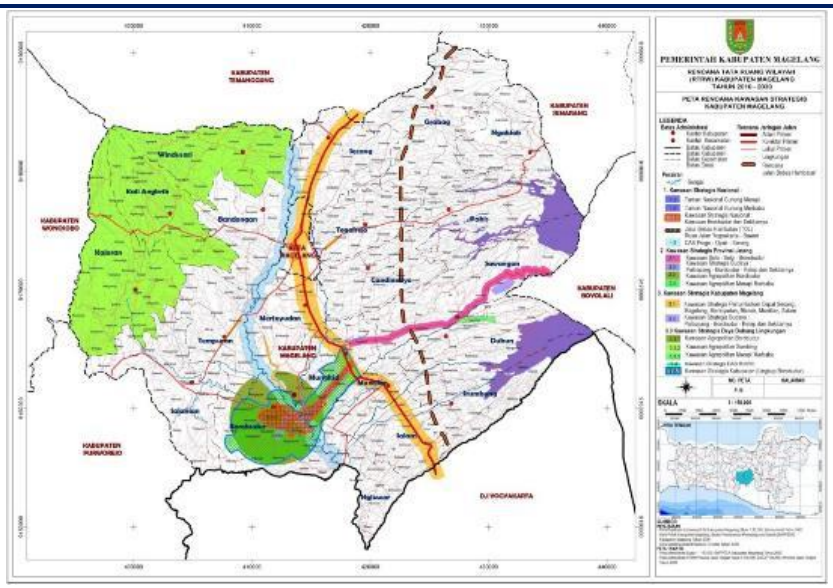


Source: Bappeda DI Yogyakarta website (http://bappeda.jogjaprov.go.id/)

16.7.4 RENCANA TATA RUANG WILAYAH (RTRW) KAB. MAGELANG MASTER PLAN 2010-2030

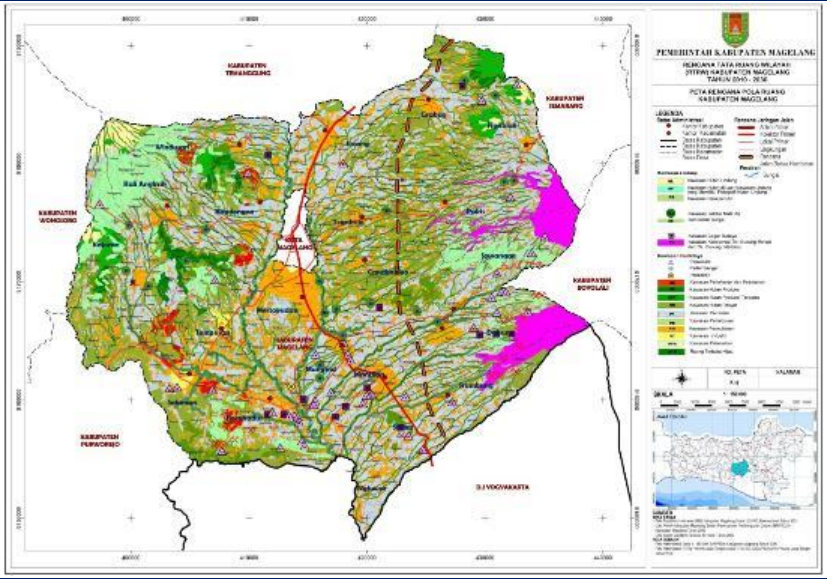
- The RTRW of Kab. Magelang Master Plan (Figure 149) is the regional level Concept Spatial Plan prepared for Kab. Magelang. It provides broad directions on development structure with strategic areas for urbanization, and infrastructure such as major roads and public transports within the regency; part of Magelang Regent Decree no. 5 year 2011 (dated 14 July 2011).
- The plan also indicates clearly national strategic zones such as national parks, 'agro-politan' areas, strategic corridor areas, etc. Further to this, the plan covers the broad zoning intentions for these zones regulating the permitted activities.
- The Kab. Magelang Master Plan shows the intentions of province level RTRW to connect Borobudur and Solo, and the Highway (Toll Road) connecting Kulon Progo airport to Borobudur and further to existing Ambarawa-Semarang Highway. The plan further puts emphasis on connectivity between the Borobudur National Strategic Area and the existing Semarang-Yogyakarta development corridor.

FIGURE 148: STRATEGIC AREA MAP FOR KAB. MAGELANG 2010-2030



Source: Bappeda Kab. Magelang

FIGURE 149: RTRW MASTER PLAN FOR KAB. MAGELANG 2010-2030

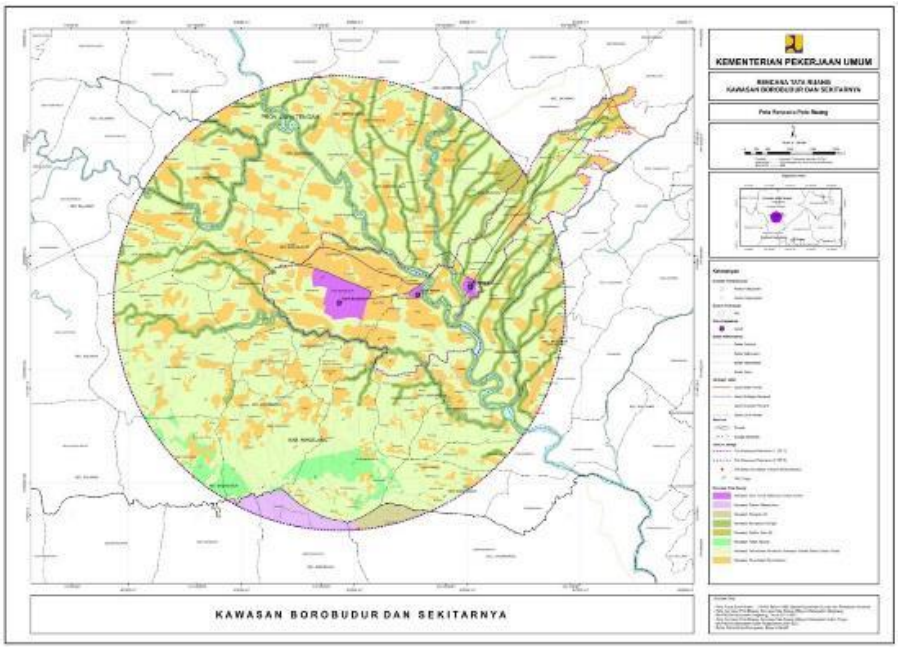


Source: Bappeda Kab. Magelang

16.7.5 BOROBUDUR SPATIAL PLAN

- The plan (Figure 150) indicates the heritage area and provides direction for this area on land use intensity; the maximum percentage of building footprint; the minimum green open space area; the maximum building height, the building character and the minimum infrastructure needs to be provided. Besides this, the plan covers the broad zoning stating the development intentions and regulating the permitted activities.

FIGURE 150: BOROBUDUR SPATIAL PLAN



Source: Bappeda Kab. Magelang

16.7.6 HERITAGE AREA MANAGEMENT ZONE AND REGULATION

The Indonesian government established five management zones for Borobudur (with the support of UNESCO and Japan International Cooperation Agency (JICA)). The overall zone spreads over 15,000 square meters (Figure 7).

