

CHAPTER 6. APPROACHES TOWARDS THE ESTABLISHMENT OF VARANASI CONVENTION CENTRE

This chapter discusses the basic approaches and concept to establish Varanasi Convention Centre.

6.1. Outline of Varanasi Convention Centre

6.1.1. Expected function and capacity of VCC under the JICA's Grant Aid

Based on the initial proposals for VCC described in DPRs summarized in Chapter 2, a series of discussions on functions, components and capacity of VCC have been held between GOI and GOJ.

On March 8, 2017, based on the preliminary and rough estimates, the capacity of the hall was proposed to cover only a main hall, having a capacity of 1,200 seats with a total floor area of approximately 4,000 m², within the budget of 2 billion Japanese Yen. MOUD, the Government of UP, and VNN accepted the proposal, but requested to secure capacity of 2,000 seats for the main hall because 1) the existing facility of 1200 seats in Varanasi does not satisfy the need for organizing any major national/ international conference/ convention, and 2) the convention centre should be befitting the standards of an Indo- Japan Partnership Project. It was agreed that the request for the seat capacity would be reviewed in the following survey with due consideration to the budget allocation by GOJ.

However, after further study and discussion, MOUD informed JICA in an official letter that plan of providing a seating capacity of 1,200 seats along with basement for parking is acceptable to Indian Side, thus the conceptual plan was prepared accordingly.

The outline of the VCC explained by MOUD on March 8, 2017 are:

- Expected events at VCC:
 - Act as a convention centre for potential government meetings, cultural events, summits, citizen interactions, etc.
 - Host international conventions, investment promotion summits etc. to promote international relations.
 - Tap into the increasing MICE Tourism in addition to religious / cultural tourism
- Expected results of the program include:-
 - Increase in tourists including MICE Tourism through business travellers.
 - Increase in national and international conventions in Varanasi

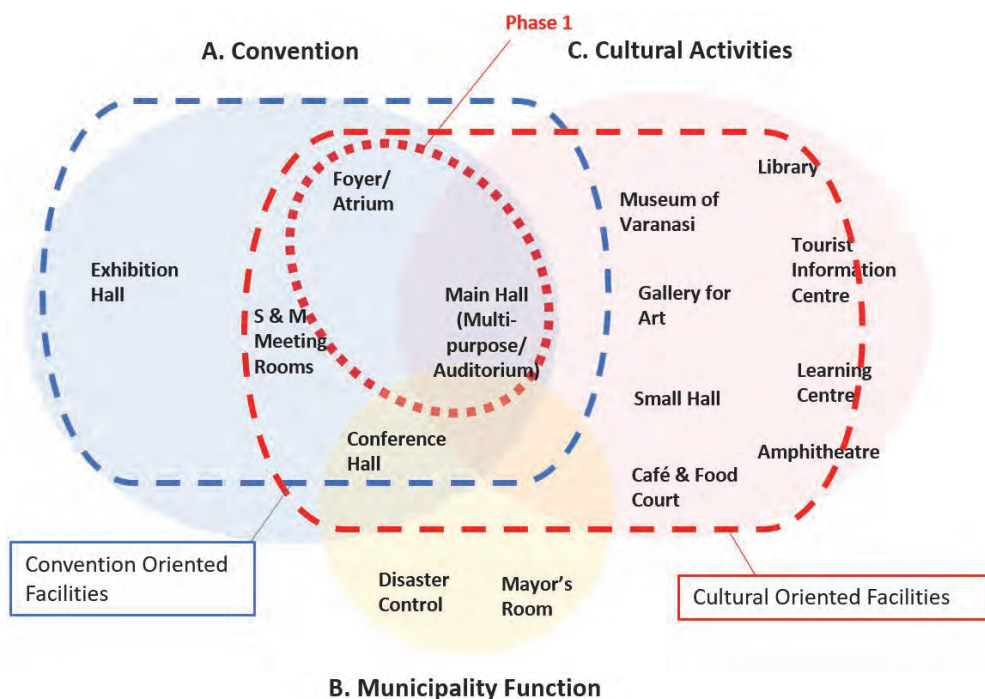
6.1.2. Master Plan of VCC

As mentioned above, JICA's Grant will cover the cost for building the main hall, which will only be a part of the VCC development as proposed in DPR at the VMC premises.

Meanwhile, it was agreed that this survey will study the master plan of the whole site including the buildings which will be developed by the Indian side in the future.

Based on the list of VCC’s functions prepared by the Indian side (refer to Table 2.2.1), the facilities required were studied as shown in Figure 6.1.1. Due to the limited available land and accessibility, JST proposes to limit facilities according to the main activities: facilities in the Blue dotted line are a set of facilities for convention business, and the ones in Red lines comprise a set for culture oriented activities. It was confirmed that VMC preferred the set of facilities for culture oriented facilities.

However, due to budget limitation, it was agreed that the facilities in the small dotted line will be covered by JICA’s grant project as Phase 1, and other facilities will be developed by the Indian side in future.



Source: JST

Figure 6.1.1 Facilities for proposed function of VCC

6.2. Study on Building Conceptual Design

As the project is a public building as well as having a public gathering / assembly use by nature, it is extremely important to look at the design from both the building architecture level as well as urban planning level. Although the main outcome of the design is the architecture of the building, there has been some study done to see how the building can be integrated into the urban fabric in which it would be built.

6.2.1. Study on the Master Plan of the Area

Based on the condition of the surrounding area described in Chapter 5.3, the risks and challenges summarized in Chapter 5.2, and with consideration of the location of the project site and its surrounding facilities such as the existing Varanasi Municipality Corporation Office (Varanasi Nagar Nigam), the

sports stadium, and a large park “Shaheed Udyan Nagar Nigam”, there is a need to conceive the project more as a public hub rather than just a building in isolation.

The Master plan vision has been proposed for the area through consolidating, integrating and proposing development opportunities, some of which are existing plans while the others are newly proposed.

Some of the highlighted points in the Master Plan are:

(1) Development of Public Hub

Develop this area as one **Public Hub** including VCC, VMC, the Public Park, Stadium and other sports facilities.

(2) Redefining traffic circulation and additional parking space

For the successful operation/ development of VCC and its surrounding area, traffic circulation, including road widening, improvement of traffic control, public transportation service and parking spaces are indispensable to deal with the increase of traffic during events in VCC.

(3) Visibility & Access through Shaheed Udhyan Park

JST proposed to have a more direct and clear access to VCC from Sigra Road by providing a well-defined pedestrian avenue through the Shaheed Udhyan Park. This would not only make it convenient but also increase the footfall for both the VCC and the park.

(4) Area-Level Beautification

Area-level beautification such as proper pavements, road side plantation, urban signage, art installations, renovation and up-keep of the existing buildings, etc. will further enhance and upgrade the outlook and value of the area.

(5) Developing as Disaster Mitigation Centre

By utilizing the abundant open space of the nearby stadium and park, VCC can also play the role of Disaster Mitigation Centre in times of natural disasters or emergencies, especially for the over-crowded central Varanasi city.

(6) New Metro Station

The proposed metro can have a subway station at the far eastern side of the park on the main Sigra Road which can provide better access to the area through public transportation. This can be achieved by creating a new station or shifting the currently proposed station in the adjacent region. However, this needs an evaluation by experts of the specific area to understand the broader implications of shifting the metro station.

(7) Hotel

Availability of a proper hotel/ accommodation is one of the key factors for successful operation of a Convention Centre. It would be advisable to provide incentives for development of 4-5 star hotels on or outside the site. Redevelopment of the stadium area as a sports complex could also be considered as an option as far as open space is not taken away.



Source: Planned metro line and Rathyatra Station and Kashi Vidyapeeth Station from Varanasi Masterplan 2031

Figure 6.2.1 Master Plan Proposal around Project Site

6.2.2. Alternative Study of Architectural Plan

The architectural plan for the building needs to be studied from three aspects:

- (1) Existing Site Constraints
- (2) Functionality Aspects– Capacity, main activity usage, circulation, etc.
- (3) Aesthetical Aspects – Form making, Façade Design, Landscape, etc.

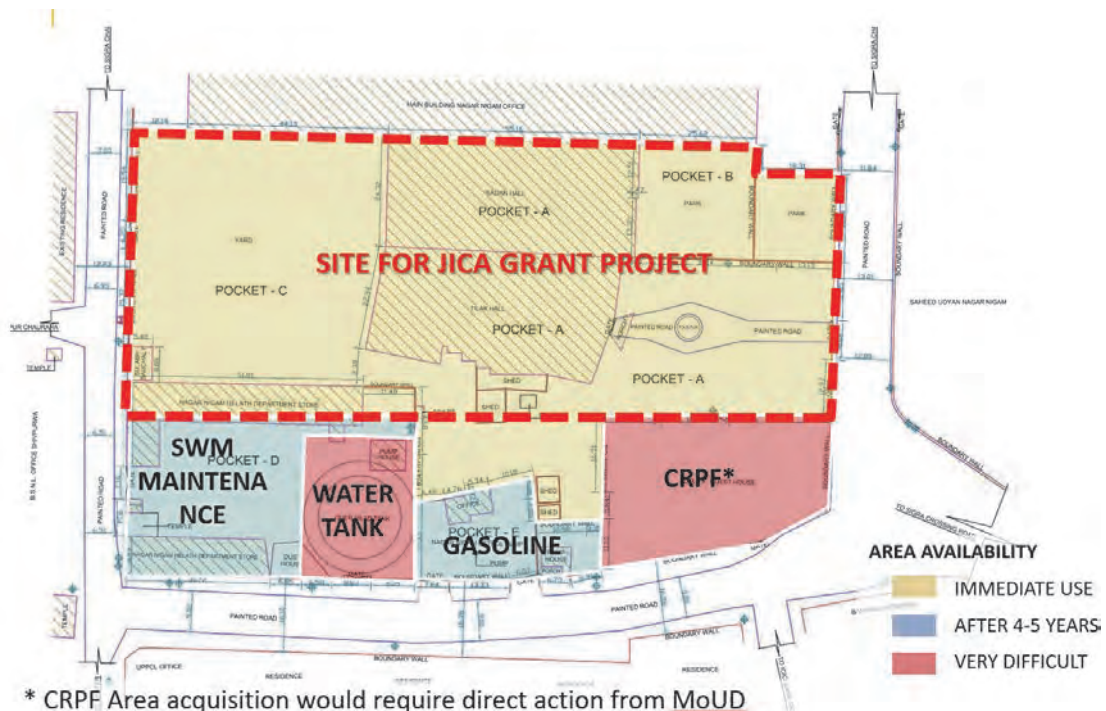
(1) Existing Site Constraints – Availability of Land

The removal of the existing structures in the project site, such as the Elevated Water Tank, Gasoline station, SWM maintenance site, garbage station, CRPF (Police) house (see Chapter 5.3) has been proposed for the development of VCC.

After consulting with VMC, the following points were confirmed:

- The existing auditorium, office wings (where mayor’s office and Sadan are located) and north half of the SWM maintenance site will be demolished before the commencement of the construction,
- SWM maintenance site, garbage station, and Gasoline station will be removed in 4-5 years (after finding new sites),
- It is difficult to remove the elevated water tank and CRPF house.

Consequently, JST has tentatively agreed with VNN to prepare a plan for the main hall building within the site below (red dotted line).



Source: JST, information from VMC

Figure 6.2.2 Available land for the project

(2) Functionality Aspect




Based on the series of discussions with various stake-holders as well as taking into consideration the tightened budget, a series of studies were done with regards to the various usages such as seating capacity of the main hall.

a) Use of Halls

It is important to understand how the hall will be used to decide and plan the type of hall/ theatre. The specifications of the hall, such as the size and shape, stage design, floor, chairs, sound system, and lighting system are all dependant on the hall use.

After consulting with VMC, the priorities of how to use the hall have been confirmed as shown in Table 6.2.1 below.

Table 6.2.1 VMC’s Priority order of how to use VCC hall

VMC’s Priority	Activities / Programs	Appropriate Type of Hall		
1	Conferences, Seminars, and Meetings			
2	Music & Drama (Opera, Ballet, Musical, etc.)			
	Drama			
	Music Concerts (Classical Music)			
3	Exhibitions, Gallery			
	4	Festivals & Events		
Recreation & Sports				

Source: JST Priority order is from VMC

According to VMC, conferences and seminars are the first priority for hall use, followed by Indian style traditional music, dance and drama as the second priority.

In order to play traditional performances including Sanskrit Drama, a proscenium stage was requested.

On the other hand, in order to increase the operation rates, VMC has requested a multi-purpose use for the hall, with a flat floor, movable partition, and retractable seating. Dividing the hall to small halls by movable partitions has been strongly requested.

b) Study on the Facility Components and Capacity

Based on the above studies with a limited budget, the following alternatives have been prepared for further discussion on the facility design.

Both alternative X & Y can accommodate 1,200 seats with stage facilities. The above ground floor areas for the Alternatives X & Y are approximately 4,500 sqm.

However the spatial planning principles for all alternatives remain the same as follows:

1) Access Plan

Pedestrian Access:

- Main pedestrian approach is being planned from the Sigra Chauhara Road arriving by using public transportation including metro either through the adjacent roads or park.
- Currently no passage way is planned connecting VCC and Nagar Nigam building.

Vehicular Access:

- Although there is a drop-off facility at the main entrance of the VCC, the main access route for both service vehicles and private cars, including those heading for basement parking, is planned from the rear side of the VCC.

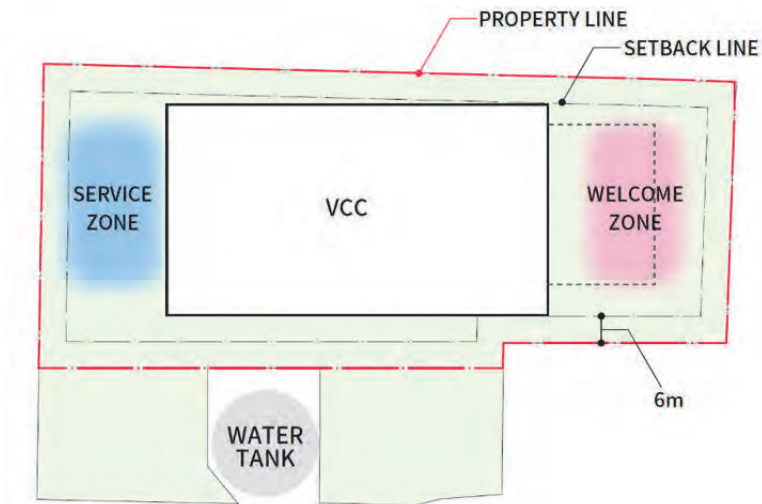


Source: JST + Google Map

Figure 6.2.3 Access plan to the VCC

2) Layout Plan

- The main building is located in the middle of the site with a minimum 6m setback from all sides for fire engine operation.
- To increase the functionality and efficiency, the Guest Zone and Service zone are placed on opposite ends with the Welcome zone (Guest zone) on the east side facing the park and the Service zone on the rear i.e. West side.



Source: JST

Figure 6.2.4 Zoning Plan of the Site

- Based on the preliminary calculations the Building Coverage Ratio (BCR) of the VCC does not exceed the limit of 40% of the entire Nagar Nigam possession site.
- However, in the next stage, the VCC building and phase 2 buildings need to be carefully designed, with considerations of BCR and all the regulations applicable.
- For a quick study purpose of possible future extension, an alternative plan has been prepared assuming that the CPRF MESS site would be acquired in the near future.

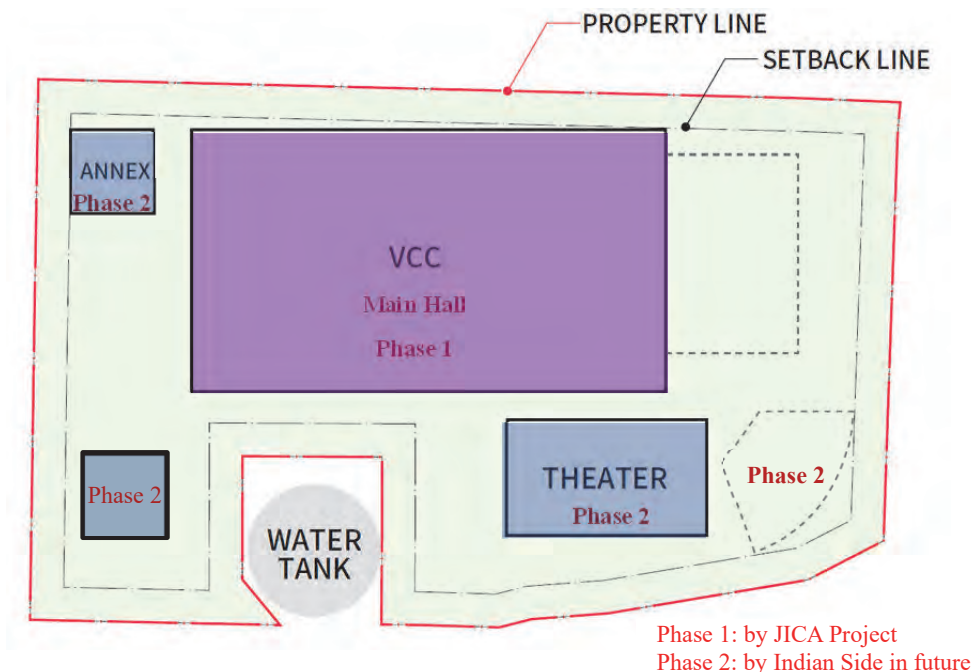
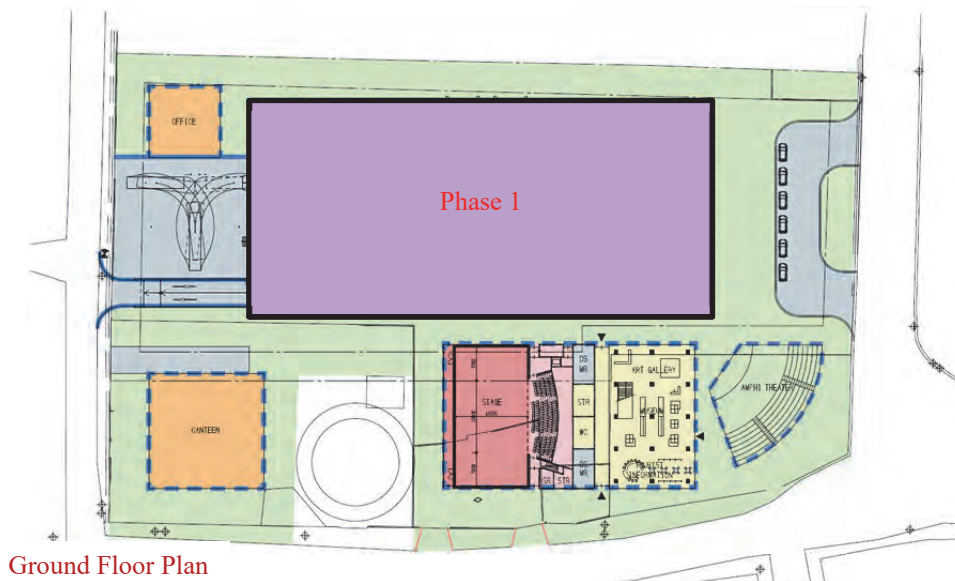


Figure 6.2.5 Building Layout Plan (including Future Plan)



Source: JST

Figure 6.2.6 Buildings proposed for Future Development (phase 2)

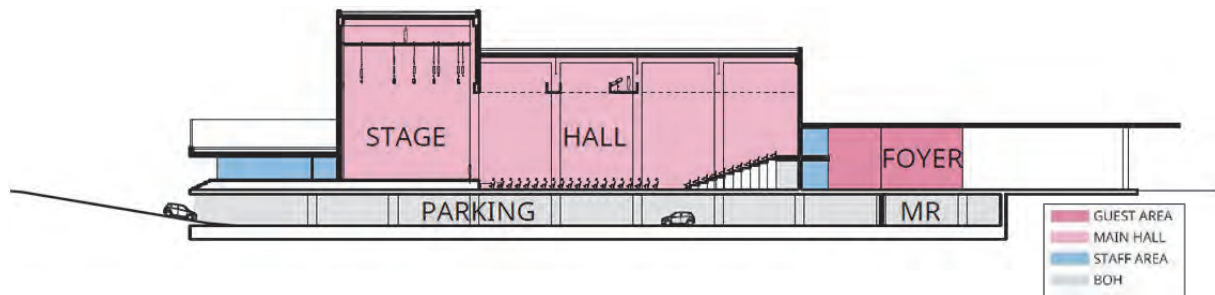
- Due to limitation of the funds available for this phase, only a main hall is being proposed, however, with a vision to have the VCC as a more complete and better serving facility JST has made a quick study and proposed a future expansion plan which includes a Sub-hall for small size concerts, Art Gallery, Museum for Varanasi, Tourism Information Centre, Canteen, Meeting Rooms and Offices. These facilities will support VCC functioning as a more comprehensive Cultural Convention Centre. However, the scale of future phase would depend on the availability of land, available FAR & BCR (Building Coverage Ratio) and fresh funding.

3) Spatial Planning

Given the site constraints as well as the circulation and functional needs of the program there are limited options that can be effectively and efficiently worked out while doing the spatial planning. JST has prepared alternative X & Y based on the functional priority and needs of the main hall however the spatial planning principals of both the alternatives remain same as below:

Sectional Layout

- The main facilities such as Hall and foyer are planned on the ground floor where as auxiliary facilities like the stage control room and back office are on the 1st floor. The basement, and at times roof top, are mainly dedicated for services and parking.



Source: JST

Figure 6.2.7 Sectional Design Concept

Floor Layout

Ground Floor

- The main hall is located in the middle, having a guest foyer on the east guest welcoming approach and lobby on the south.
- BOH such as green rooms and loading space are located west next to the service yard for easy loading and access to the stage.

1st Floor

- Air conditioning machine rooms are planned along the both sides of the hall.
- Control rooms for stage equipment are located at the back of the hall.

Basement

- Parking spaces for approximately 120 cars and machine rooms are planned on the basement floor.



Figure 6.2.8 Floor Plans for Alternative X

4) Main Hall

- To maximize the utilization of the main hall the floor has been kept flat.
- The hall capacity is 1200 seats which can be achieved by 800 stacking chairs and 400 retractable seats. (for Alternative X)
- Movable partitions are planned to increase the usability of the hall by dividing it into 2 smaller halls of almost equal capacity.
- Stage of performance area size W18m X D12m with D18m X H10m proscenium, and well organized stage equipment (acoustic, lighting and hanging battens) has been planned to enable various types of cultural performances in this facility.

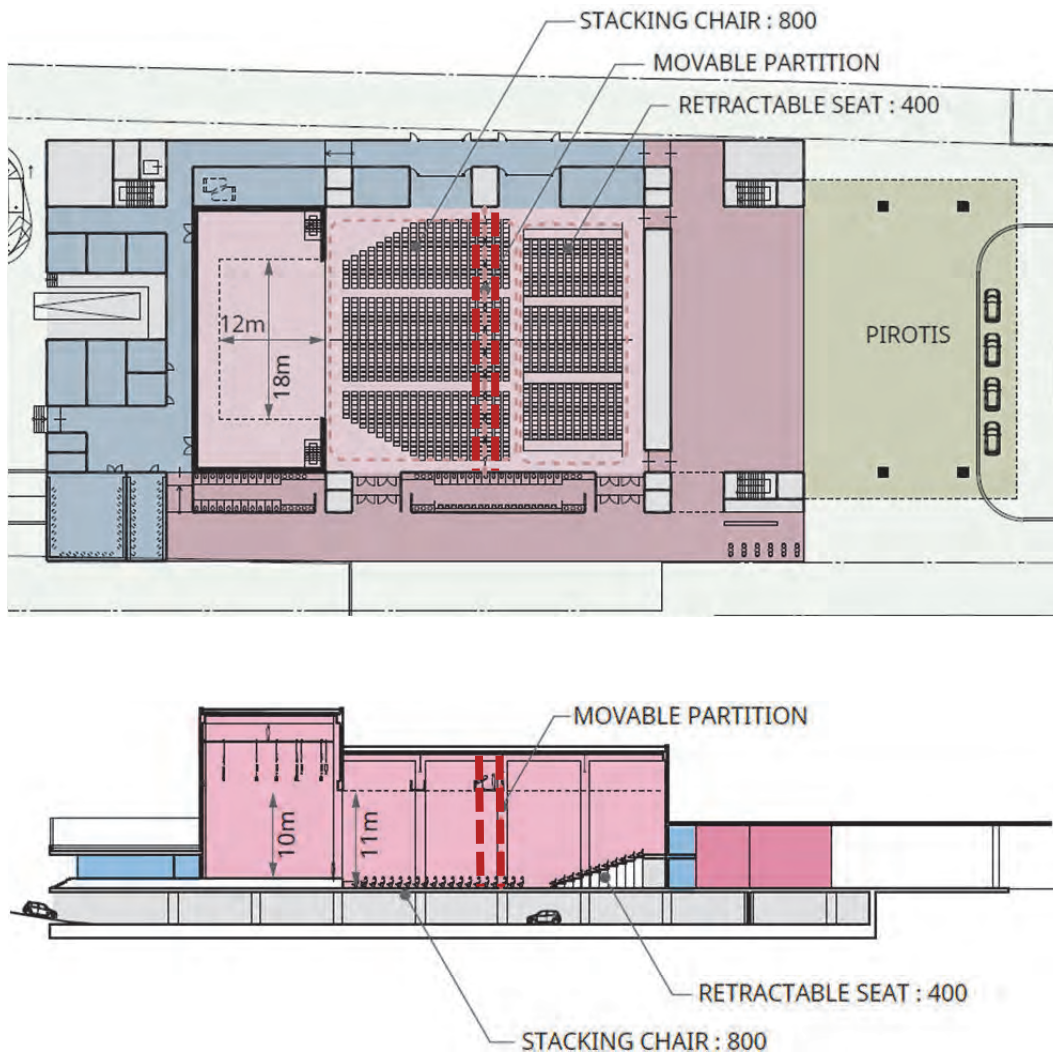


Figure 6.2.9 Floor Plan and Section of Main Hall (Alternative X)

5) Circulation Plan

- Visitors enter from the Welcome zone, main entrance through foyer and south side corridor to the main hall.
- The staff entrance is from the backside to the stage and the staff service corridor is on the north side.

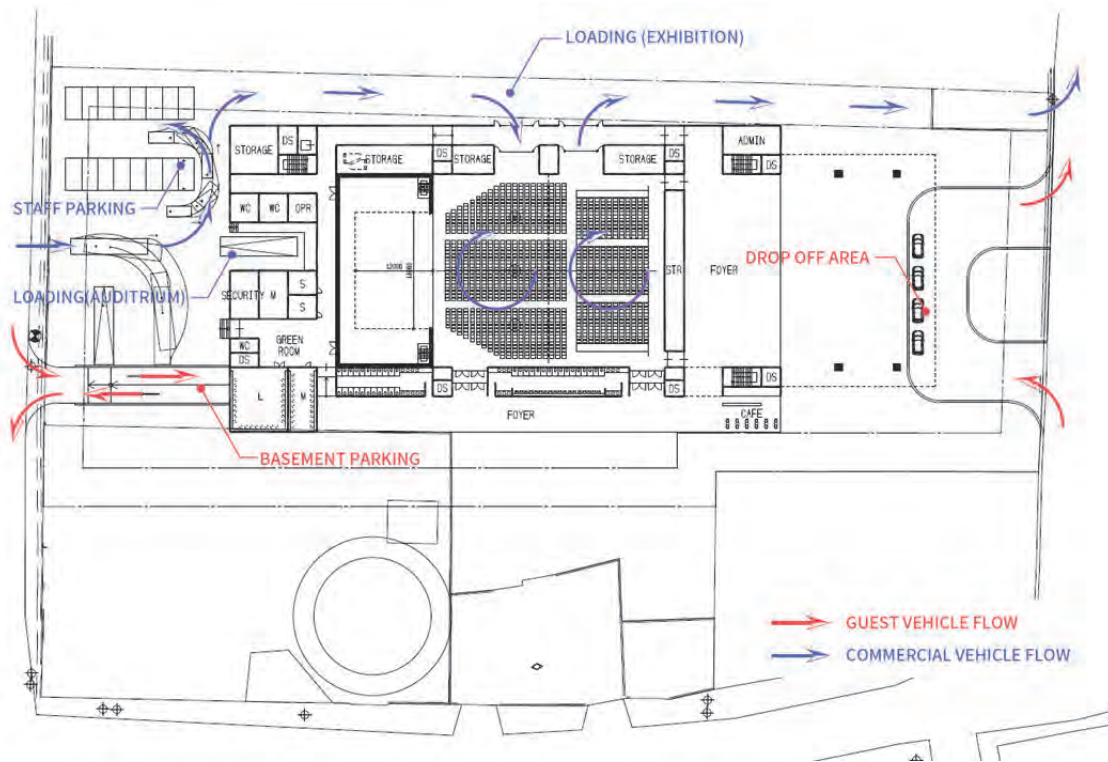


Figure 6.2.10 Guest and Staff Circulation Plan

- Service Vehicles approach from the back side. In the case of stage setting, the service vehicles use the unloading space at the back side of the stage. In the case of exhibitions, service vehicles approach the hall through the north side passageway and use the north side door to unload items for exhibitions.

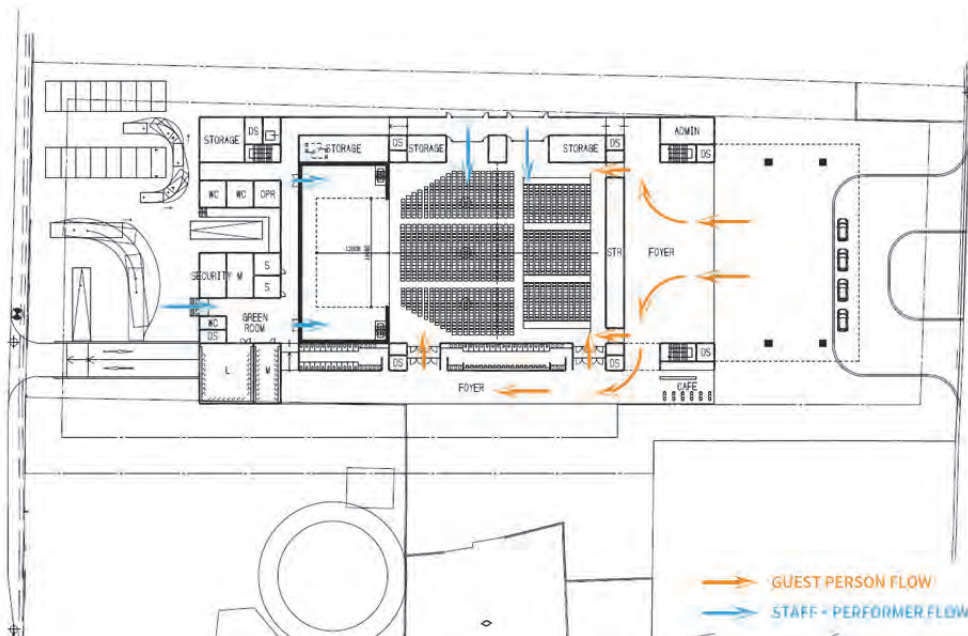


Figure 6.2.11 Vehicle Circulation Plan

6) Alternative Studies

In keeping with the above mentioned planning principles, the following two alternatives were prepared. The Schematic Line Drawings of the Alternatives are as follows:

Alternative X	
Capacity	1,200 Seat
Stage Setting	Stage with wing spaces, but without fly tower. Enough for simple performances and music.
Floor	Flat floor
Chairs	Retractable seats + stacking chairs
Partition	Movable partition to divide the hall into two spaces
Basement	1 Floor

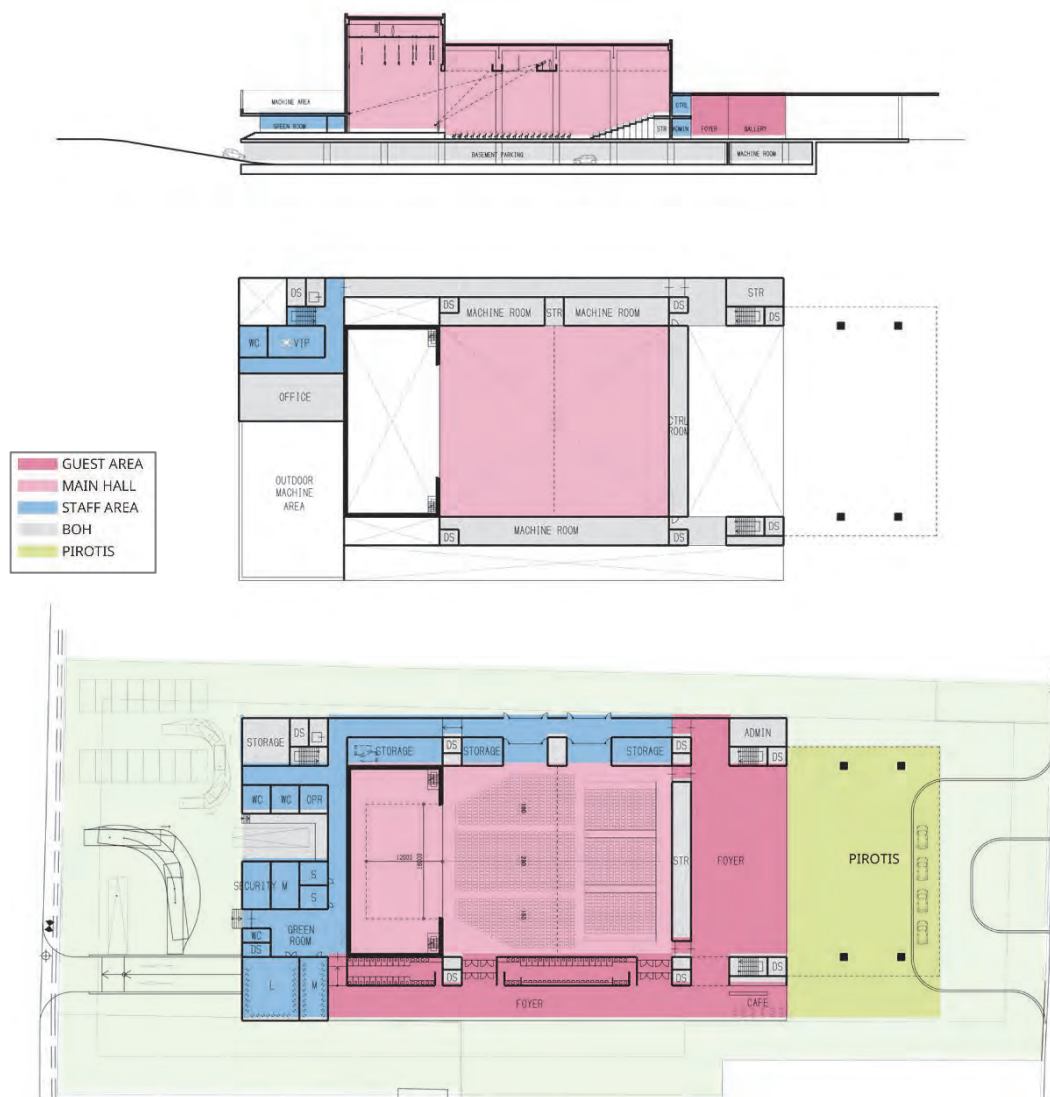
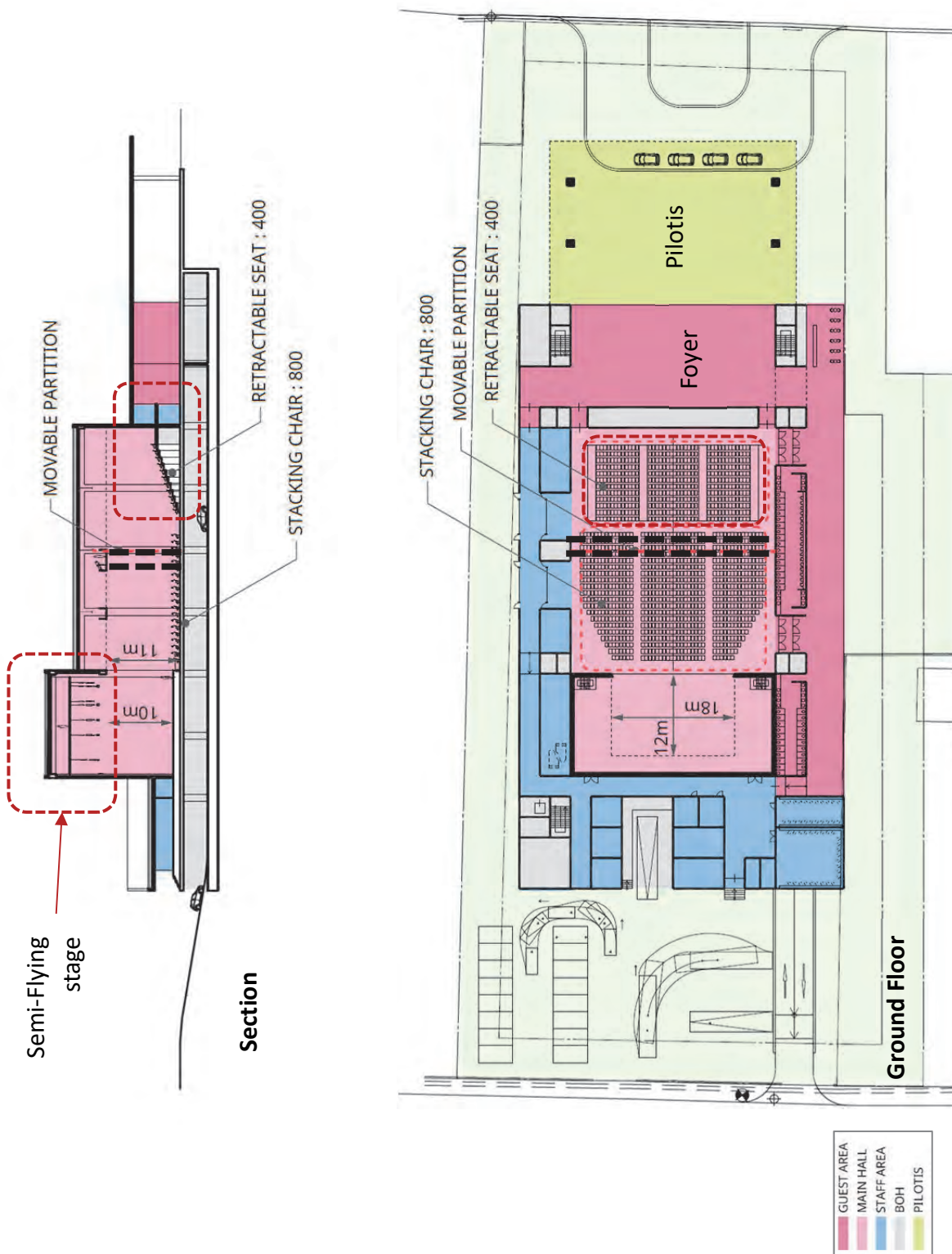


Figure 6.2.12 Alternative X - Floor Plan and Section

ALTERNATIVE X



Alternative Y	
Capacity	1,200 Seat
Stage Setting	Providing stage house (fly tower). Good for Theatrical Dramas / Kabuki etc.
Floor	Half flat and Half step floor
Chair	Fixed chairs + stacking chairs
Partition	Movable partition to divide the hall into two spaces: one with steps and the other with flat floor.
Basement	1 Floor



Figure 6.2.13 Alternative Y - Floor Plan and Section

ALTERNATIVE Y

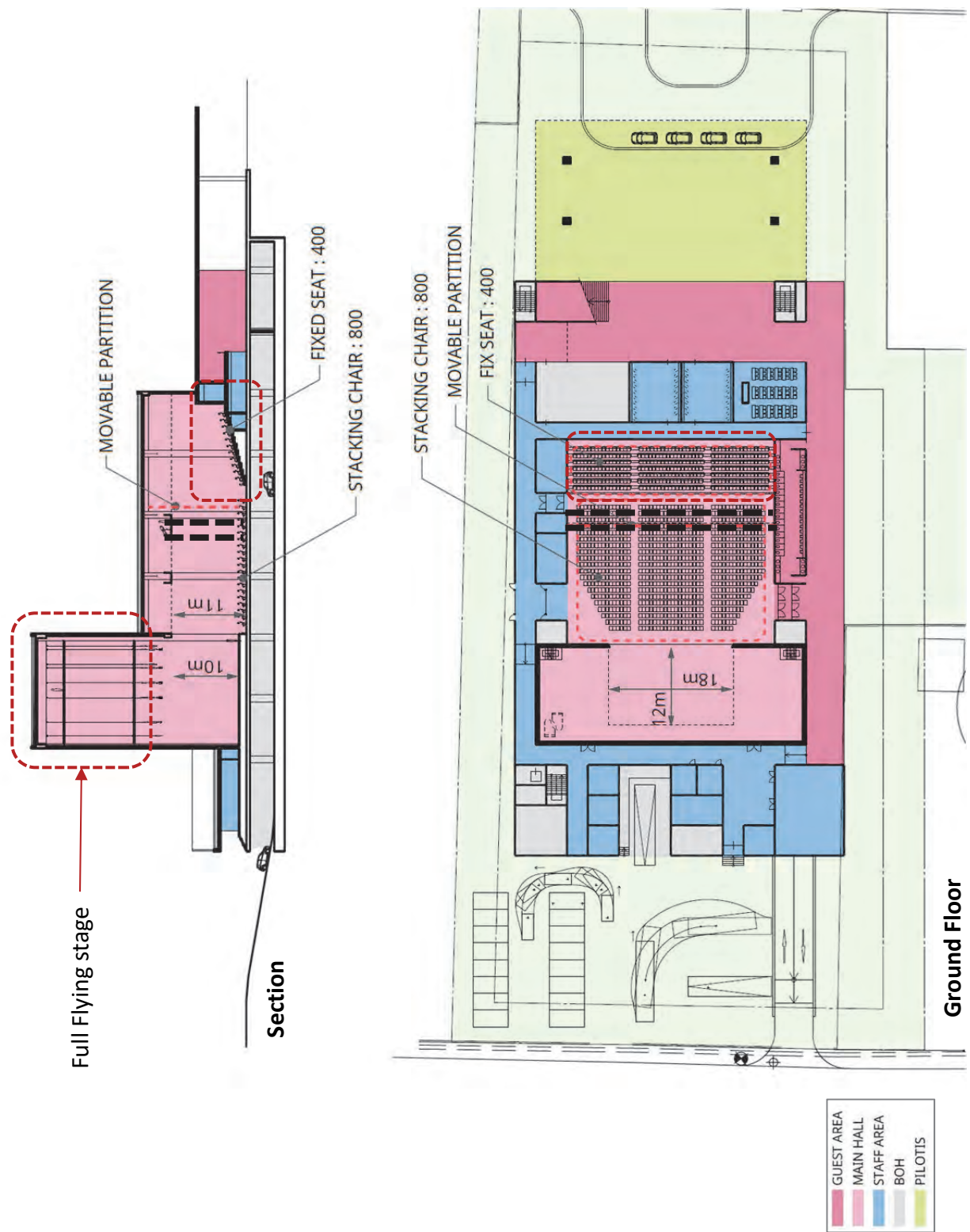
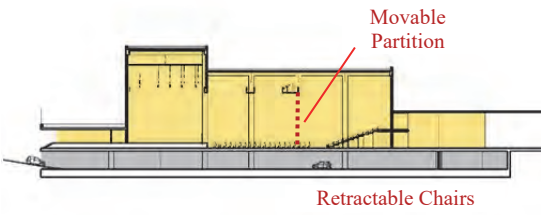
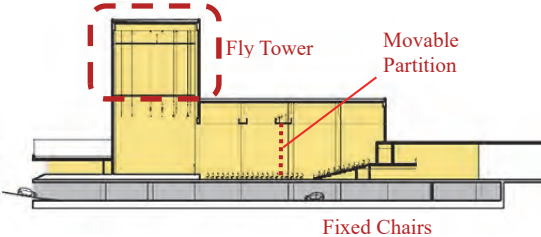


Table 6.2.2 Comparison between Alternatives

Alternative X	Alternative Y
Capacity: 1,200 Seat	Capacity: 1,200 Seat
Stage Setting: Stage with wing spaces, but without fly tower. Enough for simple performances and music.	Stage Setting: Provides stage house (fly tower). Good for Sanskrit Drama / Kabuki etc.
Floor : Flat floor	Floor : Half flat and Half step floor
Chair : Retractable seats and stacking chairs	Chair: Fixed chairs (for step floor) and stacking chairs
Partition: Movable partition to divide the hall into two spaces: both are flat floor.	Partition: Movable partition to divide the hall into two spaces: one with steps and the other with flat floor.
Basement: 1 Floor	Basement: 1 Floor
	
Pros: High flexibility of usage	Pros: Compatible for various stage uses
Cons: Less compatible for stage use	Cons: Medium flexibility of usage

Source: JST

(3) Aesthetical Aspects

Functional aspects of the building are a must for its successful use in the long run, however, the aesthetical outcome is equally desired as it’s a natural tendency of humans to connect with the appearance. The three main ways of achieving the desired Aesthetical outcome is through building design, landscape design and interior design. Further, to have a deeper meaning to the Aesthetical outlook there needs to be a genuine design concept at the heart, evolved by well thought out design approaches and finally an expressive form-making.