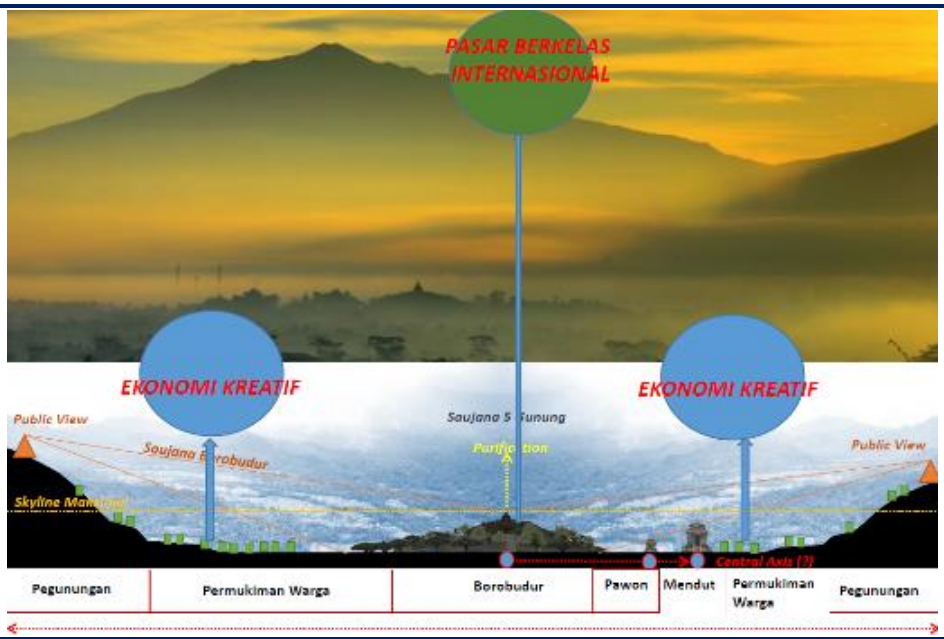
- Zone I covers an area with a radius of 100 to 300 meters from the main temple, and consists of the three temples and obliges the Ministry of Education and Culture to protect and maintain the physical state of the temples.
- Zone II with a radius of up to 2.5 kilometers is the area where tourism, research and conservation activities are carried out. This area is managed by a state-owned institute PT. Taman Wisata Candi Borobudur, Prambanan and Ratu Boko.
- Zone III-V is the area beyond 2.5 kilometers from the temple, where any planning, usage or development has to be monitored and managed by the Kab. Magelang.

16.7.7 MONEV ONGOING STUDY TO REGULATE BOROBUDUR HERITAGE

- Based on Monitoring and Evaluation (Monev) by UNESCO (April 2003 and February 2006), there are several critical issues within the Borobudur area including development pressures from BTS tower, uncontrolled vendors around the property, and a lack of institutional coordination.[29]
- Based on Presidential Decree No. 58 / 2014, the National Strategic Area needs to control the building character, permitted activities, building height, green coverage, plot ratio, etc for all developments within this area.
- Within Presidential Decree No. 58 / 2014, the regulation on Borobudur landscape view "Pusaka Saujana" (cultural landscape heritage) is to be enforced. Located within Kawasan Strategis Nasional (KSN) or National Strategic Area, and within the landscape view regulation, one of the objectives is to control the spatial use of Borobudur temple which ensures the harmony in the preservation and development of the world cultural heritage region (Figure 151). Hence, it has been recommended limiting structures within Borobudur Area or to camouflage them.

[29] *Source: Bappeda Java Tengah, presentation FGD to develop Borobudur Tourism Area (held at Yogyakarta, 25 May 2016)*

FIGURE 151: BOROBUDUR LANDSCAPE VIEW "PUSAKA SAUJANA"



Source: Data from Bappeda Kab. Magelang, received on the 24 October 2016

16.7.8 RELOCATION OF PARKING AND VENDOR IN BOROBUDUR (ONGOING STUDY BY TWC)

- The other initiative that falls within Presidential Decree No. 58 / 2014, is the separate Detailed Planning Study being undertaken by PT. Taman Wisata Candi (TWC), to look into the relocation of vendors and car park locations from Zone 2. The study is in the process of identifying new locations for these existing vendors and car parks.

16.7.9 PRAMBANAN TEMPLE (LOCAL AREA PLAN)

- Several development programs are under study by PT Taman Wisata Candi (TWC) to improve tourism activity, such as Keraton Ratu Boko (Palace) circular path; Prambanan – Boko – Ijo road corridor; construction of Prambanan – Boko cable car; Opak River retaining wall and bridge construction Kowang Taman Martani; Prambanan road junction traffic improvement; restructuring Prambanan Peace Park; restructuring northern tourism corridor; and construction of World Heritage Museum at Bogem.[30]

16.7.10 GAPS & NEEDS FOR IMPROVEMENT IN SPATIAL PLANNING FRAMEWORK

Figure 152 provides the summary of key gaps and improvements needed in spatial planning framework.

FIGURE 152: GAPS IN SPATIAL PLANNING FRAMEWORK, BOROBUDUR TOURISM DESTINATION

Existing Plans	Assessment	Gaps /Needs for Improvement
Concept Spatial Plans - RTRW Jawa Tengah Master Plan (2009-2029) - RTRW DI Yogyakarta Master Plan (2009-2029) - RTRW Kabupaten Magelang (2010-2030)	- The RTRW Province and Regency Master Plan provides broad directions on development structure and broad level land uses including identification of strategic focus areas.	- RTRW for Kab. Magelang, Kota Yogyakarta and Prambanan Temple area needs to be reviewed based on tourism demand, rationalized infrastructure needs, and detailed socio-economic assessments.

[30] *Source: Presentation material from Mr. Pujo Suwarno (TWC), presented in Coordination Meeting of Regional Development of Integrated Tourism together with the Government of Kab. Sleman (at Prambanan, 22 June 2016)*

Existing Plans	Assessment	Gaps /Needs for Improvement
- RTRW Kota Yogyakarta (2010-2029) - RTRW Kabupaten Klaten (2011-2031) - RTRW Kabupaten Sleman (2011-2031) - Borobudur Spatial Plan (Presidential Decree No. 58 Year 2014)	- The Borobudur Spatial Plan for the planning area is with respect to RTRW and provides broad development guidelines for heritage area (e.g. ground coverage, building height, etc and the permitted activities)	- Borobudur Spatial Plan needs to be reviewed based on tourism study.
Detailed Spatial Plans - Heritage Area Management Zone and Regulation - Ongoing individual studies such as Monev, and Relocation of Vendors and Car Park from Zone II	- There is no approved RDTR known for key tourism areas. - There is heritage regulation for management and protection of heritage area.	- Detailed Spatial plans will be needed for Borobudur Spatial Planning Area including detailed heritage and/or other specific guidelines for the heritage area. Detailed Spatial Plans will also be needed for Prambanan and Kota Yogyakarta.