The study of the Aesthetical Aspect consists of the following steps, where in the FS Study stage the Concept making is the main aim whereas form making is the least priority as the form making would be the main subject of the study in the subsequent stages.



a) Design Concept

As a project back-ground there are a number of factors that have led to formation of this project, a few of which to name would be `historical ties`, `cultural similarities`, `diplomatic gesture`, `Varanasi – Kyoto Smart Heritage Cities`, etc. Further strengthening these factors is the very nature of the `Convention Centre` as an entity, i.e. a welcoming `Gateway` and starting of new

relationships, 'Nurturing' the of the spirit of 'caring through sharing' and a place of 'Confluence' of cultures by getting people together.

With a perfect setting, from its inception, the design seeks to draw inspiration not just from mutual mythological and historical connections, but also through integration of the philosophies imbibed in the living symbols which lie in the very heart of the two cultures, which in its truest sense can also depict the readiness of the 'transformational ties' in process between the two cultures in their totality.



Figure 6.2.14 Mount Fuji and River Ganga`

One these being the soul of the Japanese culture while the other is the very reason of existence of Indian society. Nothing like these two can express better, the sentiment, the value system and nature of the two societies which they represent. At the conceptual level the hardscape of the project i.e. the main convention centre auditorium is like Mt. Fuji still and tall by nature and well confined within the site boundaries. Meanwhile the soft-scape, mainly consisting of the landscape, is the River Ganga which tends to flow and transcend the fixed boundaries there by making the Shaheed Udhyan and herbal park as a natural extension of the concept there by integrating the site and surroundings in a more harmonious manner.



Figure 6.2.15 Landscape Design Concept

For making of a successful public realm, the design needs to integrate culture and aesthetics and hence the expression of River Ganga flowing can be integrated with the pedestrian axis and the proposed shifting of the metro station on Sigra Road which would make the public accessibility to the convention facility easy and beautiful there by justifying and serving the purpose.

b) Design Approach

With the solid foundation of the concept of the River Ganga and Mt. Fuji representing the synergies between India and Japan, there is a need to establish a framework of design approach which would help in manifestation of the `Concept` into a ground reality without losing its essence. In order to have a final out-come with a sense `place-making` it is necessary that the design approaches should be inspired by the overall context and process rather than a hijacked foreign idea coming out of no-where.

The underlying principles of creating Gateways, Nurturing relationships and Congruence of cultures need to be paired with the existing highlights of the site and surroundings, the rich cultural heritage of Varanasi, the environmental needs, the commonalities in design methodology of the two countries, etc. to evolve the desired design approach including:


- i. Building in a park
 - ii. The Park as an extension of VCC
 - iii. Japanese Design Approach of Shakkei, etc.
 - iv. Adapting Concepts of Local building elements like `Verandah` / `Engawa` etc.
 - v. Environmentally Friendly Design
 - vi. Barrier-free Design
 - vii. Flexible and Adaptive to future Extension
-
- i. Extending the design thought beyond the confined boundaries of the provided site, the existing Saheed Udhyan Park can be looked at as a natural extension of the landscape for the project. Integrated planning of the two can give a feel of "a building in a park".
 - ii. As both the VCC and park belong to the City and are of a public nature, the landscape of the park can be designed to accommodate the spill over of the VCC as well as an extension in form of out-door exhibition centre.




Figure 6.2.16 Shakkei – Design Philosophy

- iii. Embodying the Japanese design philosophy of 'Shakkei' in which the background landscape which is actually outside the site extent is borrowed and thoughtfully portrayed as a part of the site by carefully framing the same.
- iv. Taking into consideration the hot climate and bright direct sunlight, the traditional concept of a 'Verandah' can be utilized by creating comfortable semi-outdoor spaces with deep eaves. 'ENGAWA' too is a similar element in traditional architecture which acts as an intermediate space between indoors and outdoors.



 Intermediate Indian 'Verandah' space connecting outdoor space and indoor

Intermediate Japanese Engawa space connecting the outdoor space and indoor space 

Source: Internet

Figure 6.2.17 Simplicity and Flexibility of Spaces

- v. The building would be environmentally friendly with emphasis on energy consciousness and energy efficiency. This can be further aesthetically enhanced by having design elements as well as choice of building material that would be culturally inspired yet having a contemporary flair.
- vi. The design would adhere to the highest standard of Barrier Free design with an intention of creating a building that is not only environmentally friendly but also user friendly, and thus will continue to be appreciated for a long time.

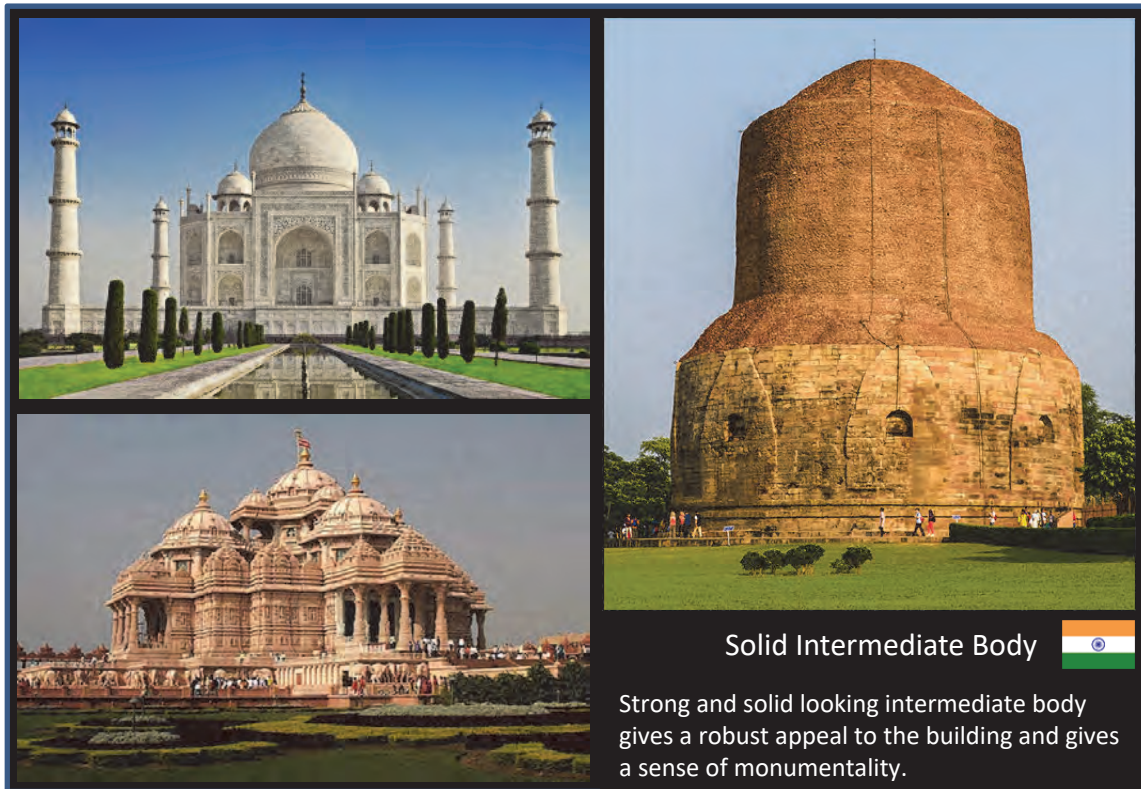
- vii. In future stages of design there would be various place and space ideas along with design elements and materials carefully chosen and integrated to further strengthen the theme of the cultural ties of the two countries.



Figure 6.2.18 Simplicity and Flexibility through Simple Straight Lines



Figure 6.2.19 Japanese Design Features – Gentle Curve



Source: JST + Internet

Figure 6.2.20 Solid Intermediate Body



Figure 6.2.21 Celebration of Water Areas

c) Form-Making

Form making is the final exercise for getting the Aesthetical Outcome and gives a direct opportunity to showcase the thought process behind the project. However successful form-making is an evolutionary process where the essence of the abstract concept is conceived and evolved by frame work for the design approach and finally manifested in the desired concrete form.

For the form-making exercise the Alternative – X (Low Flying Tower + Re-tractable seats) has been taken as a prototype and three form-making options have been worked on the same base to understand the final building architecture form design. With some modification all the form-making options can be tried on the remaining alternatives to have a similar out-come. The main aim of the form-making exercise at this feasibility study stage is not to decide the form-based design out-come but to try, check and understand how form-making as an exercise can impact, be leveraged as well as get impacted by other factors and aspects of projects.

Three initial studies of form-making have been undertaken trying to celebrate the spirit of Varanasi Convention Centre, namely, Welcoming 'Gateway', 'Nurturing' by Sharing and 'Congruence' through interaction.

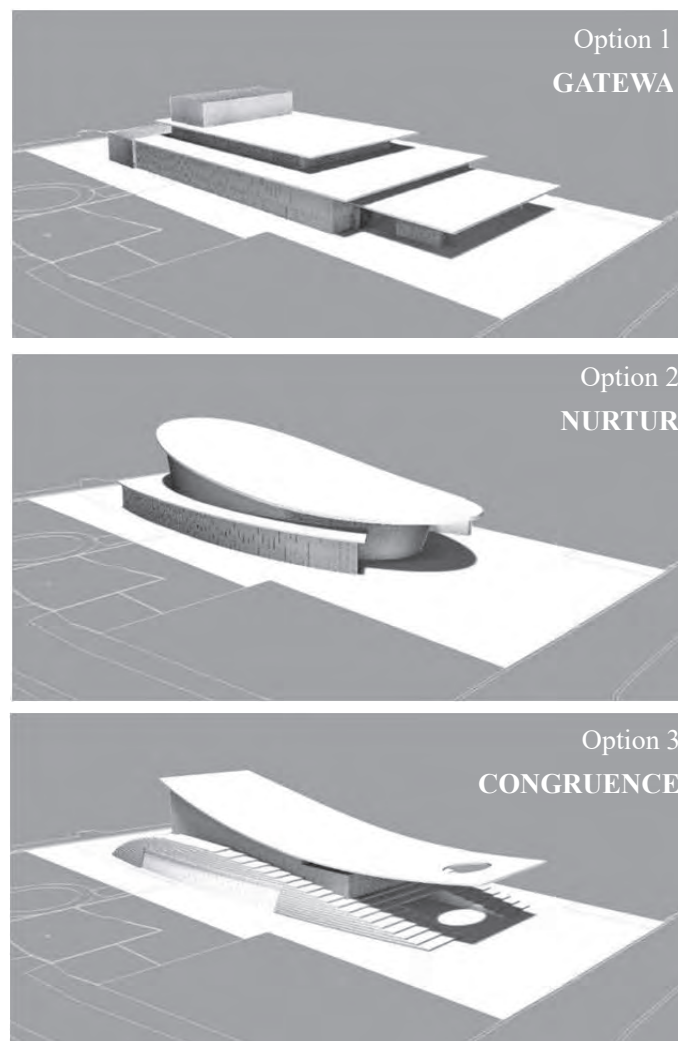


Figure 6.2.22 Options

Option 1 – GATEWAY

Concept:

- The Option of 'Gateway' derives its inspiration from the fact that the Varanasi Convention Centre is a welcoming place and the starting point of new relationships.
- The concept is highlighted by having a grand entrance portal like a gateway and a formal shape.



Figure 6.2.23 Gateway

Form-Making Highlights

- Gateway Emphasis with formal approach.
- Simplicity of form
- Few straight lines and minimum articulation
- Contextually inspired deep overhang and stepped roofs.

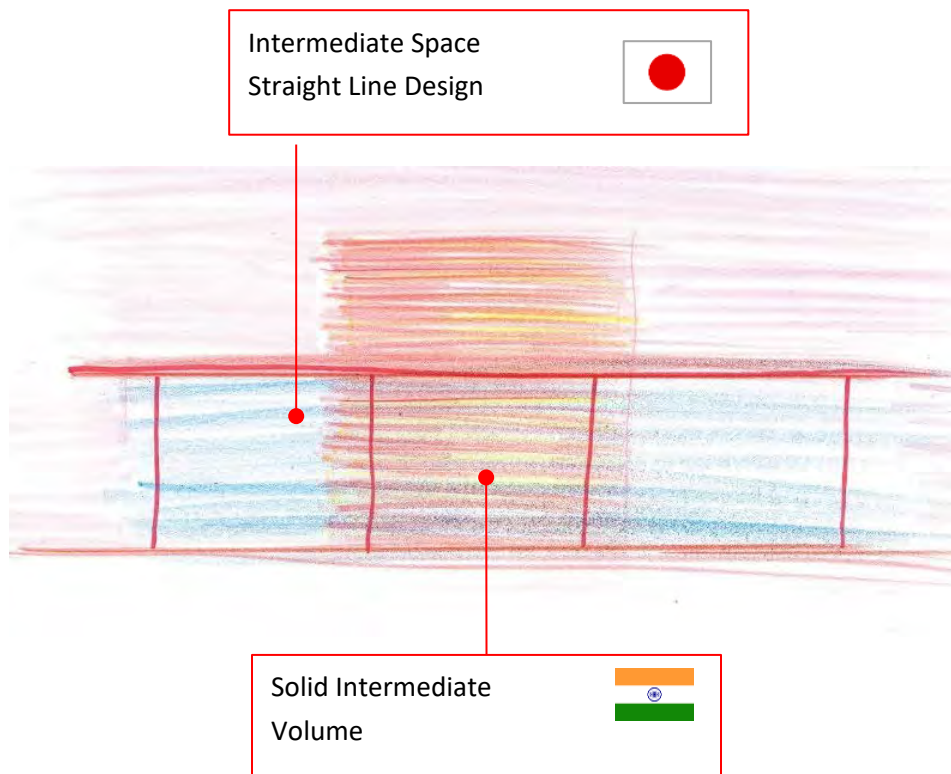


Figure 6.2.24 Form-Making Highlights for Option 1

The form making aims at giving the feeling of a series of gateways inspired by the entrance area of Inari-Fushimi Shrine in Kyoto



Figure 6.2.25 Torii at Fushimi Inari Shrine

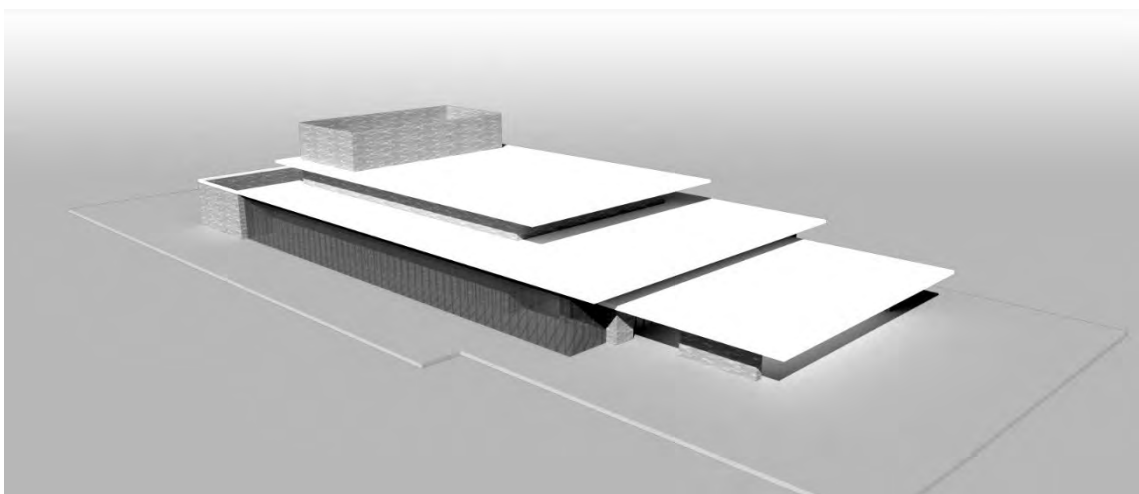


Figure 6.2.26 Option 1 - Gateway

OPTION 2 – NURTURE

Concept:

- The Option of `Nurture` derives its inspiration from fact that the Varanasi Convention Centre is a place where knowledge and culture is nurtured through the spirit of `Share and Care`.
- The concept is highlighted by having the central auditorium as a sanctuary place with other facilities around it to support the cause.



Figure 6.2.27 Nurture

Form-Making Highlights

- Series of Simple Curved Surfaces
- Few curved lines and minimum articulation
- Shape allows easy connection with the next phase in adjoining land.
- Contextually inspired deep overhang of the stepped roofs.

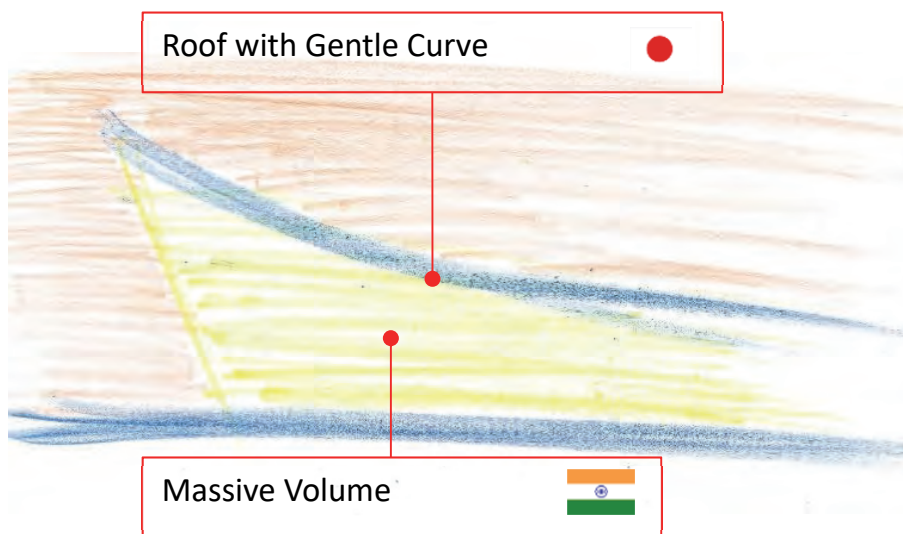


Figure 6.2.28 Form-Making Highlights for Option 2

The Shape of the plan allows easy integration of the next phase to give a feeling of a more coherent and seamless development.