- RTRW Province and Regency Master Plans are the major spatial plans for Borobudur and surrounding areas identifying areas that could be urbanized, national strategic areas and eco-sensitive zones for environmental protection. It is important to review the RTRW such that it addresses the tourism demand and related infrastructure needs, along with the future socio-economic potential of the Destination. The reviewed RTRW will help to establish common goals for all implementing agencies to execute the respective sector development plans.
- There is a Borobudur Spatial Plan in place following the RTRW directions for the entire Planning Area and regulating broadly the development in the heritage areas within the Borobudur Planning Area. The Borobudur Spatial Plan along with RTRW needs to be reviewed based on the tourism studies. However, this plan is not as detailed as the RDTR.
- There is national law for protection of Borobudur Cultural landscape, and some detail studies are ongoing. However, there is no detailed plan or RDTR to guide the development (including ancillary developments) in the Borobudur heritage area and the surrounding Borobudur areas. The RTRW and the Borobudur Spatial Plan only provides broad directions for spatial planning with limited control parameters and is not enough to regulate the development especially in the heritage area. There is a need to prepare RDTR for Borobudur spatial planning area, demarcating the clear boundaries of protection areas and providing detail guidelines to regulate the urban development.
- RDTR will also be needed for other key tourism areas including Prambanan and Kota Yogyakarta.

16.7.11 RECOMMENDATIONS FOR SPATIAL PLAN

In the broader context of spatial planning for Borobudur, there is provincial and regency level planning framework to guide the physical development in the Study Boundary. There is also a national regulation to protect the Borobudur Heritage Area that has been designated as National Strategic Area. Further to these plans and regulations, there are other separate studies undertaken by Monev and TWC to protect the heritage area. However, there is no RDTR or detailed Heritage Area Master Plans for the Borobudur Planning Area (boundary as identified for Borobudur Spatial Plan).

It is important to update the Borobudur Spatial Plan based on the latest tourism demand, rationalized infrastructure needs and the potential socio-economic scenario. Hence, the Spatial Plan will need to consider tourism demand incorporating the environmental strategies, land use, transport, utilities infrastructure plans, and heritage strategies that are being planned and identified as needed.

Equally important is the Detailed Spatial Plans (RDTR) especially looking into the preservation of specific heritage area/precincts guiding the supporting development such that it safeguards the character of the heritage zone and its vicinity from the repercussions of unmanaged growth of tourism and urbanization. Such detailed plans will be needed for urban /tourist areas in Key Tourism Kecamatans. These include:

- The Borobudur Cluster (The Borobudur Temple, Pawon Temple, Mendut Temple, Punthuk Setumbu, Bukit Rhema and surrounding cultural villages) covering Kec. Borobudur and Mungkid in Kab. Magelang (Jawa Tengah);
- The Prambanan-Boko Cluster (The Prambanan Temple and Ratu Boko) covering Kec. Prambanan in Kab. Sleman (in DI Yogyakarta) and Kec. Prambanan in Kab. Klaten (Jawa Tengah); and
- The Yogyakarta Cluster (Keraton, Water Castle, Malioboro Shopping Street) covering Kecamatans Keraton, Gondomanan, Ngampilan, Gedongtengen, Danurejan and Kotagede in Kota Yogyakarta.

A detailed spatial plan shall promote and guide the developers and land owners on the intended local urban development through detailed zoning and development control regulations for different types of development zones, and suggest special heritage regulations for the heritage area/ precincts. The scope of Detailed Spatial Plan (RDTR) shall cover the following:

- Local Level Land Use Plans including clear delineation of heritage areas/precincts for conservation and protection of built, cultural and natural heritage; and clear zones for residential uses, commercial uses and public facilities (including tourism facilities);
- Transportation Plans including Road/ Rail network, public transport, parking plans and provisions of non-motorized transport including heritage trails;
- Infrastructure Plans including water supply, power supply, and storm water management and solid waste management strategies; and
- Zoning Plans and development guidelines regulating different types of developments in supporting tourist areas. Further special heritage regulations for key heritage areas/precincts will help to regulate intended development identity and character of the heritage area/precincts.

APPENDIX I: AIRPORT CAPACITY ANALYSIS

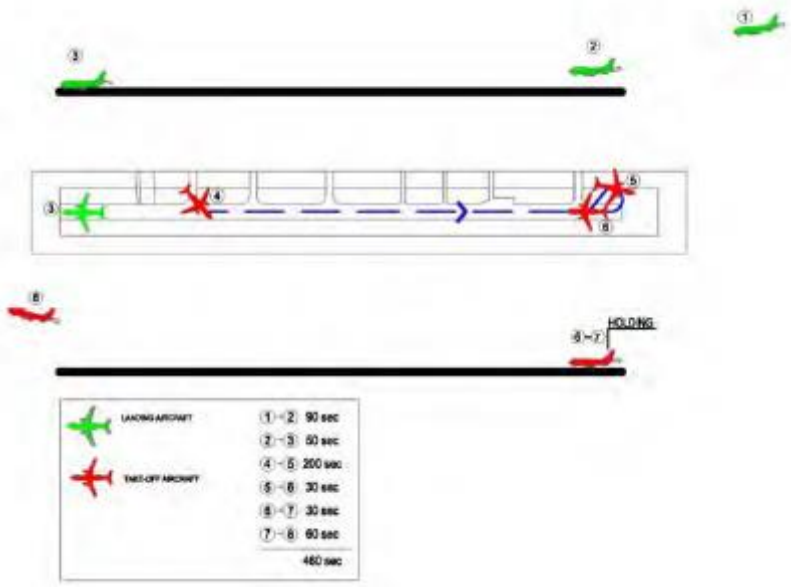
Adi Sucipto Airport, Yogyakarta

Possible Hourly Aircraft Movements

Adi Sucipto airport has a parallel taxiway; and hence, the landing aircraft do not need to run up to the end of the runway, turn at the turn pad and taxi along the runway up to the exit taxiway. Similarly, departing aircraft will not need to taxi along the runway, turn at the turning pad and start for take-off. Since departing and landing aircraft occupy the runway for a long time, with parallel taxiway the runway capacity increases.

As shown in the Figure 153, a benchmark from the Halim Airport the runway occupancy time by landing and departing aircraft is calculated at approximately 260 seconds (removing sequence 4-5). As a result, assuming that the situation in which a departing aircraft follows a landing aircraft is continuous, the hourly runway capacity is calculated at approximately 22 movements (assumed 80% declared capacity for civil aircraft operation).