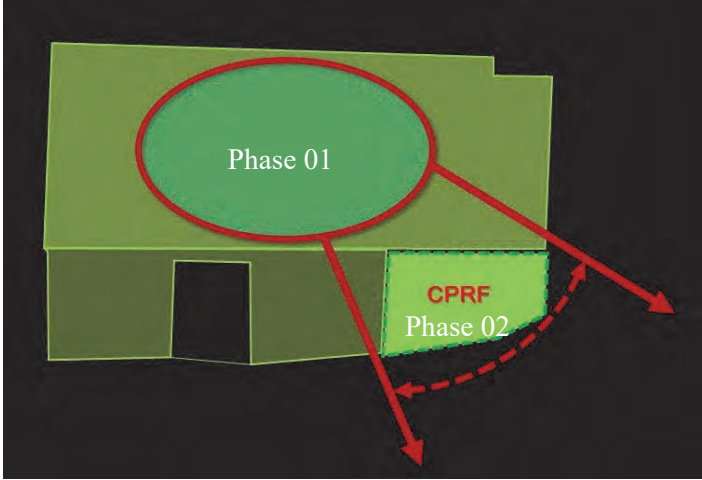


Figure 6.2.29 Easy Integration for Future Development

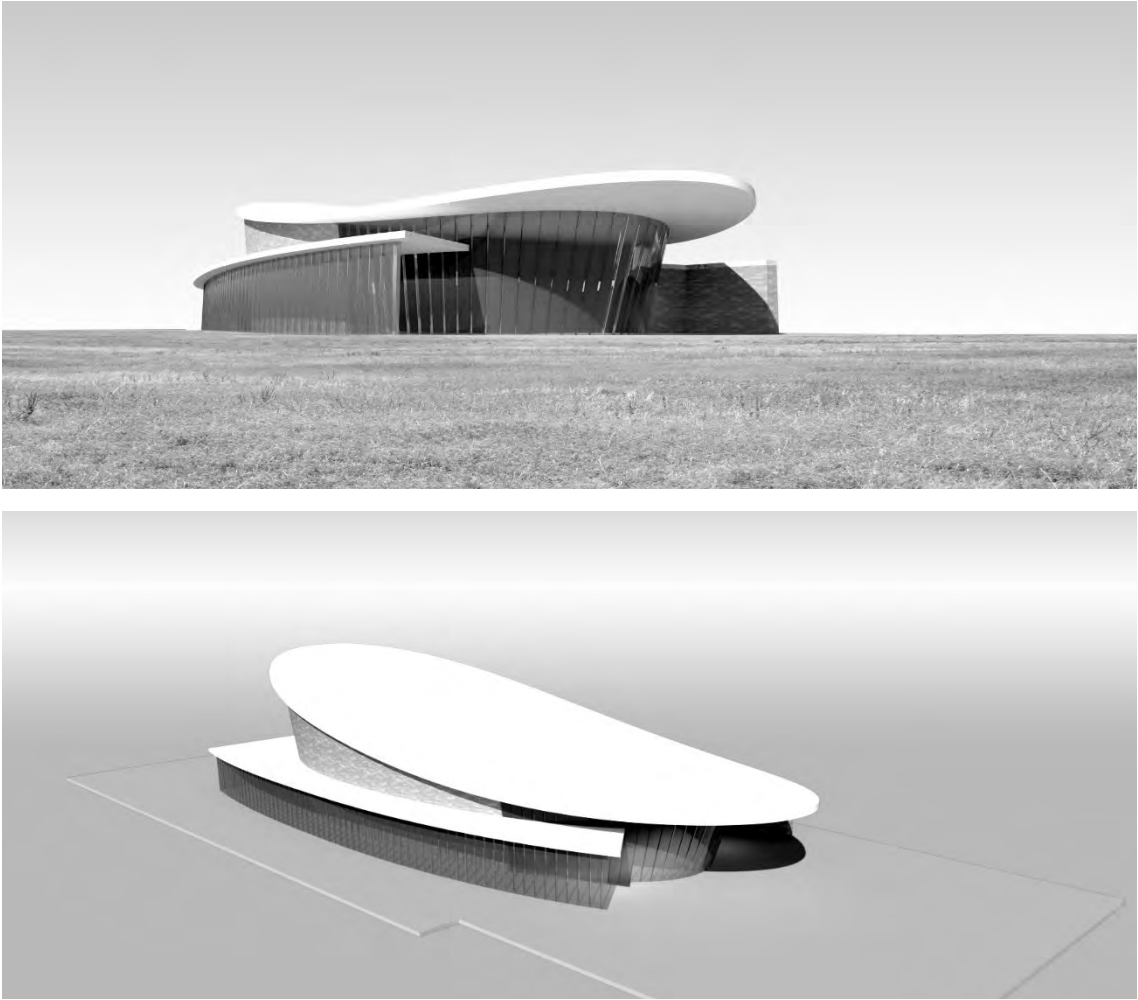


Figure 6.2.30 Option 2- Nurture

OPTION 3 – CONGRUENCE

Concept

- The Option of 'Congruence' derives its inspiration from the fact that the Varanasi Convention Centre is a place where various cultures come to gather in harmony and respect mutual existence side-by-side.
- The concept is highlighted by having a stepped form that encourages interaction to transcend the barriers, thus realizing the form integrated with the ground.



Figure 6.2.31 Congruence

Form-Making Highlights

- Marriage of Option A & B
- Ghats of Varanasi depicted through the stepped Ground/Roof Plane.
- The Landscape flows from the garden over the stepped profile of the parks
- Contextually inspired deep overhang of the stepped roofs.

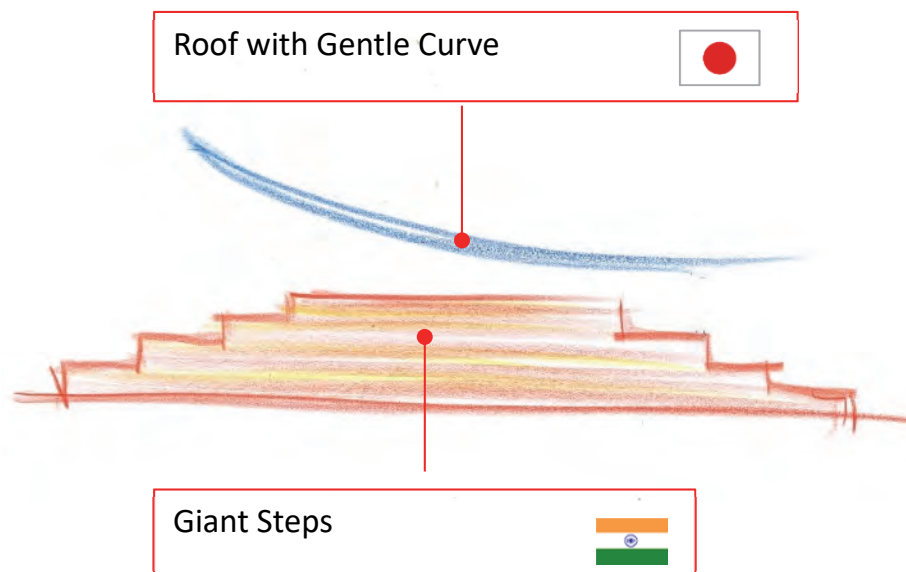


Figure 6.2.32 Form-Making Highlights for Option 3

The steps of the podium help in integrating the ground plane with the roof plane whereby creating an opportunity in which the landscape can flow over to the roof of the podium. With a properly designed landscape the Public Park can be integrated with this roof top green thereby creating a feel of a building in the park.

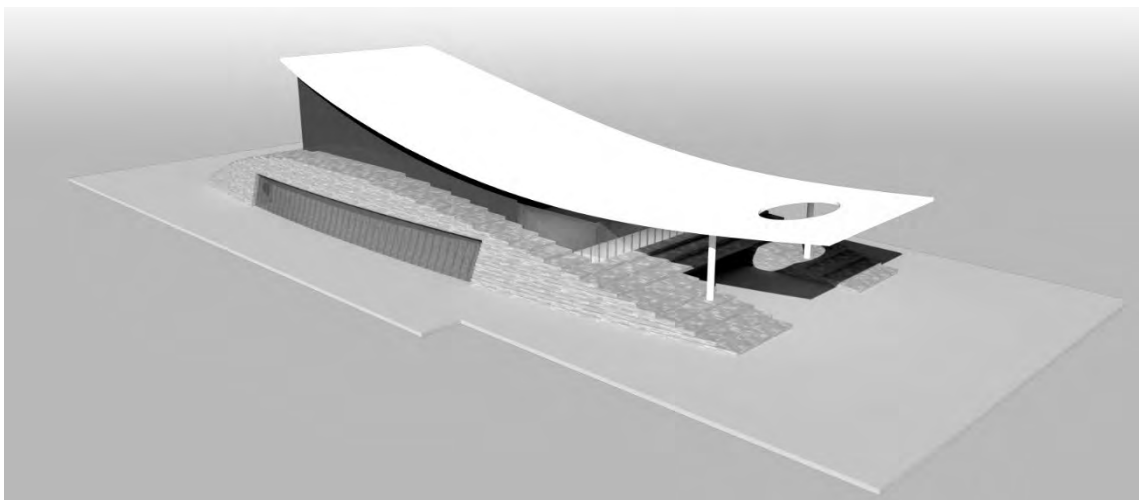
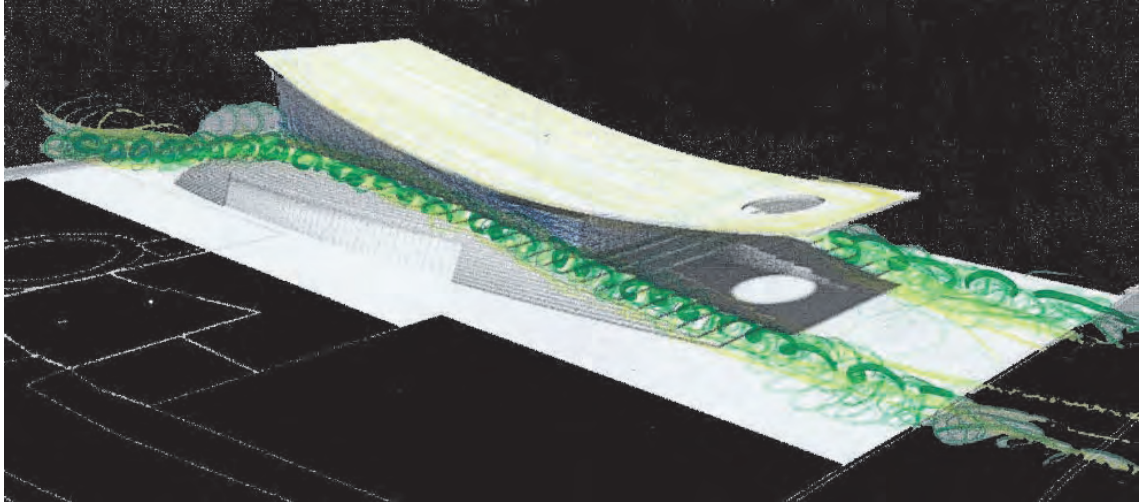


Figure 6.2.33 Option 3 - Congruence

6.2.3. Facility Planning (Structural/ Utility/ Sound System)

(1) Structural

As per the natural hazard maps of BMTPC (Building Materials and Technology Promotion Council, Central Government, Ministry of Housing & Urban Poverty Alleviation) Varanasi lies in Seismic Zone III which is Moderate Risk Damage Zone (MSK VII) with no major fault lines. Although there is no major history of wind related natural disaster, the BMTPC's Winds and Cyclone Hazard map indicates Varanasi to be in a High Damage Risk Zone ($V_b = 47$ m/s). In BMTPC's Flood Hazard Map Varanasi is also indicated as a flood-liable zone.

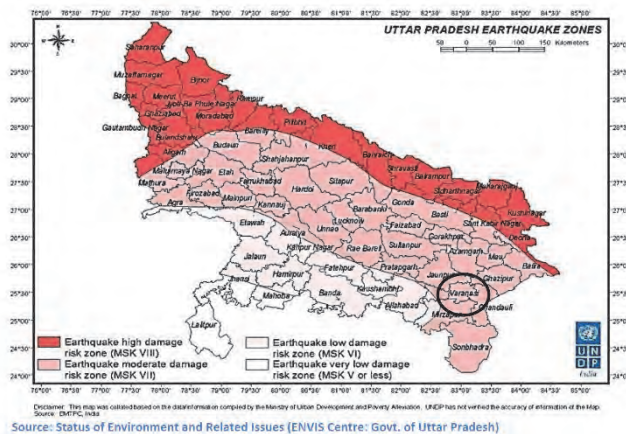


Figure 6.2.34 Earthquake Zone Map

Taking into consideration the relevant regulations, standards and codes mentioned in Chapter 5 section 3.3.e the structure would be designed mainly in Reinforced Concrete and long span steel roof. Varanasi lies in the Gangetic plains, where deep layers of silt with solid strata at very deep levels are very natural. Further, perched aquifer is also a common phenomenon in which there is an impervious strata layer creating water tables in two layers, upper and lower. Because of this, the water table sees a remarkable change with seasons where in summer, the water table (underground water table) is reached at 7.5-9m depth whereas in wet seasons, the water table would be reached at 2.0-2.5m depth. This poses a challenge to the speed and cost of the basement construction. Furthermore, based on the nearby construction site, the recommended foundation type is pile foundation/ isolated foundation with stitched raft slab or a full-fledged raft foundation. This decision is dependent on the depth of the basement as well as the span and the loads of the super structure.

(2) Utility

After inspecting other convention centres, the MEP facility should be minimized and easy-maintenance equipment should be installed. Special equipment for special use would be temporarily installed for each event.

The following MEP are being considered.

a) Electrical system

a)-1. Power incoming and distribution system

From the surrounding road, 11kV power shall be connected through utility poles. Based on the local operation and reliability, a suitable power distribution system shall be installed. The capacity is to be decided in consideration of the demands of the exhibition hall.

a)-2. Generator system

Varanasi faces power shortages which peak during hot summer months. Hence it is necessary to provide an auxiliary emergency generator. The capacity of the generator to be installed will be based on the local power supply condition. Looking at the current trend in the city as well as in other parts of India, a Diesel Generator would be the preferable choice and its fuel tank capacity shall depend on the anticipated operation time.



Source: JST

Figure 6.2.35 Generator in front of a music hall

a)-3. Lighting system

Fluorescent lighting fixtures shall be installed with the necessary illuminance and function. Central lighting control systems shall be studied for remote and scheduled control.

Emergency lighting and exit signs shall be installed based on local codes. The necessary power supply shall also be considered.

The lighting system for the stage shall be designed according to the program/use of the stage. The basic lighting system shall be installed permanently, and special lighting for specific purposes shall be provided by the event organizer temporarily.

a)-4. Socket outlets

The necessary socket outlets would be installed for standard use. Low voltage power will be supplied from the final distribution board whereas emergency power will be supplied from the generator for emergency use.

Low voltage power for the exhibition hall shall be installed in a floor pit, from which temporary cable can be installed for each exhibition. Only the necessary power source and circuit shall be installed in this project.



Source: JST

Figure 6.2.36 Power supply for exhibition hall (Mahatma mandir)

a)-5. Communication systems

Communication systems, including telephone system, PA system, intercom, MATV system, LAN/WAN, digital signage system, security system and so on, are to be studied.

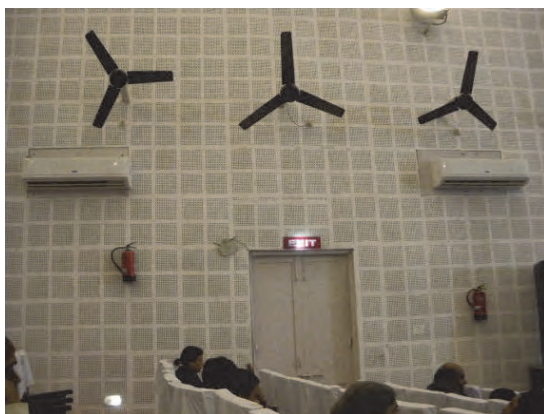
a)-6. Earthing, Lightning, and Fire protection systems

Based on the local condition and codes, the necessary earthing, lightning and fire protection systems including fire detection and alarm systems shall be installed.

b) Air Conditioning (AC) system

b)-1. Heat source, Air conditioning system

An AC system that is environmentally-friendly, energy-saving, as well as easy to maintain shall be installed. AC for the large hall will be provided with a central high-efficiency chiller and air handling unit whereas AC for small rooms will be provided with independently packaged air conditioners, because of the flexible operation.



Source: JST

Figure 6.2.37 Packaged air conditioners and ceiling fans in BHU Main Auditorium, Varanasi



Figure 6.2.38 Centrifugal chiller (Mahatma mandir, Gandhinagar)

b)-2. Fire detection and smoke exhaust systems

Based on the local condition and standard, the necessary fire detection and smoke exhaust systems shall be installed as a part of the fire fighting system.



Source: JST

Figure 6.2.39 Wall mounted smoke exhaust fan (Mahatma mandir, Gandhinagar)

c) Plumbing system**c)-1. Potable water system**

Potable water shall be tapped from the city main pipe, which shall be coming from the ESR installed in the site. Based on the local regulations and codes, the water storage capacity shall include fire fighting purposes too. Potable water shall be supplied to the necessary point either through gravity-fed water tank at higher level or by a pressure pump. As the requirement for hot water is limited, it shall be supplied through a local source rather than creating any central hot water system.

Taking into consideration the intermittent use pattern of convention centres as well as to avoid long term maintenance expenses, it is advisable to provide the users with drinking water through an end point filter system along with a local cooling machine.

c)-2. Wastewater system

Based on the local condition, wastewater can be connected to the city wastewater line. However, if required for Green Building purposes, the wastewater can be recycled and reused for toilet flushing purpose as well as landscape.

c)-3. Plumbing fixtures

Water-saving type fixtures shall be installed based on the local conditions. The number of fixtures would be decided based on the expected number of visitors and the governing regulations.

c)-4. Fuel Gas System

As there is no piped fuel gas system in Varanasi, LPG cylinders shall be used as deemed necessary. It shall be decided based on the local regulations if the gas cooking space can be part of the main building.

c)-5. Fire fighting system

Based on the local conditions, regulations and standards, the necessary fire fighting systems (sprinklers, hydrants and so on) shall be installed in a manner integrated with the larger fire fighting system framework.

(3) Sound system**a) Sound environment**

The sound environment shall follow the local regulations as well as the NBC provisions to suit the space usage as shown in the table below:

Table 6.2.3 Acceptable Indoor Noise Level for various buildings

Sl No.	Location	Noise Level dB(A)
(1)	(2)	(3)
i)	Auditoria and concert halls	20-25
ii)	Radio and TV studios	20-25
iii)	Cinemas	25-30
iv)	Music rooms	25-30
v)	Hospitals and cinema theatres	35-40
vi)	Apartments, hotels and homes	35-40
vii)	Conference rooms, small offices and libraries	35-40
viii)	Court rooms and class rooms	40-45
ix)	Large public offices, banks and stores	45-50
x)	Restaurants	50-55

Source: NBC 2005 Section 4

a) Sound system

The project will have mainly two types of sound systems: 1) generic catering to public announcements, and 2) task specific based on the activities assigned to the individual spaces. Especially with regards to the latter, the provision would be more for providing an infrastructural back-bone, which would be provided by each event organizer rather than a fixed device

6.3. Environmental and Social Considerations

This section discusses basic data of the project site for the Environmental and Social Considerations.

6.3.1. Environmental Setting

(1) Location of the Project

The proposed project site is in a 3.3 acre parcel located within the premises of Varanasi Municipal Corporation which is 1.7 km from a railway station, 2.3 km from a bus stand, 24 km from Lal Bahadur Shastri International airport, and 15km from Sarnath heritage site. It is situated in the Campus of Varanasi Municipal Corporation Headquarters at Sigra, Varanasi. It has Sigra sports club to its north side and Shaheed Uyaan Nagar Nigam towards its east side. Abutting the site is a 12m wide arterial road towards the east and west sides. The site lies in the government and semi-government buildings zone in Masterplan 2031. The location and situation of the proposed convention site is specified in Chapter 5.1.

The proposed site is located adjacent to the existing Municipal Corporation office building in the Nagar Nigam office campus. The existing office building also has an existing old auditorium.

(2) Socio-economic Profile

a) Economy

Since Varanasi is famous as a religious and pilgrimage town, the overall economy of the city is dependent on tourism and tourist related activities.

In addition to tourism, Varanasi grew as an important industrial centre and is famous for its silk industry, perfumes, ivory works, and sculpture. Silk weaving is one of the major industries of India and is famous all over the world for its quality. Varanasi accounts for 60% of the total production of woven silk products in India. Moreover, Varanasi has been a traditional seat for learning and also the publishing industry.

b) Literacy and Education

The literacy rate in Uttar Pradesh as per the 2011 Census was 70%. While this is still below the national average of 74%, there has been an increase of 13% from 2001. Similarly, the literacy rate in Varanasi District has also increased 10% (from 66% in 2001 to 76% in 2011, as mentioned in the City Development Plan). The literacy rate in Varanasi District is higher than the state average.

c) Religion

According to the National Census 2011, 79.80% of the population in Varanasi are Hindus, and the rest are Muslims (14.23%), Christians (2.30%), and others.

d) Public Health

The main health concerns observed in the project area are Diarrhoea, Dysentery, Viral Hepatitis, Typhoid, fever, Gastroenteritis, etc. These diseases are mostly due to water contamination.

e) Scheduled Caste and Scheduled Tribes

According to the National Census, the population of the scheduled caste increased from 3.51 Cr. in 2001 to 4.13 Cr. in 2011 at a growth rate of 18%. In Varanasi city, the percentage of scheduled caste population increased 5.5%. The scheduled tribe population in the state, on the other hand, increased substantially from 1.07 lakh to 11.34 lakhs. This is caused by a transfer of 10 castes from the scheduled caste list to the scheduled tribe list in Uttar Pradesh. Due to the same reason, the percentage growth appears to be much higher in Varanasi District and Varanasi city.

f) Slums

There are 156 slums in Varanasi, 2 of which: Chittipur Dayanagar and Madhopur Slum, are located within 500 meters from the proposed site. Approximately 700 inhabitants in 140 households live in Chittipur Dayanagar and 250 inhabitants in 40 households in Madhopur Slum. The living situation of these slums is not good. For example, 87% of the dwellings are temporary structures, and water supply is not available in 67% of the dwellings in Chittipur Dayanagar. Redevelopment of this slum area has been recommended by the slum-free city plan to make the area inhabitable and to create tenure rights.