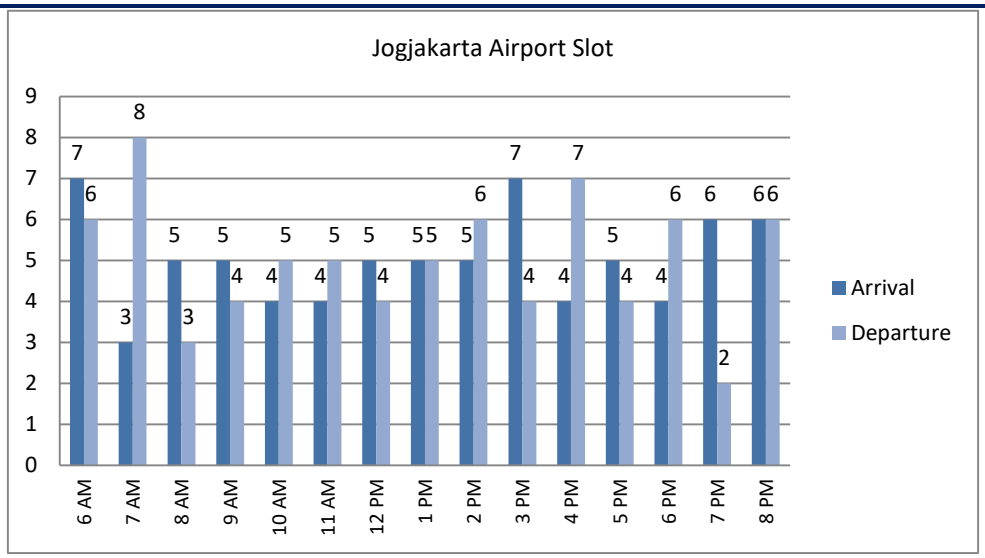
FIGURE 153: SINGLE RUNWAY OCCUPANCY TIME



Source: Survey from Halim Airport Runway Occupancy Time (JICA, 2012)

Existing peak-hour aircraft movements for the airport is not available; however, existing aircraft slots information based on the flight schedule is a good basis for reference. Therefore, daily aircraft movement information obtained from the flightradar24.com was used for the analysis.

FIGURE 154: ADI SUCIPTO INTERNATIONAL AIRRPORT – AIRPORT SLOT



Source: Flightradar24.com accessed on 10th October 2016

Based on the above information, the predicted existing peak-hour aircraft movements at Adi Sucipto airport is approximately 13 movements. This information indicated that the existing runway capacity is adequate and able to cater the current movement of the aircraft.

The data has a limitation which does not depict the actual peak season of airlines operated at the airport as the movement of departure and arrival presented here is less than ten aircraft per hour. However, this data can be used to determine the percentage of time windows for typical airlines slot movements.

As seen from the above figure, most of the slots are distributed evenly for entire time windows, of which 8 hours windows considered as the peak movement. Based on this, hourly runway capacity will be converted to daily runway capacity by multiples of 8 ($\geq$ 10 aircraft movement). The annual capacity of aircraft movement based on the current operation is estimated to be 64,240 aircraft.

Achmad Yani Airport

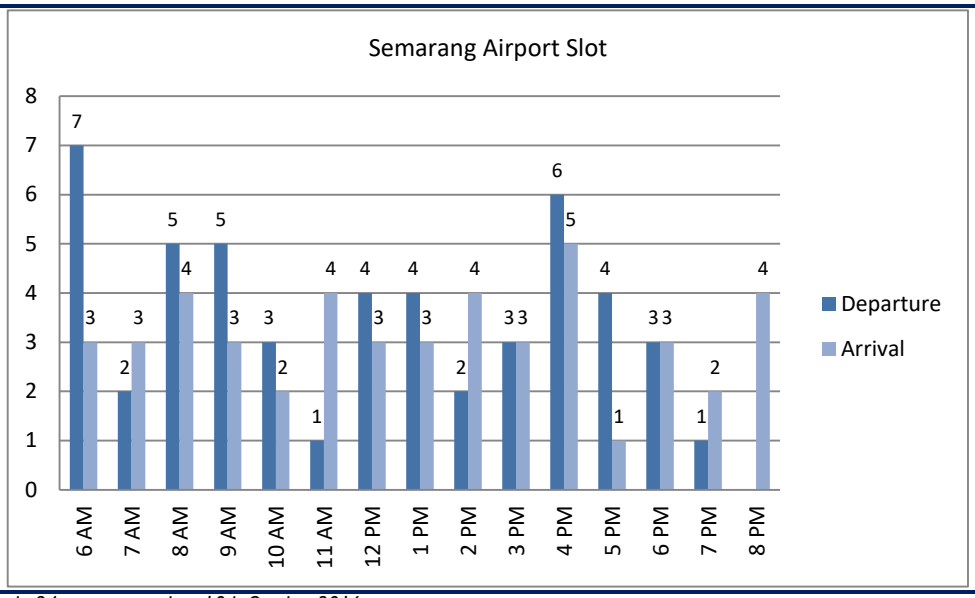
Possible Hourly Aircraft Movements

Since Achmad Yani airport does not have a parallel taxiway similar to Halim Airport in Jakarta, landing aircrafts need to run up to the end of the runway, turn at the turn pad and taxi along the runway up to the exit taxiway. Similarly, departing aircrafts will taxi along the runway, turn at the turn pad and start for take-off. Since departing and landing aircrafts occupy the runway for a long time, the runway capacity decreases.

As shown in figure, the runway occupancy time by landing and departing aircrafts is calculated at approximately 460 seconds. As a result, assuming that the situation in which a departing aircraft follows a landing aircraft is continuous, the hourly runway capacity is calculated at approximately 16 movements.

By using similar approach, the predicted existing peak-hour aircraft movements are obtained from the real time database and calculated at approximately 11 movements. This indicated that the existing runway capacity is adequate for the immediate future.

FIGURE 155: ACHMAD YANI INTERNATIONAL AIRPORT – AIRPORT SLOT



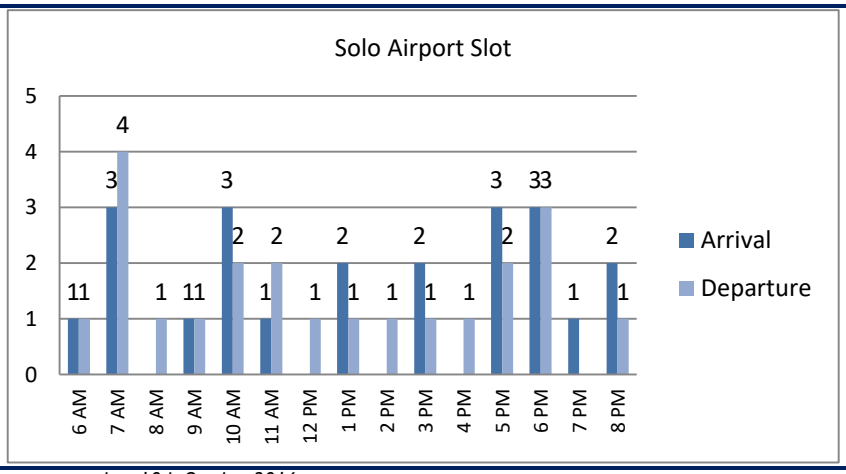
Source: Flightradar24.com accessed on 10th October 2016

Adi Sumarmo Airport

Possible Hourly Aircraft Movements

Since Adi Sumarmo airport does not have a parallel taxiway similar to Halim Airport in Jakarta, the runway occupancy time by landing and departing aircrafts is calculated at approximately 460 seconds. As a result, assuming that the situation in which a departing aircraft follows a landing aircraft is continuous, the hourly runway capacity is calculated at approximately 16 movements.