(3) Biological and Natural Environment**a) Fauna and Flora****Flora**

Details pertaining to flora observed in the study area have been collected from site observations and discussions with the locals, as summarized in Table 6.3.1.

Table 6.3.1 Flora Observed in the Study Area

	Scientific Name	Common Name		Scientific Name	Common Name
1	<i>Caryota urens</i>	Fishtail Palm, Shivjata	11	<i>Peltophorum pterocarpum</i>	Copper Pod
2	<i>Roystonea regia</i>	Royal Palm, Bottle Palm	12	<i>Adansonia digitata</i>	Baobab
3	<i>Cocos nucifera</i>	Coconut Palm	13	<i>Lagerstroemia speciosa</i>	Queen's Flower, Taaman tree
4	<i>Ficus bengalensis</i>	Banyan tree, Vad tree	14	<i>Artocarpus heterophyllus</i>	Jackfruit
5	<i>Ficus religiosa</i>	Peepal	15	<i>Plumeria rubra</i>	Temple tree
6	<i>Ficus racemosa</i>	Aaudumber, Umber tree	16	<i>Drypetes roxburghii</i>	Putranjeev
7	<i>Mangifera indica</i>	Mango tree	17	<i>Alstonia scholaris</i>	Saptarni
8	<i>Syzygium cumini</i>	Jamun tree	18	<i>Spathodea campanulata</i>	African Tulip Tree
9	<i>Mimusops elengi</i>	Bakul tree	19	<i>Sterculia foetida</i>	Java Olive, Jungli Badam
10	<i>Delonix regia</i>	May flower, Gulmohar	20	<i>Neolamarkia cadamba</i>	Kadamb tree

Fauna

There are no major fauna found on the project site and hence no impact is envisaged. The vertebrate wild life of Varanasi based on site observations and discussions with locals, is summarized in Table 6.3.2.

Table 6.3.2 Fauna Observed in the Study Area

No.	Common Name (Scientific Name)	No.	Common Name (Scientific Name)
	Amphibi		Reptiles
1	Common toad (<i>Bufo melanostictus</i>)	1	Rock lizard (<i>Psmmophilus blanfordanus</i>)
2	Indian bullfrog (<i>Rana tigrina</i>)	2	Rock gecko (<i>Hemidactylus maculates</i>)
	Mammals	3	House gecko (<i>Hemidactylus brooki</i>)
1	Common Cat (<i>Felis silvestris catus</i>)	4	Chameleon (<i>Chamaeleonidae</i>)
2	Squirrel (<i>Funambulus palmarum</i>)		Birds
3	Goat (<i>Capra hircus aegagrus</i>)	1	Black bulbul (<i>Hypsipetes madagascariensis</i>)
4	Domestic Buffalo (<i>Bubalus bubalis</i>)	2	Common Myna (<i>Acridotheres tristis</i>)
5	Cow (<i>Bos primigenius</i>)	3	Rock pigeon (<i>Columbia livia</i>)
6	Bandicoot rat (<i>Bandicota bengalensis</i>)	4	Common Sparrow (<i>Passer domesticus</i>)
7	House rat (<i>Rattus rattus</i>)	5	Common Parakeet (<i>Psittacula Krameri</i>)
8	House Mouse (<i>Mus musculus</i>)	6	House Crow (<i>Corvus splendens</i>)
9	Common Dogs (<i>Canis lupus familiaris</i>)	7	Jungle Crow (Large -billed crow) (<i>Corvus macrorhynchos</i>)
		8	Domestic Fowl (Hen & Cock) (<i>Gallus gallus domesticus</i>)

b) Conservation Area and Sensitive Features

Table 6.3.3 shows details of the important features along with other sensitive ecological locations in the study area. According to N.1 in Table 6.3.3, there are some huge trees within the proposed site.

It is recommended to incorporate these trees into the proposed design of the Convention Centre. The situation is shown in Figure 6.3.1.

If tree felling is necessary, the applicant shall submit the application to the forest department for prior tree cutting permission along with the list of trees existing in the proposed land and the trees to be felled. A representative of the forest department may visit the proposed site for inspection before further action.

Table 6.3.3 Important Features and Sensitive Ecological Locations in the Study Area

	Sensitive Ecological Features	Locations	Aerial Distance (in km.) from Plot boundary
1	Nature Parks/ Dense tree covers	Shaheed Udhyaan, Herbal Park of VMC	0.07 Km 0.08 Km
2	Habitat for migratory birds	There are migratory birds that come to Varanasi in winter. They use the Ganga and its surroundings.	3.5 km
3	Stream/ Rivers	Varna river, Ganga River	0.5 km 2.0 km
4	Estuary/ Sea	Arabian sea	6.0 km
5	Mountains/ Hills	Vindhya range (Chunar)	26.14 km (Aerial)



Figure 6.3.1 Locations of Trees within the Premises of VMC

c) Climate

Varanasi has a humid subtropical climate, and temperatures vary widely between summer and winter. Summer lasts from early April to October, and the temperatures range from 22°C to more than 46°C.

On the other hand, winter in Varanasi brings pleasant temperature with the average high of 22.5°C. However, the temperatures vary widely hour by hour with warm daytimes and cold nights. Cold waves from the Himalayan region cause temperatures to dip across the city in winter from December to February and the temperatures sometimes fall below 5°C.

The average annual rainfall is 1,110 mm, which mostly occurs during July to September. Fog is common in winter, while hot dry winds, called “loo”, blow in summer. In recent years, Ganges water level has decreased significantly; upstream dams, unregulated water extraction, and dwindling glacial sources due to global warming may be to blame.

(4) Historical, Religious Places, and Cultural Heritages

Regarding cultural heritage, there are 20 archaeological monuments protected by the Archaeological Survey of India (ASI) in Patna Circle under the provision of the Ancient Monument and Archaeological Sites and Remains (Amendments and Validation) Act, 2010 (AMASR). The Act specifies a prohibited area of 100 m from any subject site and a regulated area is established 200 m from the limit of the prohibited area. No construction is allowed in the prohibited area but may be done in the regulated area after getting approval from the ASI.

The construction site of Varanasi Convention Centre is outside of these restricted areas.

(5) Surrounding Road Conditions, Traffic and Noise

a) Surrounding Road Conditions

The project site is situated in the Campus of Varanasi Municipal Corporation headquarters at Sagra, Varanasi. It has Sagra sports club to its north side and Shaheed Udyaan Nagar Nigam towards the east side. Abutting the sites are 12 meter wide arterial roads towards east and west sides. The site lays in the government and semi-government buildings zone in the Master plan 2031. Two roads, Nagar Nigam Road and Sagra Chauraha Road can provide access to the project site as shown in Figure 6.3.2.



Source: Google Earth

Figure 6.3.2 Roads in the Vicinity of the Project Site

b) Traffic Volume

Traffic volume studies were conducted to determine the number, movements, and categories of vehicle types at two locations near the proposed project site.

The traffic volume was measured in the day time (7am to 7pm: 12hours) on both sides of the public road at two locations; one is Nagar Nigam Road and the other is Sigra Crossing Road which are indicated in Figure 6.3.2.

The traffic volume was acquired as shown in Table 6.3.4. Rickshaws occupied the largest group of vehicles on these roads.

Table 6.3.4 Traffic Volume at Nearby Roads

Unit in Vehicle Number

Location of Measurement	Pedestrian / Rickshaw / Bike/ Bicycle/ Etc.	Auto, Battery Rickshaw / motorized three wheeler	Car / Jeep	Small Trucks / other small loading vehicles etc.	Bus / Mini bus / Truck/ other heavy vehicles
VMC Road	16,492	1,063	961	259	224
Sigra Crossing	63,021	29,161	21,745	876	585

Source: JST

c) Ambient Noise Measurement

Ambient noise level was measured at day and night time at the previous two locations as shown in Figure 6.3.2. All the measured values exceeded Indian environmental standards (for land use in industrial and commercial areas).

Table 6.3.5 Noise Level in Nearby Areas

Unit in LAeq

Location of Measurement	January 3 rd , 2017		January 4 th , 2017
	Day	Night	Day
VMC Road	75.7	65.4	77.2
Sigra Crossing	83.4	77.4	85.6

Notes;

1) The Indian environmental standard for noise control as per The Noise Pollution Rules, 2000, is shown as below:

A: Industrial	75 (day)	70 (night)
B: Commercial	65 (day)	55 (night)
C: Residential	55 (day)	45 (night)
D: Silence zone	50 (day)	40 (night)

2) The limits of day time and night time for the measurements is during 14:00 to 16:00 and 22:00 to 24:00 for January 3rd, 2017 and 10:00 to 12:00 for January 4th, 2017

Source: JST

6.3.2. Legal and Regulatory Framework

The Government of India has laid various policy guidelines, acts and regulations pertaining to the environment. The Environmental (Protection) Act, 1986 is the umbrella legislation for the protection of the environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Ministry of the Environment and Forests (MOEF) and the Central Pollution Control Board (CPCB)/ Uttar Pradesh Pollution Control Boards (UPPCB).

With respect to the prevention and control of environmental pollution, the following Acts and Rules from the Ministry of the Environment and Forests of India are shown in Table 6.3.6 which mainly govern the proposed Varanasi Convention Centres:

Table 6.3.6 Environmental Regulations and Legislations

No.	Act/Rules	Purpose	Reason for Applicability
1	The Environmental Protection Act, 1986	To protect and improve the overall environment	All environmental notifications, rules and schedules are issued under this act.
2	Environmental Impact Assessment Notification, 14 th Sep-2006	To provide environmental clearance to new development activities following environmental impact assessment	This notification is applicable only to the identified 29 projects that need an EC posted at UPPCB website
3	Municipal Wastes (Management and Handling) Rules, 2000	To manage the collection, transportation, segregation, treatment and disposal of municipal solid wastes	This notification is applicable to municipal solid waste treatment facility projects
4	Air (Prevention and Control of Pollution) Act, 1981	To control air pollution from transportation and to control emission of air pollutants as per prescribed standards	This act will be applicable during construction for obtaining NOC for the establishment of workers' camp, construction camp, etc.
5	Water Prevention and Control of Pollution Act, 1974	To control water pollution by controlling discharge of pollutants as per prescribed standards	This act will be applicable during construction for obtaining NOC for the establishment of workers' camp, construction camp, etc.
6	The Noise Pollution (Regulation Control) Rules, 2000	The standards for noise for day and night have been promulgated by MOEF for various land uses	This act will be applicable for all construction equipment deployed at the worksite
7	Public Liability Act, 1984	Protection from hazardous materials and accidents	Contractor needs to stock hazardous material like diesel, bitumen, emulsions, etc.
8	Explosive Act, 1984	Safe transportation, storage and use of explosive material	For transporting and storing diesel, oil and lubricants, etc.
9	Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989	To check vehicular air and noise pollution	This rule will be applicable to vehicles deployed for construction activities and construction machinery.

Source: JST

6.3.3. Procedure for prior Environmental Clearance

This section is mostly based on the EIA Notification 2006, the Ministry of the Environment and Forests.

Procedure for prior Environmental Clearance for building construction projects is as follows:

An application seeking prior Environmental Clearance in all cases is to be made on the prescribed Form 1 and Supplementary Form 1A, especially framed only for Building/ Construction projects/ Area Development projects and Townships (item 8, Schedule, Environmental Clearance Notification 2016), which are to be submitted along with a copy of the conceptual plan, instead of the pre-feasibility report (which otherwise is to be submitted for all other items as per EIA Notification).

The Stages in prior Environmental Clearance Process are as follows:

(1) Stage I: Screening

Screening refers to the scrutiny of category 'B' projects seeking prior environmental clearance made on Form-1 and/or Form-1A (applicable only for building construction and Township and area development projects) by the concerned Expert Appraisal Committee (EAC) / State Level Expert Appraisal Committee (SEAC) for determining whether or not the project requires further environmental studies for preparation of EIA for its appraisal depending upon the nature and location of the project.

(2) Stage II: Scoping

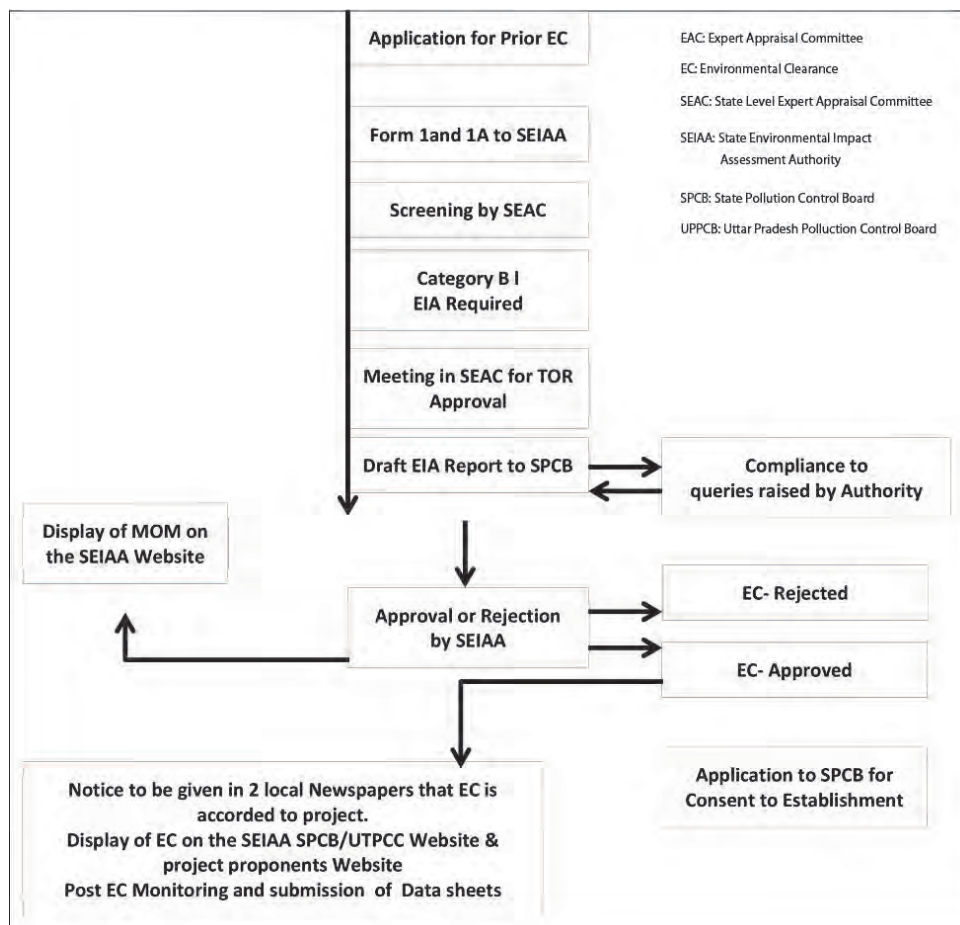
Scoping refers to the process by which the SEAC, or EAC (if SEAC is not constituted for the State) in the case of Category ‘B1’ projects or activities, determine detailed and comprehensive TORs addressing all the relevant environmental concerns for the preparation of EIA report.

(3) Stage III: Appraisal

Appraisal means the detailed scrutiny by the Expert Appraisal Committee or State Level Expert Appraisal Committee of the application and other documents submitted by the applicant for grant of environmental clearance.

As per EIA notification, Public Consultation is considered as Stage III. Public Consultation refers to the process by which the concerns of the affected locals and others who have a plausible stake in the environmental impacts of the project or activity are ascertained. But all Building/ Construction projects/ Area Development projects and Townships (item 8) are exempted from the process of Public hearing as per this Notification.

Prior Environmental Clearance Process for Category B Projects is presented in Figure 6.3.3.



Source: EIA Guidance Manual for Building Construction 2010 (Annex 10)

Figure 6.3.3 Prior Environmental Clearance Process for Category B Projects

(4) Type of EC to be required for this Proposed Project

As per EIA Notification 2006, the projects which have a built-up area over 20,000 m² shall require preparation of an EIA (Environmental Impact Assessment) statement. When the built-up area ranges from 5,000 to 20,000 m², the project proponent needs only to submit to the local authority Form 1A, an Environmental Management Plan with Mitigation Measures and Environmental Monitoring Plan and a Self-Declaration Form to comply with the environmental conditions along with specified fees for the EC (Environment Clearance).

Since the proposed project doesn't come under this screening, EIA is not required.

All projects or activities which are not required to undergo public consultation, or submit an Environmental Impact Assessment report, shall be carried out on the basis of the prescribed application Form 1 or Form 1A as applicable, any other relevant validated information available and the site visit wherever the same is considered as necessary by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

Preparation of Form 1A is applicable only for building construction and township development projects. The contents of Form 1A shall cover the requirement and compliance on land environment, water environment, vegetation, fauna, air environment, aesthetics, socio-economic aspects, building materials, energy construction and environmental management plan. The draft of Form 1A for this project is shown in Appendix-7.

(5) Notification S.O. No. 3999 (E) dated 9th of December, 2017 for integrating Environmental Clearance incorporated with Building Permission

The Indian Government has put in place a new framework and an institutional structure for the environmental clearance for the building sector. The MOEF (Ministry of the Environment and Forests) issued a notification S.O. No. 3999 (E) dated 09.12.2016 for integrating standard and environmental conditions incorporated with building permissions for buildings of different sizes of buildings; 'Category 1' is for buildings with total built-up building area of 5,000 m² to 20,000 m²; 'Category 2' as 20,000 m² to 50,000 m² and 'Category 3' 50,000 m² to 150,000 m² with monitoring mechanisms for implementation of environmental concerns and obligations in building projects.

For Category 1, the following requirements, which are shown in Table 6.3.7 are mandatory for the layout plan and its design as per the above notification.

Table 6.3.7 Mandatory Requirements for Category 1 Buildings as per Notification S.O. No.3999

Permissions	Mandatory Requirements as per Notification S.O. No. 3999 (E)
Topography and Natural Drainage	<ul style="list-style-type: none"> Natural drain systems should be maintained for ensuring unrestricted flow of water. No construction is allowed to obstruct the natural drainage system. No construction is allowed on wetland and water bodies. Check dams, landscape, and other SUDS (Sustainable Urban Drainage Systems) are allowed for maintaining the drainage pattern
Water Conservation, Rain Water Harvesting, and Ground Water Recharge	<ul style="list-style-type: none"> Promotion of use of water efficient appliances Adoption of rain water harvesting as per local bye-law provisions Adequate provision for storage and recharge as per the Ministry of Urban Development Model Building Bye-Laws, 2016. A rain water harvesting plan needs to be designed where recharge bores (minimum one recharge bore per 5,000 square meters of built up area) are recommended. Promotion of storage and reuse of the rain water harvesting At least 20% of the open spaces shall be pervious.
Waste Management	<ol style="list-style-type: none"> Solid waste management <ul style="list-style-type: none"> Provision of a separation system to provide wet and dry bins for segregation of waste The Solid Waste (Management) Rules 2016 and the e-waste (Management) Rules 2016, and the Plastics Waste (Management) Rules 2016 shall be followed. Sewage treatment <ul style="list-style-type: none"> In areas where there is no municipal sewage network, onsite treatment systems should be installed. Natural treatment systems which integrate with the landscape shall be promoted. As far as possible treated effluent should be reused. Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed of as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.
Energy	<ul style="list-style-type: none"> Compliance with the Energy Conservation Building Code (ECBC) of the Bureau of Energy Efficiency shall be ensured. Outdoor and common area lighting shall be Light Emitting Diodes (LED). Solar, wind or other Renewable Energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level/ local building bye-laws requirements Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirements of the local building bye-laws, whichever is higher. Concept of passive solar design shall be incorporated in the building design. Wall, window, and roof u-values shall be as per ECBC specifications.
Air Quality and Noise	<ul style="list-style-type: none"> Dust, smoke & other air pollution prevention measures shall be provided for the building as well as the site. Sheet covers shall be provided for vehicles bringing in sand, cement, murrum and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Sand, murrum, loose soil, and cement stored on site shall be covered adequately so as to prevent dust pollution. Wet jets shall be provided for grinding and stone cutting. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust. All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed of. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules 2016. All workers working at the construction site and involved in loading, unloading or carriage of construction material and construction debris or working in any area with dust pollution shall be provided with dust masks. For indoor air quality the ventilation provisions as per the National Building Code of India shall be put in place. The location of the DG set and exhaust pipe height shall be as per the provisions of the CPCB norms.
Green Cover	<ul style="list-style-type: none"> A minimum of 1 tree for every 80 square meters of land should be planted and maintained. Preference should be given to planting native species. Where the trees need to be cut, compensatory plantation in the ratio of 1:3 (i.e. planting of 3 trees for every 1 tree that is cut) shall be done and maintained.