FIGURE 156: ADI SUMARMO AIRPORT – AIRPORT SLOT



Source: Flightradar24.com accessed on 10th October 2016

The predicted existing peak-hour aircraft movements are calculated at approximately 7 movements. This indicated that the existing runway capacity is very sufficient, and not required to upgrade the current infrastructure.

APPENDIX II: ROAD CAPACITY ANALYSIS

1. General Traffic Volume

Future traffic volume for general Traffic is estimated by using following method;

$$Traffic\ Volume\ in\ 2021 = Traffic\ Volume\ in\ 2015\ x\ \frac{Number\ of\ registered\ vehicles\ in\ 2021}{Number\ of\ registered\ vehicles\ in\ 2015}$$

$$Traffic\ Volume\ in\ 2041 = Traffic\ Volume\ in\ 2015\ x\ \frac{Number\ of\ registered\ vehicles\ in\ 2041}{Number\ of\ registered\ vehicles\ in\ 2015}$$

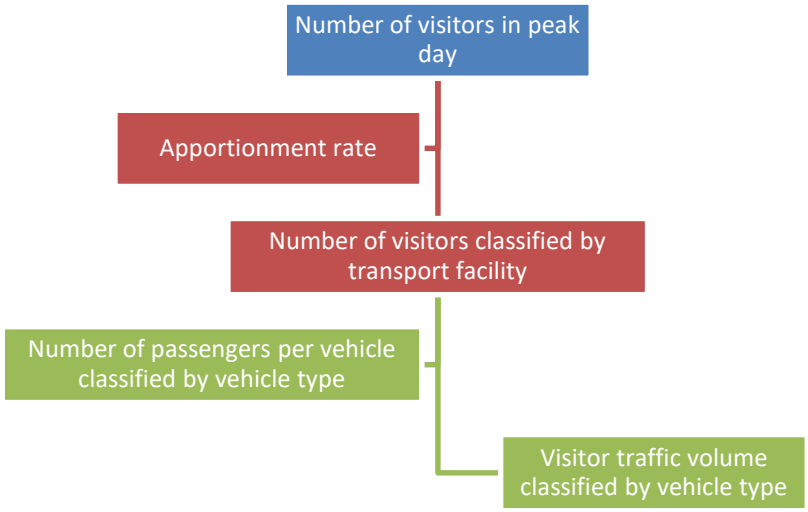
2. Visitor's Traffic

The traffic volume is estimated as follows:

- Obtain the number of visitors who enter each tourism destination and potential visitor's distribution around the destination.
- Distribute the number of the visitors in each transport facility.
- Based on the number of passengers per vehicle, the total visitors traffic volume is estimated.

Figure 157 illustrates the methodology of visitors' traffic volume estimation.

FIGURE 157: FLOWCHART OF VISITOR TRAFFIC VOLUME ESTIMATION



Source: Surbana Jurong

3. Road capacity is reviewed and calculated with the following formula.

A $$C = C_o \times FC_w \times FC_{sp} \times FC_{SF} \times FC_{CS}$$

C	capacity (PCE/hour)
C_o	free flow capacity (PCE/hour)
FC_w	link width capacity factor

FC_{SP} link separated capacity factor

FC_{SF} side friction capacity factor

B Free Flow Capacity (Co)

No	Type	Urban Co (PCE/hour)	Inter-urban	Notice
1	4 Lanes Divided or one way	1650	1900	each lane
2	4 Lanes undivided	1500	1700	each lane
3	2 Lanes undivided	2900	3100	all lanes

C Link Width Capacity Factor (FCw)

Type	**Width (m)**	**FC_W**		**Remark**
4L D or one way	3	0.92		Width for each line
	3.25	0.96		
	3.5	1		
	3.75	1.04		
	4	1.08		
4L UD	3	0.91		Width for each line
	3.25	0.95		
	3.5	1		
	3.75	1.05		
	4	1.09		
2L UD	5	0.56		Width mean for whole segment
	6	0.87		
	7	1		
	8	1.14		
	9	1.25		
	10	1.29		
	11	1.34		

D Link Separated Capacity Factor (FCsp)

FC_{SP} (%-%)	50-50	55-45	60-40	65-35	70-30
2/2	1	0.97	0.94	0.91	0.88
4/2	1	0.985	0.97	0.955	0.94

E Side Friction Capacity Factor Value for Road with Shoulder

Road Type	Side Friction Category	FC_{SF} Shoulder Wide (m) 0,5	1,0	1,5	2,0
4/2 D	VL	0,96	0,98	1,01	1,03
	L	0,94	0,97	1,00	1,02
	M	0,92	0,95	0,98	1,00
	H	0,88	0,92	0,95	0,98
	VH	0,84	0,88	0,92	0,96
4/2 UD	VL	0,96	0,99	1,01	1,03
	L	0,94	0,97	1,00	1,02
	M	0,92	0,95	0,98	1,00

	H	0,87	0,91	0,94	0,98
	VH	0,80	0,86	0,90	0,95
2/2 UD	VL	0,94	0,96	0,99	1,01
	L	0,92	0,94	0,97	1,00
	M	0,89	0,92	0,95	0,98
	H	0,82	0,86	0,90	0,95
	VH	0,73	0,79	0,85	0,91

Remark:

VL : Very Low
L : Low
M : Medium
H : High
VH : Very High

Side Friction Capacity Factor Value for Road with Curbs

Road Type	**Side Friction Category**	**FC_{SF} Curbs (m)**			
		<0.5m	1.0m	1.5m	>2.0m
4/2 D	VL	0,95	0,97	0,99	1,01
	L	0,94	0,96	O,98	1,00
	M	0,91	0,93	0,95	0,98
	H	0,86	0,89	0,92	0,95
	VH	0,81	0,85	0,88	0,92
4/2 UD	VL	0,95	0,97	0,99	1,01
	L	0,93	0,95	0,97	1,00
	M	0,90	0,92	0,95	0,97
	H	0,84	0,87	0,90	0,93
	VH	0,77	0,81	0,85	0,90
2/2 UD	VL	0,93	0,95	0,97	0,99
	L	0,90	0,92	0,95	0,97
	M	0,86	0,88	0,91	0,94
	H	0,78	0,81	0,84	0,88
	VH	0,68	0,72	0,77	0,82

Remark:

VL : Very Low
L : Low
M : Medium
H : High
VH : Very High

E City Size Factor

Population (in Millions)	FC_{CS}
<0.1	0.86
0.1-0.5	0.9
0.5-1.0	0.94
1.0-3.0	1
>3.0	1.04