Source: JST

(6) Relevant Permissions other than Environmental Clearance

Certain permits/ NOCs (No Objection Certificates) from different departments need to be obtained as per requirements. The detailed list of required NOCs and permissions are shown in Table 6.3.8. These permissions may include NOC for waste management, power receiving, tree cutting permissions, etc. The number of approvals or NOCs may vary according to the requirements at the final stage of construction. With regard to permissions for building construction, refer to Chapter 5.

Table 6.3.8 Relevant Permissions and NOCs

Type of Approval	Approving Authority	Stage of Project	Estimated Duration (Days)
NOC for Waste Management, etc. (as per requirements)	Varanasi Municipal Corporation. Jalkal Vibhag of Varanasi Municipal Corporation is responsible for supply of pure drinking water and proper sewerage facilities to the citizens.	Pre-construction	30 - 60
Road access	NHAI/PWD	Pre-construction	30
Approval for operation of bore wells in the project (if necessary)	Central Ground Water Board	Pre-construction	15
NOC for power receiving (for all substations / transformers in the building)	Electricity Distribution Authority. Electricity for the entire Varanasi and eastern region of Uttar Pradesh is generated by Purvanchal Vidyut Vitran Nigam Limited (PuVVNL). A temporary electricity connection will be opted from PuVVNL according to the requirements	During construction	15
Approval for keeping the diesel in storage during construction stage and operational phase	Chief Controller of Explosives	During construction /Operation	15
Service Plan Clearance and Service Connections (Water, Sewer, Power, Gas, Telecom)	Service Departments/ other concern authorities	During-Construction/Post construction	30
Occupancy Certificate	Development Authority/ Municipality	Post construction	15
Tree Cutting Permission	Forest Department of UP state or VMC	Before the Construction the Tree Protection Act, 1976 makes it compulsory to seek official permission from the forest department for cutting, lopping, removing and disposing of the felled trees. For trees present on all other land holdings, including private, permission from the Divisional Forest Officer (DFO) is required. A Conservator is the appellate authority under the said Act. The proponent needs to submit an application to the respective Forest department office, mentioning the purpose along with the relevant documents. On receiving the application, a concerned officer undertakes a site inspection for further decisions.	Depends on the situation

Source: JST

6.3.4. Alternative Analysis including Zero-Option

(1) Zero Option

Zero option does not implement the construction of the VCC project. In the case of the zero option, the existing old auditorium will still remain.

The comparison of environmental and social impacts for the cases of the zero option and the proposed project is shown in Table 6.3.9.

Table 6.3.9 Comparison of Environmental and Social Aspects

Environmental and Social Impact	Zero Option	Proposed Project
Topography	Same as existing condition	Minor change is expected due to the excavation of the project site and appearance of a building structure.
Hydrology	Same as existing condition	Minor change due to development of the facility. However, mitigation measures will be implemented for the drainage plan as per the legal requirements
Vegetation	Same as existing condition	Tree cutting or transplantation will be necessary for the development. However, these will be carried out as per the legal requirements.
Landscape	Same as existing condition. Existing old auditorium will still remain.	A new building for a convention centre will appear as an improved cityscape.
Local economy	Same as existing condition	Opportunities for employment will be expected in the construction and operation phases.

Source: JST

(2) Alternative Analysis

Refer to Chapter 6.2.

6.3.5. Initial Scoping

The potential environmental and social elements which may be caused by the project are shown in Table 6.3.10. Air / water pollution, solid waste management, soil contamination, noise, ecosystem, social infrastructure (traffic), infectious diseases, working environment / safety and safety are expected as environmental and social elements which may cause potential adverse impacts.

Table 6.3.10 Scoping List

Category	No	Impact Item	Assessment	Phase	Reason
Pollution control	1	Air pollution	B-	Construction	Potential impact due to generation of dust from construction vehicles and equipment
			B-	Operation	Some impact due to the increased incoming and outgoing vehicles at the convention centre.
	2	Water Pollution	B-	Construction	<ul style="list-style-type: none"> • Soil runoff at the site (Particularly during rainy season). • Disposal of domestic wastewater from temporary labourers' rest rooms. • Spillage of oil and grease from the vehicles and equipment.
			D	Operation	Sewage will be generated by the VCC. However, an appropriate sewerage system will be provided as per the requirements of the notification S.O. No. 3999 (E)
	3	Solid Waste	B-	Construction	Excavation soil and demolition waste including asbestos or general waste will be generated at construction site.
			D	Operation	An appropriate waste management system including segregation will be applied as per the requirements of the notification S.O. No. 3999 (E).
	4	Soil contamination	B-	Construction	Demolition waste including asbestos and soil that is potentially contaminated by asbestos will be generated at the construction site.
			D	Operation	VCC will not generate hazardous substances.
	5	Noise and vibrations	B-	Construction	<ul style="list-style-type: none"> • Generation of noise during movement of vehicles carrying materials and loading & unloading activities. • Noise from the mechanical operations such as drilling, fitting, etc.
			B-	Operation	Impact of noise due to vehicles in the parking area and the nearby roads.
	6	Land subsidence	D	Construction	The project does not include groundwater extraction.
			D	Operation	The project does not include groundwater extraction.
	7	Offensive odour	D	Construction	The construction works will not generate offensive odour.
			D	Operation	The operation will not generate offensive odour.
	8	Bottom sediment	D	Construction	There is no construction works on the river bed.
			D	Operation	There is no operation activity on the river bed.
Natural Environment	9	Protected area	D	Construction	The project site does not cross national parks or reserved areas.
			D	Operation	The project site does not cross national parks or reserved areas.
	10	Ecosystem	B-	Construction	<ul style="list-style-type: none"> • Loss of vegetation due to excavation works. • Displacement of vegetation
			D	Operation	There will be a landscape design as per the requirements of the notification S.O. No. 3999 (E) by the project.
	11	Hydrology	D	Construction	The catchment area of the project site is minor and restricted to the local level.
			D	Operation	A facility plan on water conservation, rain water harvesting and groundwater recharge will be provided by the project as per the requirements of the notification S.O. No. 3999 (E).

Category	No	Impact Item	Assessment	Phase	Reason
	12	Topography /geology	D	Construction	Minor change is expected due to the excavation of the project site. However, there will be no large scaled topographical / geological I change.
			D	Operation	There will be no topographical / geological I change.
	13	Resettlement	D	Construction	The project site is the existing old auditorium with no residential houses.
			D	Operation	The project site is the existing old auditorium with no residential houses.
	14	Poverty group	D	Construction	The project site does not relate to poverty.
			D	Operation	The project site does not relate to poverty.
	15	Ethnic Minorities and Indigenous People	D	Construction	There are no ethnic minorities in the project site.
			D	Operation	There are no ethnic minorities in the project site.
	16	Local economy of employment & livelihood	B+	Construction	Employment opportunities will be increased for the locals by the construction works.
			B+	Operation	Employment opportunities will be increased due to the development of surrounding areas.
	17	Land use and utilization of local resources	D	Construction	Land use pattern will be the same as the existing condition.
			D	Operation	Land use pattern will be the same as the existing condition.
	18	Water Use	D	Construction	The project site does not relate to water use.
			D	Operation	The project site does not relate to water use.
	19	Existing social infrastructure and social services	B-	Construction	Impact on traffic by construction vehicles and impact on surrounding public utilities due to underground excavation.
			B-	Operation	Impact on traffic by the cars of the users or visitors of the centre.
	20	Social organizations such as social asset and the local authority	D	Construction	The construction works does not relate to social organization.
			D	Operation	The proposed convention centre is a social infrastructure and will be operated as a social asset.
	21	Biased distribution of damages and benefits	D	Construction	Some impact is expected partially at the project site and the surrounding area. However, it will be temporary during the construction phase.
			D	Operation	The proposed convention centre will provide benefits to all persons concerned.
	22	Conflict of interest in the project area	D	Construction	The project is to implement a project for social contribution through fair processes which will not bring conflict of interest at the local level.
			D	Operation	
	23	Cultural heritage	D	Construction	There are no sites of cultural significance in or around the project sites
			D	Operation	
	24	Landscape	D	Construction	Some change of appearance will be generated at the construction phase. However, the change is temporary.
			B+	Operation	An improved city scape will be generated compared to the existing old building.
	25	Gender	D	Construction	The construction works does not relate to gender issues.
			D	Operation	The operation does not relate to gender issues.
	26	Children's rights	D	Construction	Child labour will not be permitted in any condition under Indian legal requirements.
			D	Operation	

Category	No	Impact Item	Assessment	Phase	Reason
	27	Infectious diseases such as HIV/AIDS	B-	Construction	A number of workers will be involved at the project sites. In this case social interactions cannot be avoided which may bring a risk of spread of infectious diseases including HIV/AIDS and STDs.
			D	Operation	The operation of VCC does not relate to occurrence of Infectious diseases such as HIV/AIDS.
	28	Working environment and safety	B-	Construction	Special care of workers health and safety for handling hazardous substances should be taken.
			D	Operation	The operation of VCC does not include poor or dangerous working environment.
Others	29	Accidents	B-	Construction	Construction activities may cause risk of serious injuries or fatalities including traffic accidents to workers or third parties.
			D	Operation	The operation of VCC does not include poor or dangerous working environment.
	30	Trans-boundary impact and climate change	D	Construction	The project does not include construction works which may cause trans-boundary impact.
			D	Operation	The measures for energy-saving strategy will be taken as per the requirements of the notification S.O. No. 3999 (E).

A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progress.)

D: No impact

Source: JST

6.3.6. Potential Environmental and Social Impacts that are apparent at IEE Level

Table 6.3.11 shows the potential adverse impacts that are apparent at IEE (Initial Environmental Examination) which may be caused by the project at each project phase.

Table 6.3.11 Potential Adverse Impacts that are apparent at IEE Level at Each Project Phase

No	Element	Phase	Potential Adverse Impact
1	Air pollution	Construction	<ul style="list-style-type: none"> Dust generation from preparatory works. Dust from various construction operations and emissions from operation of construction equipment or movement of vehicles are likely to cause some impacts on the construction workers as well as surrounding residents. Traffic to the construction sites during construction will be more intensive compared to the current status which may cause idling of construction vehicles and other vehicles of third parties in the vicinity.
		Operation	<ul style="list-style-type: none"> Traffic to the proposed convention centre will be more intensive compared to the current status which may cause idling of the vehicles of visitors and operating staffs, which may cause potential adverse impacts in the form of generation of air pollutants.
2	Water Pollution	Construction	<ul style="list-style-type: none"> Soil runoff at the site (Particularly during rainy season) may cause turbid water. Disposal of domestic wastewater from temporary labourers' rest rooms is expected in the construction phase. Spillage of oil and grease from the vehicle is expected.
3	Solid Waste	Construction	<ul style="list-style-type: none"> Impact due to excavation soil, demolition waste including asbestos or general waste at the construction site is expected. The waste from labourers' rest rooms will cause unhygienic conditions.

No	Element	Phase	Potential Adverse Impact
4	Soil contamination	Construction	<ul style="list-style-type: none"> Handling of chemicals, oil and grease may cause adverse impacts in the form of soil contamination. Demolition waste including asbestos may cause soil contamination.
5	Noise and vibrations	Construction	<ul style="list-style-type: none"> Generation of noise during movement of vehicles carrying materials and loading & unloading activities is expected. Noise from a standby DG (Diesel Generator) is expected. Noise from the mechanical operations such as drilling, fitting, etc. is expected.
		Operation	<ul style="list-style-type: none"> Noise from a standby DG (Diesel Generator) is expected. Impact of noise due to vehicles in the parking area is expected.
10	Ecosystem	Construction	<ul style="list-style-type: none"> Loss of vegetation due to excavation works is expected.
19	Existing social infrastructure and social services	Construction	<ul style="list-style-type: none"> Impact on traffic is expected by the incoming and outgoing of construction vehicles. Impact on surrounding public utilities is expected due to underground excavation.
		Operation	<ul style="list-style-type: none"> Impact on traffic of the nearby roads by the cars of the users or visitors of the centre is expected.
27	Infectious diseases of HIV/AIDS	Construction	<ul style="list-style-type: none"> A number of workers at the project sites may cause a risk of spreading infectious diseases including HIV/AIDS.
28	Working environment and safety	Construction	<ul style="list-style-type: none"> Construction works may cause poor working environment and reduced safety to construction workers.
29	Accidents	Construction	<ul style="list-style-type: none"> Construction activities may cause an adverse impact of risk of serious injuries or fatalities including traffic accidents to workers or third parties.

Source: JST

6.3.7. Environmental Impact Assessment

The results of comparison between the initial scoping and the assessment at IEE level is shown in Table 6.3.12.

Table 6.3.12 Environmental Impact Assessment between Initial Scoping and IEE

Category	No.	Element	Assessment at Initial Scoping		Assessment at IEE		Reason
			Cont.	Ope.	Cont.	Ope.	
Pollution control	1	Air pollution	B-	B-	B-	B-	<p><u>At Construction Phase</u> Potential impact due to generation of dust by construction vehicles and equipment is expected.</p> <p><u>At Operation Phase</u> Some impact due to the increased incoming and outgoing vehicles of staffs and visitors at VCC.</p>
	2	Water Pollution	B-	D	B-	N/A	<p><u>At Construction Phase</u></p> <ul style="list-style-type: none"> Soil runoff at the site (Particularly during rainy season). Disposal of domestic wastewater from temporary labourers' rest rooms. Spillage of oil and grease from the vehicles. <p><u>At Operation Phase</u> Sewage will be generated in VCC. However, an appropriate sewerage system will be provided as per the requirements of the notification S.O. No. 3999 (E).</p>

Category	No.	Element	Assessment at Initial Scoping		Assessment at IEE		Reason
			Cont.	Ope.	Cont.	Ope.	
	3	Solid Waste	B-	D	B-	N/A	<p><u>At Construction Phase</u> Excavation soil, demolition waste including asbestos or general waste will be generated at the construction site.</p> <p><u>At Operation Phase</u> An appropriate waste management system including segregation will be applied as per the requirements of the notification S.O. No. 3999 (E).</p>
	4	Soil contamination	B-	D	B-	N/A	<p><u>At Construction Phase</u> Demolition waste including asbestos and potentially soil contaminated by asbestos will be generated at the construction site.</p> <p><u>At Operation Phase</u> VCC will not generate hazardous substances which may cause soil contamination.</p>
	5	Noise and vibrations	B-	B-	B-	B-	<p><u>At Construction Phase</u></p> <ul style="list-style-type: none"> • Generation of noise during travelling of vehicles carrying materials and loading & unloading activities is expected. • Noise from the mechanical operations such as drilling, fitting, etc. is expected. <p><u>At Operation Phase</u> Impact of noise due to vehicles of visitors and staffs incoming and outgoing at VCC.</p>
	6	Land subsidence	D	D	N/A	N/A	<p><u>At Construction Phase</u> The project does not include groundwater extraction.</p> <p><u>At Operation Phase</u> The project does not include groundwater extraction.</p>
	7	Offensive odour	D	D	N/A	N/A	<p><u>At Construction Phase</u> The construction works will not generate offensive odour.</p> <p><u>At Operation Phase</u> The operation works will not handle substances which may cause offensive odour.</p>
	8	Bottom sediment	D	D	N/A	N/A	<p><u>At Construction Phase</u> There is no construction works in the river bed.</p> <p><u>At Operation Phase</u> There is no operation activity in the river bed.</p>
	9	Protected area	D	D	N/A	N/A	<p><u>At Construction Phase</u> The project site does not cross national parks or reserved areas.</p> <p><u>At Operation Phase</u> The project site does not cross national parks or reserved areas.</p>
	10	Ecosystem	B-	D	B-	N/A	<p><u>At Construction Phase</u></p> <ul style="list-style-type: none"> • Loss of vegetation due to excavation works. • Displacement of vegetation <p><u>At Operation Phase</u> There will be a landscape design as per the requirements of the notification S.O. No. 3999 (E) by the project.</p>
11	Hydrology	D	D	N/A	N/A	<p><u>At Construction Phase</u> The catchment area of the project site is minor and limited to the local level.</p> <p><u>At Operation Phase</u> A facility plan on water conservation, rain water harvesting and groundwater recharge will be provided by the project as per the requirements of the notification S.O. No. 3999 (E).</p>	
Natural Environment							

Category	No.	Element	Assessment at Initial Scoping		Assessment at IEE		Reason
			Cont.	Ope.	Cont.	Ope.	
	12	Topography /geology	D	D	N/A	N/A	<p><u>At Construction Phase</u> A minor change is expected due to the excavation of the project site. However, there will be no large scaled topographical / geological change.</p> <p><u>At Operation Phase</u> There will be no topographical / geological change.</p>
Social Environment	13	Resettlement	D	D	N/A	N/A	<p><u>At Construction Phase</u> The project site is the existing old auditorium with no residential houses.</p> <p><u>At Operation Phase</u> The project site is the existing old auditorium with no residential houses.</p>
	14	Poverty group	D	D	N/A	N/A	<p><u>At Construction Phase</u> The project site does not relate to poverty.</p> <p><u>At Operation Phase</u> The project site does not relate to poverty.</p>
	15	Ethnic Minorities and Indigenous People	D	D	N/A	N/A	<p><u>At Construction Phase</u> There are no ethnic minorities in the project site.</p> <p><u>At Operation Phase</u> There are no ethnic minorities in the project site.</p>
	16	Local economy of employment & livelihood	B+	B+	N/A	N/A	<p><u>At Construction Phase</u> Employment opportunities will be increased for the locals by the construction works.</p> <p><u>At Operation Phase</u> Employment opportunities will be increased due to the development of surrounding areas.</p>
	17	Land use and utilization of local resources	D	D	N/A	N/A	<p><u>At Construction Phase</u> Land use pattern will be the same as the existing condition.</p> <p><u>At Operation Phase</u> Land use pattern will be the same as the existing condition.</p>
	18	Water Use	D	D	N/A	N/A	<p><u>At Construction Phase</u> The project site does not relate to water use.</p> <p><u>At Operation Phase</u> The project site does not relate to water use.</p>
	19	Existing social infrastructure and social services	B-	B-	B-	B-	<p><u>At Construction Phase</u> Impact on traffic by construction vehicles and impact on surrounding public utilities due to underground excavation.</p> <p><u>At Operation Phase</u> Impact on traffic by the cars of the users or visitors of the centre.</p>
	20	Social organization	D	D	N/A	N/A	<p><u>At Construction Phase</u> The construction works does not relate to social organization.</p> <p><u>At Operation Phase</u> The proposed convention centre is a social infrastructure and will be operated as a social asset.</p>
	21	Biased distribution of damages and benefits	D	D	N/A	N/A	<p><u>At Construction Phase</u> Some impact is expected partially at the project site and the surrounding area. However, it is temporary during and limited to the construction phase.</p> <p><u>At Operation Phase</u> The proposed convention centre will provide benefits to all persons concerned.</p>
	22	Conflict of interest in the project area	D	D	N/A	N/A	The project is to implement a project for social contribution through fair process which will not bring conflict of interest at the local level.

Category	No.	Element	Assessment at Initial Scoping		Assessment at IEE		Reason
			Cont.	Ope.	Cont.	Ope.	
	23	Cultural heritage	D	D	N/A	N/A	There are no sites of cultural significance in or around the project sites.
	24	Landscape	D	B+	N/A	N/A	<u>At Construction Phase</u> Some change of appearance will be generated in the construction phase. However, the change is temporary. <u>At Operation Phase</u> An improved city scape will be generated compared to the existing old building.
	25	Gender	D	D	N/A	N/A	<u>At Construction Phase</u> The construction works does not relate to gender issues. <u>At Operation Phase</u> The operation does not relate to gender issues.
	26	Children's right	D	D	N/A	N/A	Child labour will not be permitted in any condition under Indian legal requirements.
	27	Infectious diseases such as HIV/AIDS	B-	D	B-	N/A	<u>At Construction Phase</u> A number of workers will be involved at the project sites. In this case social interactions cannot be avoided which may bring a risk of spread of infectious diseases including HIV/AIDS and STDs. <u>At Operation Phase</u> The operation of VCC does not relate to occurrence of Infectious diseases such as HIV/AIDS.
	28	Working environment and safety	B-	D	B-	N/A	<u>At Construction Phase</u> Safety of construction workers should be paid attention in the construction site. <u>At Operation Phase</u> The operation of VCC does not include a poor or dangerous working environment.
Others	29	Accidents	B-	D	B-	N/A	<u>At Construction Phase</u> Construction activities may cause risk of serious injuries or fatalities including traffic accidents to workers or third parties. <u>At Operation Phase</u> The operation of VCC does not include a poor or dangerous working environment.
	30	Trans-boundary impact and climate change	D	D	N/A	N/A	<u>At Construction Phase</u> The project does not include construction works which may cause trans-boundary impact. <u>At Operation Phase</u> The measures promoting an energy-saving strategy will be taken as per the requirements of the notification S.O. No. 3999 (E).

Notes:

A+/-: Significant positive/negative impact is expected.

B+/-: Positive/negative impact is expected to some extent.

C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)

D: No impact is expected.

Source: JST

6.3.8. Recommended Mitigation Measures against Potential Adverse Impacts

The mitigation measures against the potential adverse impacts and the environmental management plan is recommended as shown in Table 6.3.13 at each project phase of construction and operation.