FIGURE 158: EXISTING ROAD CAPACITY ANALYSIS

											2015			
Section	Road	Length	Carriageway	Type	Co	Fcw	FCsp	FCsf	FCcs	C	ADT	PCU	Peak	VCR
1	FROM SEMARANG													
48	SECANG - PRINGSURAT	4.54	10.79	2/2 UD	3100	1.29	1	0.89	1.04	3,701	48,670	72,697	7,270	1.96
49	PRINGSURAT - BTS.KEDU TMR/SMG BRT (PRING	9.66	9.32	2/2 UD	3100	1.25	1	0.89	1.04	3,587	36,636	58,975	5,898	1.64
50	BTS. KEDU TMR/SMG BRT - BAWEN (BAWEN -	17.07	8.46	2/2 UD	3100	1.14	1	0.89	1.04	3,271	36,970	57,901	5,790	1.77
90	BTS. KOTA SEMARANG/UNGARAN - BAWEN	11.15	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	59,215	97,365	9,737	1.34
91	JLN. RADEN PATAH (SEMARANG)	1.43	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	48,739	84,617	8,462	1.16
91	JLN. WIDOHARJO (SEMARANG)	0.4	9.00	2/2 UD	3100	1.25	1	0.89	1.04	3,587	39,120	55,265	5,527	1.54
91	JLN. DR. CIPTO (SEMARANG)	2.81	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	41,461	57,553	5,755	0.79
91	JLN. KOMPOL MAKSUM (SEMARANG)	0.7	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	36,884	49,415	4,942	0.68
91	JLN. MT. HARYONO (SEMARANG)	0.88	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	47,189	60,185	6,018	0.83
91	JLN. DR. WAHIDIN (SEMARANG)	2.34	13.00	4/2 D	7600	0.96	1	0.92	1.04	6,981	77,699	103,995	10,399	1.49
91	JLN. TEUKU UMAR (SEMARANG)	0.89	13.86	4/2 D	7600	0.96	1	0.92	1.04	6,981	77,423	112,624	11,262	1.61
91	JLN. SETIA BUDHI (SEMARANG)	3.74	16.00	4/2 D	7600	1	1	0.92	1.04	7,272	67,651	98,763	9,876	1.36
91	JLN. PERINTIS KEMERDEKAAN (JLN. ANTON SU	6.83	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	51,905	126,760	12,676	1.74
91	JLN. GATOT SUBROTO (UNGARAN)	2.88	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	55,314	146,059	14,606	2.01
91	JLN. DIPONEGORO (UNGARAN)	2.82	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	49,550	86,783	8,678	1.19
92	SECANG - BTS. KOTA MAGELANG	5	10.00	4/2 UD	6800	0.92	1	0.92	1.04	5,986	51,427	82,216	8,222	1.37
92	JLN. AHMAD YANI (MAGELANG)	5	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	38,920	56,931	5,693	0.78
92	JLN. ELO SURABAYAN (URIP SUMOHARJO) (MA	2.58	6.62	2/2 UD	3100	0.87	1	0.89	1.04	2,496	29,565	51,893	5,189	2.08
92	JLN. SOEKARNO-HATTA (MAGELANG)	2.55	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	48,980	79,072	7,907	1.09
93	BTS. KOTA MAGELANG - KEPREKAN	8.35	17.74	4/2 D	7600	1.04	1	0.92	1.04	7,563	55,071	92,030	9,203	1.22
2	FROM YOGYAKARTA													
A108	KEPREKAN - BOROBUDUR	9.89	7.25	2/2 UD	3100	1	1	0.92	1.04	2,966	17,658	28,394	2,839	0.96
94	KEPREKAN - BTS. KOTA MUNTILAN	1.18	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	45,962	72,761	7,276	1.00
94	JLN. PEMUDA (MUNTILAN)	3.61	10.00	4/2 UD	6800	0.92	1	0.92	1.04	5,986	70,814	121,550	12,155	2.03
95	MUNTILAN - SALAM (BTS. PROV. D.I. YOGYAK	7.11	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	61,558	94,791	9,479	1.30
15	TEMPEL/SALAM (BTS. PROV. JATENG) - BTS.	7.39	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	23,975	45,280	4,528	0.62
16	BTS. KOTA SLEMAN - BTS. KOTA YOGYAKARTA	5.64	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	65,419	107,116	10,712	1.47
16	BTS. KOTA - SP. JOMBOR (YOGYAKARTA)	2.21	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	52,240	89,383	8,938	1.23
18	JLN. ARTERI UTARA (YOGYAKARTA)	9.95	22.00	6/2 D	11400	1.04	1	0.98	1.04	12,084	83,470	122,275	12,227	1.01
19	JANTI (YOGYAKARTA) - PRAMBANAN (BTS. PRO	9.9	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	83,965	136,274	13,627	1.87
19	BTS. KOTA YOGYAKARTA - JANTI (YOGYAKART	2.09	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	100,300	155,760	15,576	2.14
3	FROM SURAKARTA													
96	KARTOSURO - BTS. KOTA KLATEN	19.69	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	45,586	74,542	7,454	1.03
96	JLN. PERINTIS KEMERDEKAAN (KLATEN)	2.37	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	62,677	95,996	9,600	1.32
96	JLN. DIPONEGORO (KLATEN)	3.03	7.00	2/2 UD	3100	1	1	1	1.04	3,224	27,886	52,089	5,209	1.62
96	JLN. KARTINI (KLATEN)	2.3	7.30	2/2 UD	3100	1	1	1	1.04	3,224	19,556	33,917	3,392	1.05
97	BTS. KOTA KLATEN - PRAMBANAN (BTS. PROV.	10.69	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	18,533	32,351	3,235	0.44
97	JLN. SURAJI TIRTONEGORO (KLATEN)	1.85	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	23,696	42,085	4,209	0.58

FIGURE 159: FUTURE ROAD CAPACITY

											2021				2041			
Section	Road	Length	Carriageway	Type	Co	Fcw	FCsp	FCsf	FCcs	C	ADT	PCU	Peak	VCR	ADT	PCU	Peak	VCR
1	FROM SEMARANG																	
48	SECANG - PRINGSURAT	4.54	10.79	2/2 UD	3100	1.29	1	0.89	1.04	3,701	68,725	102,653	10,265	2.77	132,407	197,773	21,755	5.88
49	PRINGSURAT - BTS.KEDU TMR/SMG BRT (PRING	9.66	9.32	2/2 UD	3100	1.25	1	0.89	1.04	3,587	51,732	83,277	8,328	2.32	99,669	160,442	17,649	4.92
50	BTS. KEDU TMR/SMG BRT - BAWEN (BAWEN -	17.07	8.46	2/2 UD	3100	1.14	1	0.89	1.04	3,271	52,204	81,760	8,176	2.50	100,577	157,519	17,327	5.30
90	BTS. KOTA SEMARANG/UNGARAN - BAWEN	11.15	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	83,615	137,486	13,749	1.89	161,095	264,884	29,137	4.01
91	JLN. RADEN PATAH (SEMARANG)	1.43	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	68,823	119,485	11,948	1.64	132,595	230,202	25,322	3.48
91	JLN. WIDOHARJO (SEMARANG)	0.4	9.00	2/2 UD	3100	1.25	1	0.89	1.04	3,587	55,240	78,038	7,804	2.18	106,426	150,350	16,539	4.61
91	JLN. DR. CIPTO (SEMARANG)	2.81	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	58,546	81,269	8,127	1.12	112,795	156,575	17,223	2.37
91	JLN. KOMPOL MAKSUM (SEMARANG)	0.7	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	52,083	69,778	6,978	0.96	100,343	134,435	14,788	2.03
91	JLN. MT. HARYONO (SEMARANG)	0.88	15.00	4/2 D	7600	1	1	0.92	1.04	7,272	66,634	84,985	8,498	1.17	128,378	163,733	18,011	2.48
91	JLN. DR. WAHIDIN (SEMARANG)	2.34	13.00	4/2 D	7600	0.96	1	0.92	1.04	6,981	109,716	146,847	14,685	2.10	211,381	282,919	31,121	4.46
91	JLN. TEUKU UMAR (SEMARANG)	0.89	13.86	4/2 D	7600	0.96	1	0.92	1.04	6,981	109,326	159,032	15,903	2.28	210,630	306,394	33,703	4.83
91	JLN. SETIA BUDHI (SEMARANG)	3.74	16.00	4/2 D	7600	1	1	0.92	1.04	7,272	95,528	139,460	13,946	1.92	184,045	268,687	29,556	4.06
91	JLN. PERINTIS KEMERDEKAAN (JLN. ANTON SU	6.83	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	73,293	178,993	17,899	2.46	141,208	344,851	37,934	5.22
91	JLN. GATOT SUBROTO (UNGARAN)	2.88	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	78,107	206,244	20,624	2.84	150,482	397,354	43,709	6.01
91	JLN. DIPONEGORO (UNGARAN)	2.82	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	69,968	122,544	12,254	1.69	134,801	236,095	25,970	3.57
92	SECANG - BTS. KOTA MAGELANG	5	10.00	4/2 UD	6800	0.92	1	0.92	1.04	5,986	72,618	116,095	11,609	1.94	139,908	223,671	24,604	4.11
92	JLN. ACHMAD YANI (MAGELANG)	5	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	54,958	80,390	8,039	1.11	105,882	154,881	17,037	2.34
92	JLN. ELO SURABAYAN (URIP SUMOHARJO) (MA	2.58	6.62	2/2 UD	3100	0.87	1	0.89	1.04	2,496	41,748	73,276	7,328	2.94	80,432	141,174	15,529	6.22
92	JLN. SOEKARNO-HATTA (MAGELANG)	2.55	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	69,163	111,655	11,166	1.54	133,251	215,117	23,663	3.25
93	BTS. KOTA MAGELANG - KEPREKAN	8.35	17.74	4/2 D	7600	1.04	1	0.92	1.04	7,563	77,764	129,952	12,995	1.72	149,821	250,368	27,540	3.64

2	FROM YOGYAKARTA																	
A108	KEPREKAN - BOROBUDUR	9.89	7.25	2/2 UD	3100	1	1	0.92	1.04	2,966	24,934	40,094	4,009	1.35	48,039	77,245	8,497	2.86
94	KEPREKAN - BTS. KOTA MUNTILAN	1.18	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	64,901	102,743	10,274	1.41	125,040	197,946	21,774	2.99
94	JLN. PEMUDA (MUNTILAN)	3.61	10.00	4/2 UD	6800	0.92	1	0.92	1.04	5,986	99,994	171,637	17,164	2.87	192,650	330,679	36,375	6.08
95	MUNTILAN - SALAM (BTS. PROV. D.I. YOGYAK	7.11	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	86,924	133,850	13,385	1.84	167,469	257,879	28,367	3.90
15	TEMPEL/SALAM (BTS. PROV. JATENG) - BTS.	7.39	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	33,854	63,939	6,394	0.88	65,224	123,186	13,550	1.86
16	BTS. KOTA SLEMAN - BTS. KOTA YOGYAKARTA	5.64	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	92,376	151,254	15,125	2.08	177,973	291,410	32,055	4.41
16	BTS. KOTA - SP. JOMBOR (YOGYAKARTA)	2.21	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	73,766	126,215	12,622	1.74	142,119	243,169	26,749	3.68
18	JLN. ARTERI UTARA (YOGYAKARTA)	9.95	22.00	6/2 D	11400	1.04	1	0.98	1.04	12,084	117,865	172,660	17,266	1.43	227,081	332,650	36,591	3.03
19	JANTI (YOGYAKARTA) - PRAMBANAN (BTS. PRO	9.9	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	118,564	192,428	19,243	2.65	228,428	370,736	40,781	5.61
19	BTS. KOTA YOGYAKARTA - JANTI (YOGYAKART	2.09	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	141,630	219,944	21,994	3.02	272,867	423,748	46,612	6.41
3	FROM SURAKARTA																	
96	KARTOSURO - BTS. KOTA KLATEN	19.69	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	64,370	105,258	10,526	1.45	124,017	202,791	22,307	3.07
96	JLN. PERINTIS KEMERDEKAAN (KLATEN)	2.37	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	88,504	135,553	13,555	1.86	170,513	261,159	28,727	3.95
96	JLN. DIPONEGORO (KLATEN)	3.03	7.00	2/2 UD	3100	1	1	1	1.04	3,224	39,377	73,553	7,355	2.28	75,864	141,708	15,588	4.83
96	JLN. KARTINI (KLATEN)	2.3	7.30	2/2 UD	3100	1	1	1	1.04	3,224	27,614	47,893	4,789	1.49	53,202	92,272	10,150	3.15
97	BTS. KOTA KLATEN - PRAMBANAN (BTS. PROV.	10.69	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	26,170	45,682	4,568	0.63	50,419	88,011	9,681	1.33
97	JLN. SURAJI TIRTONEGORO (KLATEN)	1.85	14.00	4/2 D	7600	1	1	0.92	1.04	7,272	33,460	59,427	5,943	0.82	64,465	114,494	12,594	1.73