Table 6.3.13 Recommended Mitigation Measures

No	Element	Phase	Potential Adverse Impact	Mitigation Measures	Actor	Person to bear Cost
1	Air pollution	Construction	<ul style="list-style-type: none"> • Dust generation from preparatory works. • Dust from various construction operations and emission from operation of construction equipment or movement of vehicles are likely to cause some impacts on the construction workers as well as surrounding residents. • Traffic to the construction sites during construction will be more intensive compared to the current status which may cause idling of construction vehicles and other vehicles of third parties in the vicinity. 	<ol style="list-style-type: none"> 1) Dust Control Plan <ul style="list-style-type: none"> • Adoption of water sprinkling systems. • Sheet covering for incoming fleets 2) Idling Reduction Plan <ul style="list-style-type: none"> • Promotion of idling control technologies comprising of power saving mode 3) Regular Equipment Maintenance Plan <ul style="list-style-type: none"> • Keeping records for regular equipment maintenance • Reduction of on-site construction time to reduce the duration of traffic interference 4) Traffic Management Plan: <ul style="list-style-type: none"> • Time management of incoming fleets avoid traffic concentration • Allocation of traffic guide at entrance and in the vicinity 5) Environmental Monitoring <ul style="list-style-type: none"> • Environmental monitoring of the contractor's mitigation measures for dust control 6) Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> • Regulator: UPPCB • Actor for mitigation: Contractor • Inspector: Consultant 	<ul style="list-style-type: none"> • To be covered in the project cost • Person to bear the cost: Contractor

No	Element	Phase	Potential Adverse Impact	Mitigation Measures	Actor	Person to bear Cost
		Operation	<ul style="list-style-type: none"> Traffic to the proposed convention centre will be more intensive compared to the current status which may cause idling of the vehicles of visitors and operating staffs, which may cause potential adverse impact of generation of air pollutants. 	<ol style="list-style-type: none"> Diesel Generator Set Emission Control Plan <ul style="list-style-type: none"> Setting of adequate stack height to disperse the air pollutants. Tree Plantation Plan <ul style="list-style-type: none"> Tree plantation plan for adsorption of air pollutants. Traffic Management Plan: <ul style="list-style-type: none"> Time management of incoming vehicles to avoid traffic concentration Allocation of traffic guide at entrance and in the vicinity Flow planning in the design of the parking area <ul style="list-style-type: none"> Flow planning in the design of the parking area for smooth traffic The National Building Code of India to be followed for indoor air quality. Environmental monitoring plan of traffic flow 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: CPWD Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the O & M (Operation and Maintenance) cost Person to bear the cost: CPWD
2	Water Pollution	Construction	<ul style="list-style-type: none"> Soil runoff at the site (Particularly during rainy season) may cause turbid water. Disposal of domestic wastewater from temporary labourers' rest rooms is expected in the construction phase. Spillage of oil and grease from the vehicles is expected. 	<ol style="list-style-type: none"> Construction of silt fences to avoid soil runoff. Installation of temporary septic tank followed by soak pit during construction phase. Installation of Oil and Grease traps Consideration of natural drain system Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor

No	Element	Phase	Potential Adverse Impact	Mitigation Measures	Actor	Person to bear Cost
3	Solid Waste	Construction	<ul style="list-style-type: none"> Impact due to excavation of the soil, demolition waste including asbestos or general waste at construction site is expected. The waste from the labourers' rest room will cause unhygienic conditions. 	<ol style="list-style-type: none"> Establishment of appropriate construction plan for waste management <ul style="list-style-type: none"> Waste segregation plan Strategy for re-use or recycling management plan Establishment of a handling system for hazardous waste such as asbestos, paints, solvents wood preservatives Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
4	Soil contamination	Construction	<ul style="list-style-type: none"> Handling of chemicals, oil and grease may cause adverse impact in the form of soil contamination. Demolition waste including asbestos may cause soil contamination. 	<ol style="list-style-type: none"> Hazardous waste management: <ul style="list-style-type: none"> Hazardous waste management as per The Hazardous Wastes (Management & Handling) Rules. Application of HWTS (Hazardous Waste Tracking System) for its generation, handling, treating, transporting and final disposal Environmental monitoring plan of hazardous substances including Asbestos. Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
5	Noise and vibrations	Construction	<ul style="list-style-type: none"> Generation of noise during movement of vehicles carrying materials and loading & unloading activities is expected. Noise from a standby DG (Diesel Generator) is expected. Noise from the mechanical operations such as drilling, fitting, etc. is expected. 	<ol style="list-style-type: none"> Time Control Plan for Construction Works Adoption of low-noise type equipment / technology <ul style="list-style-type: none"> Adoption of low-noise type equipment / machinery at construction works To provide the DG set with acoustic enclosure to reduce sound level Setting an enclosure of the facility / equipment <ul style="list-style-type: none"> Setting an enclosure around the peripheral parts of the site To provide an enclosure for the DG set to meet the environmental standard Establishment of contact point for the complaints of the vicinity residents Environmental monitoring plan of noise level Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor

No	Element	Phase	Potential Adverse Impact	Mitigation Measures	Actor	Person to bear Cost
		Operation	<ul style="list-style-type: none"> Noise from a standby DG (Diesel Generator) is expected. Impact of noise due to vehicles in the parking area is expected. 	<ol style="list-style-type: none"> Appropriate Equipment Plan <ul style="list-style-type: none"> The DG set room should be provided with appropriate acoustic enclosure to meet the environmental noise standard. Appropriate Landscaping Plan <ul style="list-style-type: none"> Tree plantation to reduce sound level as a function of a buffer zone. 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: CPWD 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: CPWD / Consultant
10	Ecosystem	Construction	<ul style="list-style-type: none"> Loss of vegetation due to excavation works is expected. 	<ol style="list-style-type: none"> Proper permission should be obtained from forest department and compensatory tree species should be planted Appropriate Tree Cutting Plan as per Requirements in Notification S.O. No. 3999 (E) <ul style="list-style-type: none"> A minimum of 1 tree for every 80 m² of land should be planted and maintained. The existing trees should be counted for this purpose. Preference should be given to planting native species. Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
19	Social infrastructure and social services	Construction	<ul style="list-style-type: none"> Impact on traffic is expected by the incoming and outgoing of construction vehicles is expected. Impact on surrounding public utilities is expected due to underground excavation. 	<ol style="list-style-type: none"> Permission Management Plan <ul style="list-style-type: none"> Preparation of Permission Management for relevant authorities for construction works Traffic Management Plan: <ul style="list-style-type: none"> Time management of incoming fleets to the site to avoid traffic concentration Allocation of traffic guide at entrance and in the vicinity for smooth traffic flow Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
		Operation	<ul style="list-style-type: none"> Impact on traffic of the nearby roads by the cars of the users or visitors of the centre is expected. 	<ol style="list-style-type: none"> Traffic Management Plan: <ul style="list-style-type: none"> Time management of incoming fleets to the site to avoid traffic concentration Allocation of traffic guide at entrance and in the vicinity for smooth traffic flow Proper parking management for vehicles of visitors 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: CPWD 	<ul style="list-style-type: none"> To be covered in the project cost Person to be borne: CPWD

No	Element	Phase	Potential Adverse Impact	Mitigation Measures	Actor	Person to bear Cost
27	Infectious diseases of HIV/AIDS	Construction	<ul style="list-style-type: none"> A number of workers at the project sites may cause a risk of spread infectious diseases including HIV/AIDS and STDs. 	<ol style="list-style-type: none"> Awareness or education program should be conducted among the site workers. Preparation of training plan for construction workers Preparation of education program for acquisition of appropriate hygiene knowledge. Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
28	Working environment and safety	Construction	<ul style="list-style-type: none"> Construction works may cause poor working environment and reduce safety to construction workers. 	<ol style="list-style-type: none"> Program / plans / training for measures for first aid, fire-fighting and premises evacuation Preparation of handling, treatment, transport and final disposal plan of hazardous substances such as asbestos Preparation of education plan for working hygiene and safety control Preparation of emergency preparedness and response plan Compliance with national or international legal requirements Environmental monitoring of Asbestos for demolition works Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor
29	Accidents	Construction	<ul style="list-style-type: none"> Construction activities may cause an adverse impact of risk of serious injuries or fatalities including traffic accidents to workers or third parties. 	<ol style="list-style-type: none"> Insurance system for indemnification should be established to compensate for any damage or injury to the construction workers or the persons / assets of third parties. Education / training for drivers of construction vehicles and equipment to avoid traffic accidents Incorporation of above measures into tender and contract documents 	<ul style="list-style-type: none"> Regulator: UPPCB Actor for mitigation: Contractor Inspector: Consultant 	<ul style="list-style-type: none"> To be covered in the project cost Person to bear the cost: Contractor

Source: JST

6.3.9. Environmental Monitoring Plan

(1) Basic Concept of Environmental Monitoring

Environmental monitoring should be a work event to examine / verify the mitigation measures and the environmental quality at each project phase of construction and operation through measurement and inspection.

The potential major impacts which can be monitored for the each activity of the project are dust / noise generation by the construction works, impact on traffic on the nearby roads and impact on the working environment caused by the demolition works of the old buildings which may contain hazardous materials such as Asbestos. In the operation phase, on one side, potential generation of air pollutants and noise, and the impact on the traffic on the nearby roads will be the major environmental impact to be caused by the project (especially, by the incoming and outgoing vehicles at VCC) which can be monitored or measured.

The major impacts and their parameters to be traced as the environmental monitoring for the major adverse environmental impacts to be affected by the project are summarized in Table 6.3.14.

Table 6.3.14 Summary of Impacts to be monitored by Environmental Monitoring

Phase	Potential Action by the Project	Potential Impact	Parameters to be Monitored	Environmental Quality to be Examined by Environmental Monitoring
Construction	Dust generation by construction fleets and equipment	Air	Dust	Dust control by the contractor
	Noise generation by construction fleets and equipment	Noise	Noise level	Noise level by construction works
	Traffic congestion on nearby roads to be affected by the construction fleets and equipment	Social Infrastructure	Traffic	Traffic volume on the nearby roads to be affected by the construction works
	Demolition works on the old auditorium buildings potentially containing hazardous materials	Working Environment and Safety	Asbestos	Working environment under demolition works especially for the potential existence of Asbestos in air, soil, or demolished materials
Operation	Generation of air pollutants by the vehicles incoming and outgoing at VCC	Air pollutants	NO ₂ , NO _x , Sox, SO ₂ , CO, PM _{2.5} , PM ₁₀	Concentration of air pollutants by the incoming and outgoing vehicles at VCC
	Noise generation by the vehicles incoming and outgoing at VCC	Noise	Noise level	Impact of noise by the incoming and outgoing vehicles at VCC Impact of air pollution by the incoming and outgoing vehicles at VCC
	Traffic congestion on nearby roads to be affected by the construction fleets and equipment	Social Infrastructure	Traffic	Impact on traffic volume on nearby roads to be affected by the incoming and outgoing vehicles at VCC

Source: JST

(2) Environmental Monitoring Plan

The proposed EMP (Environmental Monitoring Plan) is shown in Table 6.3.15.

Table 6.3.15 Environmental Monitoring Plan

Phase	Potential Impact	Parameters	Place for Monitoring	Time / Frequency	Method	Actor for Monitoring	Estimated Cost per Year in Rs.
Construction	Air	Dust	1 place within the construction site	<ul style="list-style-type: none"> • Twice at pre-monsoon • Twice at post-monsoon 	• Visual inspection	Contractor	To be covered in the project cost
	Noise	Noise level	2 places at facility boundary	Quarterly	As per the method by Noise Pollution (Control and Regulation) Rules, 1999	Contractor	50,000
	Social Infrastructure	Traffic	2 places on nearby roads (VMC Road, Sigra Crossing)	Quarterly (Day time)	Measurement of traffic volume	Contractor	50,000
	Working Environment and Safety	Asbestos	<ul style="list-style-type: none"> • Building materials: 2 • Covering pipes material: 2 • Air: 2 • Soil: 2 	<ul style="list-style-type: none"> • Once before demolition • Once under demolition • Once after demolition 	As per BIS (Bureau of Indian Standard) 11769, 11768, 11450	Contractor	100,000
Operation	Air pollutants	NO ₂ , NO _x , Sox, SO ₂ , CO, PM _{2.5} , PM ₁₀	1 place at entrance	• Twice after completion	As per the Guidelines for Ambient Air Quality Monitoring, CPCB, MoEF, April, 2003	CPWD	50,000
	Noise	Noise level	1 place at entrance	• Day and night time twice after completion	As per the method by Noise Pollution (Control and Regulation) Rules, 1999	CPWD	30,000
	Social Infrastructure	Traffic	2 places on nearby roads (VMC Road, Sigra Crossing)	• Twice after completion (Day time)	Measurement of traffic volume	CPWD	30,000

Source: JST

6.3.10. Land Acquisition

The project site is the existing VMC's land for the old auditorium and other relevant facilities. The project does not require land acquisition or its process for compensation.

CHAPTER 7. PROJECT IMPLEMENTATION

7.1. Project Procedure

7.1.1. General Procedure of Grant Aid Project

NOTE: This section describes general procedure so that it does not imply any decision or commitment by JICA to extend grant.

(1) Exchange of Notes and Contract Stage

- a) The Preparatory Survey will be conducted by JICA to formulate the project, propose cooperation contents and outline design, and examine relevance, effectiveness and efficiency of the project.
- b) The Exchange of Notes (E/N) for the Grant Aid Project between GOI and GOJ after the approval by the Cabinet of Japan.
- c) The Grant Agreement (G/A) between JICA and GOI in order to define necessary articles in accordance with E/N to implement the project.

(2) Detailed Design Stage

- a) Following the G/A, the consultant from Japan and GOI will conclude an execution design and supervision contract, and immediately start the detailed design stage.
- b) Full details of facilities and equipment designed in the Preparatory Survey will be carefully confirmed and discussed with the Indian side (VMC).
- c) The consultant will discuss the technical issues through meetings with the relevant authorities in Japan and India during the detailed design stage.

(3) Tender Stage

- a) Tendering will be conducted in line with JICA's Procurement Guidelines for the Japanese Grant (Type I).
- b) Tendering will be conducted amongst eligible Japanese construction companies and suppliers for procurement of equipment.
- c) The party executing the tender will be the implementing agency (CPWD), but it is necessary for the consultants to cooperate sufficiently while taking instructions from JICA.

(4) Construction

- a) Based on the result of this Survey, local building materials, which are acceptable in quality and availability in India, should be used for the project as much as possible. However, the quality needs to be ensured and maintained.

- b) It is important for the Japanese contractor, as the prime contractor, to supervise and manage the local contractor and his labourers carefully to achieve the quality assurance required for the project.

7.1.2. Implementation Conditions and Considerations

Initially, according to the Indian side, VCC was planned to be opened in the beginning of 2019. However, given the maturity of the planning by India side and standard schedule required under the procedure of Japan's Grant Aid scheme, JST explained to the Indian side that the design and tender stages will require more time, thus the construction work is assumed to start in the middle of 2018 at the earliest, and even in such case, it seems difficult to complete the entire facility by early 2019.

(1) Consideration of rainy season

From July to September is the rainy season in Varanasi. For construction planning, the earthworks, substructure and superstructure works should be planned considering this and be scheduled to commence after or to complete before the rainy season.

(2) Applicable laws

Laws, codes and standards in India and standards in Japan should be followed. However, British Standards (BS), American Society for Testing and Materials (ASTM), etc., may also be applied when necessary.

(3) Schedule monitoring and coordination

Careful schedule monitoring and coordination is required, particularly between the facilities construction work and the equipment installation.

(4) Establishing opening date

Based on the progress of interior decoration, furnishing, exhibition works and installation of equipment and display items, CPWD needs to establish an opening date.

(5) Closing works of construction contract

The necessary time for adjustments, testing and commissioning of: electrical supply, water supply, hydrants, cold water supply, circulation of cold water for air-conditioning equipment, and ventilation fans will take about 3 months after filling-up all tanks with clean water and receiving electrical supply.

In other words, it takes at least another 3 months for simply cleaning, testing & commissioning. CPWD should request the various test results of M&E works from the contractor. Re-testing for items found to have defect or deficiency should be done with CPWD's representative and the consultant in attendance.

List of the required as-built documents between CPWD and the contractor should be confirmed beforehand. Furthermore, a consistent O&M manual should be submitted.

CPWD should issue practical completion certificates when confirming practical completion. The Defect Liability Period (DLP) should start from this date for the designated areas.

The performance bond should be released and the originals should be returned to the contractor. The effective date of DLP is important and thus needs to be documented carefully. Also, it is one of the dispute items after completion.

7.1.3. Preparation of Operations during Project Implementation

(1) The importance of pre-opening stage

It is important to programme all the necessary activities to be implemented by MOUD/ CPWD/ VMC before the opening of VCC while the design development and construction works are still on-going.

The design, tendering, and the completion of construction as well as the nominating and employment of staff for VCC operations needs to be arranged on schedule.

The initial operation period will take at least 6 months after all construction, installation of equipment and staffing of VCC are completed, to achieve the most functional result. The initial stage will be a time to learn from numerous errors. Furthermore, it will take at least 2-3 years for VCC to be attractive for tourists, PCO, and tour operators.

(2) Work Items for VCC Opening

The preparatory works and pre-opening activities require more than a year, so they should be performed in parallel with the construction works before the handover of the site. By the length of time required, the following activities are suggested with the highest priority at the top:

- Staffing of CPWD/ VMC preparation office for the opening of VCC.
- External organization set-up (establishment of operational related organization).
- Internal organization set-up (nominating board members, employment of managerial and highly skilled positions for VCC operations).
- Tendering procedure for VCC operator and the division of functions to be outsourced.
- The necessary actions to be taken before and during civil works.

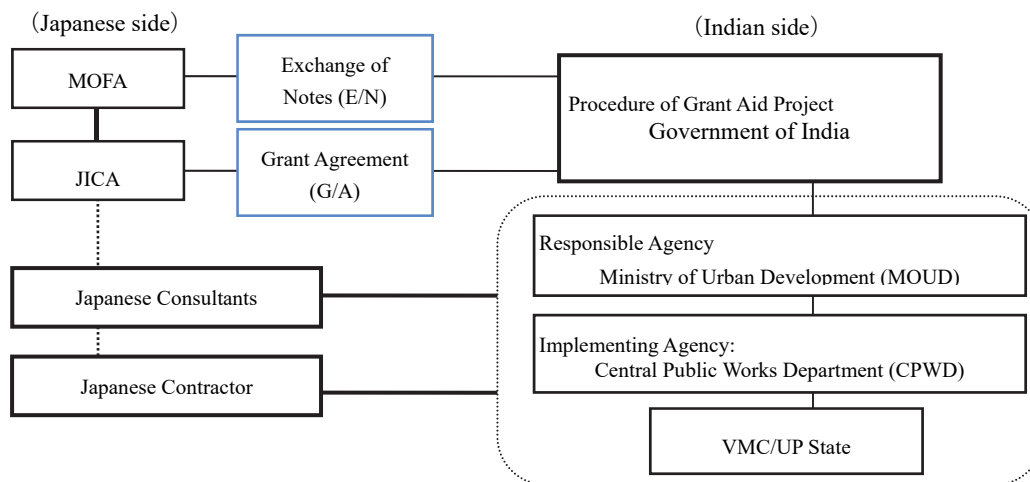
7.2. Organization Plan for Project Implementation

7.2.1. Project Implementation Organization under the Grant Aid

The organizations involved in this project are as shown below:

- Ministry of Urban Development (MOUD): the responsible agency for the project
- Central Public Works Department (CPWD): the implementing agency.
- The Ministry of External Affairs (MEA): responsible for the procedures of this Japanese Grant Aid project, such as E/N and G/A.

The following diagram shows the relationship between the implementing organization, the Japanese consultant and the contractor.



Source: JST

Figure 7.2.1 Project Implementation Organization under the Grant Aid Project

7.2.2. Roles and Responsibilities of the Implementing Agencies

(1) CPWD

CPWD, with professional expertise in Architecture, and Engineering, and Project Management, has been serving the nation for the last 162 years and has executed priority works in difficult and demanding geographical and climatic conditions. CPWD is a comprehensive construction management department, which provides services from project conception to completion, consultancy and maintenance management. CPWD has PAN India presence and has the ability to undertake construction of complex projects even in difficult terrain and maintenance in the post construction stage. CPWD was involved in construction of stadiums and other infrastructure requirements for Asian Games 1982 and Commonwealth Games 2010.¹

The major roles and responsibilities of CPWD are as follows:

a) Overseer and financier of Project Management Unit (PMU)

CPWD will be the overseer of PMU specifically established for VCC development. CPWD should provide qualified personnel as the core staff of PMU, office space, administration equipment and running cost for PMU.

b) Employment of the consultant and procurement of the contractor

Since PMU is a temporary project entity and does not possess contractual authority, CPWD is required to employ consultants during the detailed design and construction supervision stages. CPWD is also required to create tender documents and the contract for the construction contractors with the assistance of the consultant.