APPENDIX III: % AIR ARRIVALS BY PROVINCE

Unit : Hari

Provinsi Asal	Moda Angkutan Utama								Total
	Pesa-wat	Kereta Api	Bus	Angkut an Air	*) Travel	Kenda-raan Pribadi	Kenda-raan Sewa	Lain nya	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Aceh	14,67	-	8,53	4,00	-	3,05	3,66	-	4,32
SumateraUtara	11,06	5,71	2,99	-	4,29	2,35	2,93	8,00	3,45
SumateraBarat	13,30	1,00	2,79	8,00	7,37	2,53	1,67	5,20	4,50
Riau	7,83	-	13,80	28,50	4,32	4,09	3,64	4,00	6,50
Jambi	5,87	-	5,40	4,84	4,80	4,15	2,89	2,80	4,47
SumateraSelatan	5,57	4,20	5,34	6,00	4,03	2,80	6,73	-	4,46
Bengkulu	7,42	8,00	7,62	18,00	7,33	3,83	2,20	-	5,90
Lampung	4,00	3,00	8,33	-	10,69	2,65	2,57	9,00	5,43
Kep.BangkaBelitung	10,31	-	1,00	3,61	-	1,18	1,00	1,00	2,51
KepulauanRiau	11,89	-	-	3,98	-	1,00	3,25	-	7,57
DKIJakarta	5,57	3,99	3,34	4,50	3,29	2,18	2,42	1,61	3,24
JawaBarat	7,15	4,27	3,11	5,50	2,21	2,60	3,02	1,00	3,26
JawaTengah	10,38	4,96	2,88	5,00	4,10	2,40	1,80	1,44	2,74
D.I.Yogyakarta	12,14	5,91	3,94	-	6,57	2,94	2,00	-	4,66
JawaTimur	5,62	4,51	2,78	4,80	4,67	2,35	1,95	2,26	2,78
Banten	5,42	5,10	3,45	2,50	2,50	2,86	2,84	2,00	3,38
Bali	5,11	-	4,08	6,00	4,54	4,25	4,62	4,31	4,36
NusaTenggaraBarat	12,50	-	6,97	2,50	2,00	2,75	4,33	5,00	4,12
NusaTenggaraTimur	15,77	-	3,61	8,51	6,27	2,90	1,98	14,00	5,39
KalimantanBarat	12,16	-	5,18	9,67	4,00	2,76	2,00	9,36	5,27
KalimantanTengah	9,74	-	6,38	-	5,93	4,32	4,36	2,50	4,71
KalimantanSelatan	5,42	-	3,10	7,00	2,50	2,10	3,33	2,45	2,84
KalimantanTimur	12,61	-	3,78	7,52	4,26	3,10	3,85	6,00	7,69
SulawesiUtara	4,58	-	1,42	3,00	1,00	1,68	2,97	2,29	2,54
SulawesiTengah	10,44	-	8,81	20,00	5,86	4,80	4,17	3,00	6,22
SulawesiSelatan	12,16	-	7,66	19,91	3,77	3,93	3,31	2,23	4,73
SulawesiTenggara	6,46	7,00	7,17	11,12	-	4,04	4,33	-	7,12
Gorontalo	6,75	-	8,16	9,50	5,03	2,70	3,72	4,67	4,43
SulawesiBarat	12,22	-	10,38	9,33	-	3,74	7,30	2,50	7,53
Maluku	21,79	-	11,83	18,09	-	6,62	1,67	22,00	16,53
MalukuUtara	8,38	-	-	9,18	-	4,29	2,38	2,50	5,81
PapuaBarat	12,22	-	-	25,60	-	23,67	10,25	-	14,29
Papua	14,38	-	-	12,05	-	-	1,38	-	11,75
TOTAL	**9,51**	**4,51**	**3,92**	**10,10**	**5,33**	**2,91**	**3,39**	**3,37**	**4,34**

APPENDIX IV: SOURCES OF INFORMATION USED

The methodology for evaluating the tourism potential of the Destination presented in this report has been developed using both primary fieldwork research and existing statistics. Quantitative data were provided by different government offices, while interviews provide qualitative information for the research. The source of primary and secondary data are referenced in the report and listed in the below section. However, in some cases the information presented is a product of experience and observation prior to and during the fieldwork, and as such it is not specifically attributed by source.

INTERVIEWS

Interviews were conducted with various government offices at central as well as provincial & kabupaten level. The interviews serve to gain a better understanding of tourism development and investment process in Indonesia and the Destination.

Central Government	Provincial / Kabupaten Governments
Badan Pusat Statistik	Dinas Perhubungan Kab. Magelang
PDAM Tirta Gemilang	Dinas Perhubungan Jawa Tengah
Profil Kesehatan of each kabupaten	Dinas Perhubungan DI Yogyakarta
PLN (Perusahaan Listrik Negara)	Dinas Komunikasi dan Informatika DI Yogyakarta
STBM (Sanitasi Total Berbasis Masyarakat)	Yogyakarta Regional Development Planning Agency (Bappeda)
BAPPENAS	Dinas Kesehatan DI Yogyakarta
Kementerian Pariwisata (International marketing, domestic marketing, investment, transport liaison, marketing communications)	Semarang Regional Development Planning Agency (Bappeda)
BKPM	Kab. Magelang Regional Development Planning Agency (Bappeda)
Badan Pusat Statistik	Kab. Kulonprogo Regional Development Planning Agency Bappeda
Taman Wisata Candi Borobudur (Jakarta)	Vice Governor Jawa Tengah
	Dinas Pariwisata Pemuda dan Olah Raga Kabupaten Kulon Progo, Dinas Kebudayaan dan Pariwisata Kabupaten Magelang, Dinas Pariwisata DIY
	BKPM DIY, BPMPPT Kabupaten Magelang
	Badan Pusat Statistik DIY, Badan Pusat Statistik Kabupaten Magelang
	Taman Wisata Candi Borobudur (Magelang)
	Angkasa Pura I
	Dinas Perhubungan Kabupaten Magelang
	Dinas Bina Marga Jawa Tengah
	Perusahaan Daerah Air Minum Kab. Magelang
	Dinas Pekerjaan Umum Kab. Magelang

Central Government	Provincial / Kabupaten Governments
	PT Taman Wisata Candi
	Dinas Pariwisata Jawa Tengah
	Dinas Kesehatan Kab. Magelang
	PLN (National Power Company) of Magelang

- Official statistics collected by the Statistics Department and Dinas Pariwisata of Magelang as well as TWC (It should be noted that there are slight discrepancies among the visitors data from the three institutions. However, after confirming with the three institutions, they all agree that the most accurate and updated data came from TWC as the visitors recorded were based on tickets sold. Thus, the official data provided by TWC regarding visitors was used throughout the report);
- Investment sentiment is gleaned from interviews with existing and potential tourism investors. The investors chosen had interests in various tourism-related assets including hotels, restaurants, ground transportation and travel agencies. The questions were aimed at gathering their thoughts on the pros and cons of SEZs, the tourism investment climate in Indonesia, the future of tourism investment and possible investment in the Destination. Potential and existing domestic investors (total of 6) and International investors (total of 25), from the current key arrivals source markets of Australia, China, Japan, Malaysia and Singapore.
- Tour operators/Travel agents:
  - Local: Kab. Magelang, Kota Yogyakarta and Jakarta; and
  - Foreign (total of 41): from the current key arrivals source markets of Australia, China, Japan, Malaysia and Singapore as well as France, Germany and the United Kingdom.
- Hotels in Kab. Magelang and Kota Yogyakarta.

STATISTICS

Quantitative data obtained from existing reports and surveys provide numerical information and allow statistical analysis of Indonesia and the Destination's tourism demand.

- BPS Accommodation Survey of DI Yogyakarta and Kab. Magelang, with results available at Regency Level. The historical data on domestic and foreign visitors are provided by the Accommodation survey. It should be noted that there are discrepancies between the BPS data (Published in Kabupaten-Magelang-Dalam-Angka-2016) and Yogya Tourism office data (published in Statistk Kepariwisatan 2015, Dinas Pariwaiata Daerah Istimewa Yogyakarta). The figures for 2015 are approximately at the same level, but not the evolution between 2011 and 2015. We have opted for the BPS data, whose evolution during the last 5 years seems more realistic.
- BPS Domestic Survey, with results available only at Province Level.
- BPS Exit survey with results available only at Province Level.
- BPS Census on population.
- TXC reports 2011 to 2015.
- Pelindo III Cruise statistics.

- Reviews on TripAdvisor Website.
- Horwath HTL Indonesia Hotel Industry Survey of Operations.