¹ CPWD web site: <http://www.cpwd.gov.in/cpwdnew/AboutUS/AboutCPWD.aspx>

c) Coordination with various stakeholders

CPWD needs to facilitate all the necessary coordination works with various stakeholders such as MOUD, UP State Government, VMC, Universities and other relevant authorities concerned regarding the PMU, the Consultant and the Contractor as required.

d) Undertakings by the Recipient side

For the Grant Aid project, some undertakings are required to be done by GOI, such as:

- an advising commission of the A/P and payment commissions paid to the Bank
- to ensure that customs duties, internal taxes and other fiscal levies be exempted or be borne by its designated authority without using the Grant or its accrued interest

e) Contractor's all risk coverage (CAR)

Usually, the contractor covers the risks with CAR which covers worker's accidents, damage to a third party, vehicles and construction machinery / equipment, flooding caused by heavy rain, fire in the construction site and/ or labourers' shed, collapse due to failure of shoring on excavation work, materials and equipment at the site except for a force majeure such as natural disaster, riot, or rebellion.

CPWD is the Employer of the Contractor, so it should have a copy of CAR submitted from the Contractor and confirm the validity and the amount of the insurance.

(2) VMC

Varanasi Municipal Corporation was established on 24th January 1959 under the act of U.P. Government (i.e. Municipal Corporation Act of 1959). Within its jurisdiction, the area of VMC is some of the most densely populated areas in the world.²

VMC will provide their municipal land for the VCC project site and coordinate with CPWD to assist PMU to coordinate with various relevant organizations in Varanasi.

The major roles and responsibilities of VMC are as follows:

a) Undertakings by the Recipient side

Some undertakings by the recipient side for this Grant Aid Project are required to be arranged by VMC.

- Handing over of the project site to the contractor: VMC is required to hand over the existing municipality land to the contractor. Prior to the handing over, VMC needs to clear the existing buildings (including underground structures), fences, structures, objects, etc.
- Obtaining the necessary planning, and building permission
- Providing facilities for distribution of electricity, water, telephone, sewage, etc.

² VMC web site: <http://nnvns.org/index.php>

b) Safety Measures

As the project site is located within the precinct of VMC, adjacent to residential areas and public gardens, consideration of safety measures during construction is required as shown below.

- Conduct safety measures for traffic around the site against heavy-duty (construction) vehicles.
- Safety measures must be taken to avoid exposing the municipal staff, visitors of VMC and neighbouring residents to any danger during the construction.

c) Ownership of VCC

At the handover of VCC building to VMC via CPWD (the Employer), the ownership should also be transferred to VMC, and as the owner VMC must have fire insurance.

Separate from the main building works, the owner needs to order other works directly such as exhibition, interior decoration, furnishing and special works after taking over the main building works if necessary. The owner must have fire insurance registered by this time.

The O & M Manual is also an important document for the handing-over as well as for the operations and maintenance of VCC.

7.2.3. Organization for Implementation and Operation Stages

(1) Uniqueness of VCC Project

According to the request from GOI to GOJ for the Grant Aid for VCC in January 2017, “SPV of the Smart City,” which is comprised of the Divisional Commissioner as Chairman and Municipal Commissioner as CEO with other SPV members hired by SPV, is expected to operate and maintain VCC.

SPV of the Smart City has been registered as a Section 8 Company under the Companies Act 2013 with UP State and VMC having 50:50 equity shareholdings. Responsibilities of the SPV are to plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects.

Eligibility for forming a Section 8 Company as a limited liability company is as follows:

- The objectives must be charitable or non-profit, to promote arts, science, commerce, sports, education, research, social welfare, charity, protection of environment, etc.
- Intends to apply all its profit in promoting the objectives. Therefore, it is possible to make profit for the future investment to improve / upgrade the facility and service of VCC for the purpose to achieve the VCC objectives.
- Assures the prohibiting of the payment of dividends to any of its members.

However, since the institutional setup of this company did not consider the development and establishment of VCC, and the company specifically established for VCC will require involvement of

other stakeholders, employment of staff and may require a long procedure. JST recommend that a temporary entity for preparatory purposes being set up initially to oversee the development works for VCC, especially for operational aspects.

On the other hand, although MOUD nominated CPWD to be a nodal government agency for project implementation and a counter agency to the Consultant, the establishment of the Project Management Unit (PMU) is necessary for a successful project implementation.

As mentioned above, CPWD is responsible for the overall construction management and for having engineering know-how as well as personnel. However, this project is not a typical “hard” infrastructure project. There are needs for complex coordination, consensus building, stakeholders’ coordination from institutional, operational and cultural perspectives and not entirely from infrastructure development/control/ management perspectives.

Unlike the conventional JICA grant aid projects, this VCC Project has various difficulties and uniqueness as shown below:

- In order to complete the Project by the expected time schedule, counterpart personnel for the JICA Consultants are required to be employed for expediting design development.
- CPWD, as the implementing agency, is well experienced and staffed in project management, engineering, technical and construction issues. However, there is no existing operator / owner for this Convention Centre. The counterpart personnel with specific experience in operations, MICE and finance should be included and assigned from the planning and design stage.
- For managing project implementation and coordinating with the relevant government agencies and authorities, the Project Management Unit (PMU) staffed with counterpart personnel should be exclusively established for the VCC Project before the preparatory survey begins in June.
- Although Varanasi has significant tourism attractions and cultural history and interests, there is no mechanism/organization for promoting and holding MICE events such as “Convention Bureau” as organized in other cities in India (i.e. Hyderabad and Ahmedabad). Establishment of an Advisory Committee to serve this task during the implementation stage is proposed.

(2) Necessary Approach during the Implementation Stage

The project implementation schedules are roughly divided into the following 3 stages:

- a) Stage of design development, preparatory and operation planning
- b) Stage of construction, operation body and HRD establishment for VCC
- c) Stage of opening and starting full-fledged VCC operations

Although each stage requires different skills and expertise, the existence of a continuous implementation body throughout the course of VCC development is the key for success, along with synchronizing the operation policy and the establishment goals of VCC. One entity can evolve from the pre-operation stage including study, design, procurement, construction, staff employment and training, to the operations stage.

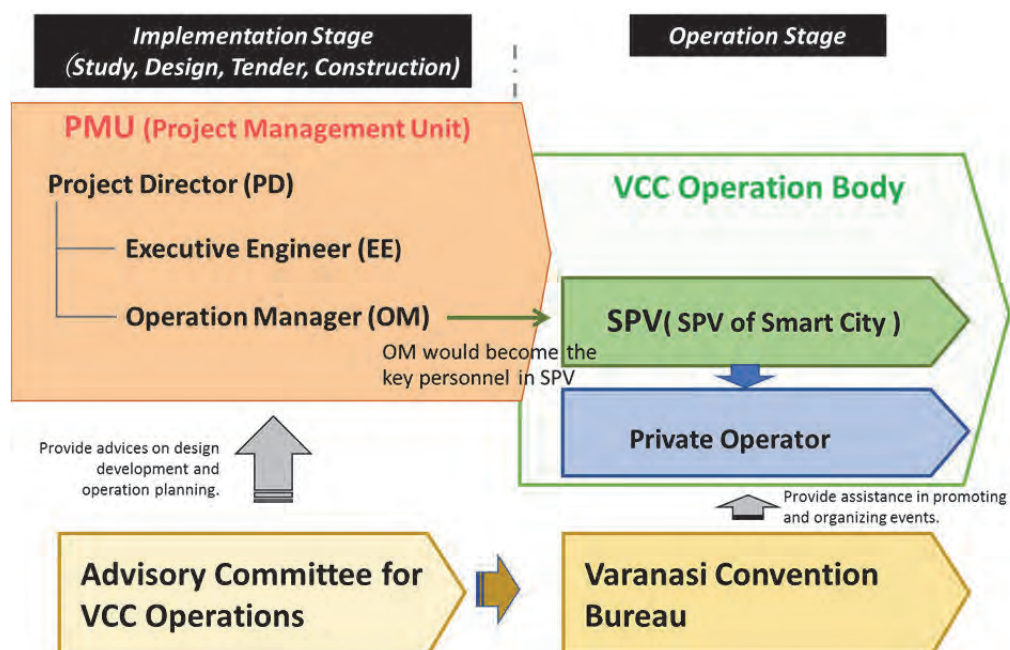
In order to organize the continuous implementation body, an integrated institutional set-up at the early stage of the project is necessary. Specialists knowledgeable for convention operations are also mandatory, since JICA Grant Aid projects do not allow design change during the construction stage (no variation is allowed). The following design aspects should be integrated in the design during the design development stage:

- Flow of visitors and crowd control of the convention centre in India.
- Hall space arrangement with movable partition, temporary stage, seating layout, etc.
- Usability and method of using the stage, lighting, floor structure, drop curtains, backstage, audio equipment, etc.
- Operations, maintenance and cleaning methodology.
- Furniture and interiors.
- Religious constraints and local customs.

Based on the above difficulties and uniqueness of this project, the PMU (Project Management Unit) is proposed to be established for the project implementation stage (study, design, tender and construction work) which will cover engineering issues and operational issues as well.

Without this formation during the implementation stage, it will be difficult to address the core issues for smooth operation, intrinsic sustainability or further consolidation of VCC. Therefore, core members of PMU are recommended to be nominated before beginning of the Design stage.

This approach is advisable to adopt, given the immense prestige and expectations as a special project from the local level as well as state and central government levels.



Source: JST

Figure 7.2.2 Organization for Implementation and Operation Stages

7.2.4. Establishment of Project Management Unit (PMU)

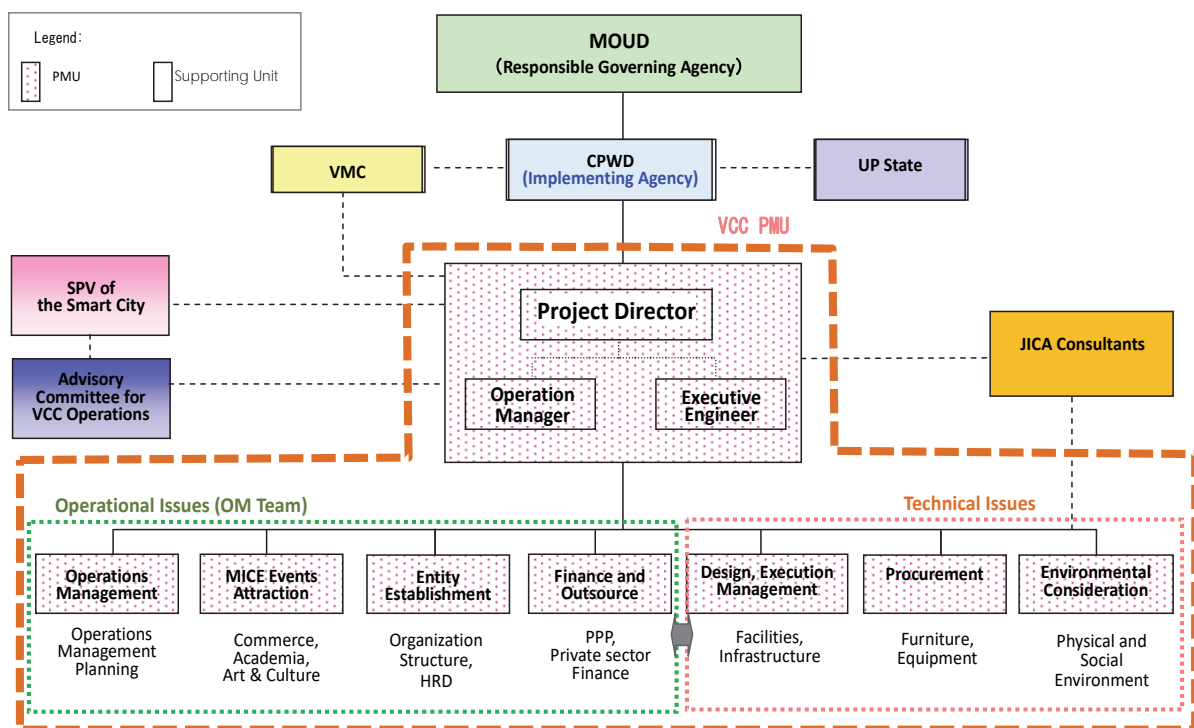
Therefore, the following aspects of VCC development are required during the design development and construction stages:

- Planning and development of VCC operations management
- Attracting MICE and cultural events
- Know-how for hospitality business
- Financial planning

In order to fulfil the above requirements, the necessary personnel should be brought from other agencies, private sectors or outsourced.

The proposed Overall Implementing Organization Structure is shown below.

For a successful implementation of the VCC project, a Project Management Unit (PMU) will be exclusively established.



Source: JST

Figure 7.2.3 Organization of PMU

PMU will coordinate and handle the following issues:

- Overall project management for VCC project.
- PMU should have ability to directly and quickly coordinate with multi-stakeholders such as MOUD, CPWD and VMC for smooth implementation of the Project.
- Direct coordination with MOUD for important policy, function and design decisions.

- Coordinating with the relevant government agencies and authorities with assigned consultants for developing designs and tender documentation.
- Monitoring and approving design works of the assigned consultants.
- Preparing tender documents for the contractors with the assigned consultants.
- Coordinating with the relevant government agencies and authorities with the assigned consultants for construction works.
- Approving and administrating contracts, requests and invoices of the consultants and the contractor.
- Managing environmental and social considerations.
- Coordinating with VMC for land clearance including the dismantling of existing structures.
- Coordinating with financial institutions for the necessary arrangement of disbursements for the consultants and the contractor.
- Coordinating for exempting customs duties, internal taxes and other fiscal levies imposed on the consultants and the contractor.

PMU will be formed as soon as both governments have agreed on the aid memoir, before beginning of the Design stage. Then, a **Project Director (PD)** will be appointed as the representative of PMU and will be responsible for supervising the project implementation, coordination and resolving critical issues between stakeholders. PD will have the authority to implement the Project including approval of all technical and financial matters within the project framework. PD will report directly to the Joint Secretary of MOUD. An **Executive Engineer (EE)** will be appointed as a deputy to PD and as head of engineering matters dealing with hard components. An **Operations Manager (OM)** will be appointed as a deputy to PD and as head of operational and financial matters dealing with soft components.

As the VCC project will be unique among all the ODA projects in India and need a wide range of specialized knowledge for implementation, it is necessary to appoint several specialists as PMU members. PMU staff may be appointed not only from the current officials, but also from outside the government when CPWD cannot obtain specialists internally. In particular, facility O&M and specialists related to convention planning should be recruited from the private sector.

(1) Primary duties and responsibilities and the required qualifications of PMU members

a) Project Director

Primary duties and responsibilities:

- Oversees overall implementation activities.
- Coordinate with various stakeholders amongst central and state government agencies, relevant authorities, universities, institutions and industries in Varanasi.

- Coordinate with and supervise EE and OM to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with SPV of the Smart City of Varanasi to effectuate ownership of VCC.
- Coordinate with the relevant government agencies concerned for financing and realizing additional development adjacent to VCC.
- Promoting VCC nationwide and worldwide.

Required qualifications:

- Possess artistic perception and vision for Varanasi
- MA or PhD in Business Management or Engineering.
- Business-oriented with working experience in foreign conventions, museums, schools and hotels.
- Fluent in English both verbal and written.
- Excellent command of computer applications.

b) Executive Engineer

Primary duties and responsibilities:

- Oversees technical implementation activities.
- Coordinate with various stakeholders amongst central and state government agencies, municipalities and relevant authorities related to design, tender, contracting and construction of buildings and infrastructure in Varanasi and UP state.
- Coordinate with PD and OM to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with municipal engineers and relevant companies in relation to electricity, water, sewerage and telecommunications for VCC.
- Coordinate with municipal engineers in relation to dismantling and/ or transferring existing buildings, foundations, structures and trees in the project site.

Required qualifications:

- Possess artistic perception and vision for Varanasi
- BA or MA in Civil Engineering and/ or Architecture
- Holds professional engineering certificate with working experience in engineering and building industries or relevant government agencies.
- Fluent in English both verbal and written
- Excellent command of computer applications

c) Operations Manager (OM)

Primary duties and responsibilities:

- Advertise VCC and manage various kinds of skilled personnel in convention operations, MICE events marketing/ promotion and administration/ finance.
- Prepare tender documents for tenants and operators to operate and maintain facilities as constructed by JICA Grant Aid.
- Coordinate with PD and EE to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with SPV of the Smart City of Varanasi to effectuate ownership of VCC.
- Coordinate with academic, art, hospitality and tourism institutions, industries, and authorities concerned for setting up a convention bureau in Varanasi.
- Conduct training programmes for VCC personnel.

Required qualifications:

- Possess artistic perception and vision for Varanasi
- BA or MA in Business Management or Engineering
- Business-oriented with working experience in international convention business, hospitality and tourism business.
- Fluent in English both verbal and written
- Excellent command of computer applications

(2) Formation of OM Team within PMU (refer to the green box of Figure 7.2.2)**A. Necessity of OM Team within PMU**

According to benchmarking of convention centres with international standard in India, Hyderabad International Convention Centre (HICC), as mentioned in Chapter 4.1, is a successful example of hard and soft fusion in planning, design, construction and operations.

HICC has been the winner of the excellence award for “Best Standalone Convention Centre” for a record four times nationally and now awarded for the region by the Ministry of Tourism, Government of India and Andhra Pradesh. It has also received the award for “Best Meeting & Conference Venue” at the South India Travel Awards 2015.³

One of the main reasons for their success was early involvement of the operator, Novotel (the midscale hotel brand of AccorHotels), in the development of HICC. Architects, facility designers and operator closely collaborated in their planning and designs, solved issues with the construction contractors, and the operations plan was developed by the operator.

³ HICC: <http://www.hicc.com/about-hicc.html>

Based on this successful experience, a preparatory team for VCC operations headed by Operation Manager (OM) should be employed within PMU and can serve as an ideal bridge among CPWD/ VMC and SPV of the Smart City until the permanent operation body of VCC are properly established as a working institution.

VCC is planned to meet international standards and is the first of their kind in Varanasi. In going forward, brand build-up of VCC needs dedicated effort and continuous tactical planning cum implementation so that it will be reflected in the visitor experience and services provided, such as making targeted and professional approaches to attract business interests and contributions through academic and commercial interests, incentives, CSR and other avenues, etc. as HICC achieved.

In this context, the OM team would be a critical enabler for VCC operations in a planned and time-bound manner.

Expected roles of OM team during the study, design and construction stages are as follows:

- Providing input for developing design and operation plans with local context and requirements.
- Establishing an Advisory Committee for VCC operations with the relevant agencies and institutions for developing operation plans during the design stage.
- Designing the structure for VCC operation and management, and preparing tender documents for outsourcing private companies if necessary, assisted by the consultants.
- Preparing a plan to promote and attract MICE events to VCC.
- Arranging finance for VCC operations.
- Staffing SPV of Smart City for VCC operations.

B. Expected Members of OM Team within PMU

As mentioned in Figure 7.2.2 (Overall Implementing Organization), the following functions are expected to be fulfilled for the Preparatory Team within PMU:

- Operation Management
- MICE Events Attraction
- Entity Establishment
- Finance and Outsource

However, it might be difficult for PMU to employ experienced and well-qualified specialists. A minimum of 4 positions are to be recruited during the implementation stage as a core group, namely Operation Manager (core member of PMU as well), Finance and Outsource head, Entity Establishment head and MICE Events Attraction head.

There are some issues to be solved for assigning capable personnel for the preparatory team as follows.

- Need to build capacity and follow through VCC management and operations plan.

- TCPWD/ VMC may not have suitable personnel or that such personnel may have multiple tasks other than VCC.
- Diversified specialist skill sets.
- Pay-scale limitations (in comparison to the government fee scale), especially with respect to the specialist skill sets required for MICE events attractions.
- Members of the preparatory team are proposed to be funded by GOI based on appropriate budgetary allocation.

They need not be from the government sector, and can be retained as consultants during the making of VCC. Eventually, they would be transferred to SPV of the Smart City, the operating and managing entity of VCC. If there is too little budget from the municipal, state and central governments, the possibility of funding support may also be considered.

The Preparatory Team shall combine with personnel who will be employees of the new centre and are thus permanent / dedicated stakeholders together with specialist experts to support them in the necessary areas. This is intended to be a practical and innovative approach for realizing a higher potential of VCC in the Indian context.

Primary duties and responsibilities and the required qualifications of the Preparatory Team except for the Operation Manager (please see above) are as follows:

a) MICE Events Attraction

Primary duties and responsibilities:

- Prepare MICE event attraction plan for VCC assisted by the Consultants.
- Prepare promotion and marketing plan for VCC assisted by the Consultants.
- Coordinate with PD, EE and OM to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with SPV of the Smart City of Varanasi to effectuate ownership of VCC.
- Coordinate with academic, art, hospitality and tourism institutions, industries, and authorities concerned for setting up a convention bureau in Varanasi.
- Conduct training programmes for VCC personnel.

Required qualifications:

- Possess artistic perception and vision for Varanasi
- BA in Business Management
- Business-oriented with working experience in international convention business, hospitality and tourism businesses.
- Fluent in English both verbal and written.

- Excellent command of computer applications.

b) Finance and Outsourcing

Primary duties and responsibilities:

- Assist OM in development of financial plan for VCC.
- Prepare tender documents for tenants and operators to operate and maintain facilities as constructed by JICA grant aid.
- Coordinate with PD, EE and OM to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with SPV of the Smart City of Varanasi to effectuate ownership of VCC.
- Coordinate with academic, art, hospitality and tourism institutions, industries, and authorities concerned for setting up a convention bureau in Varanasi.
- Conduct training programmes for VCC personnel.

Required qualifications:

- Possess artistic perception and vision for Varanasi
- BA in Business Management
- Business-oriented with working experience in international convention business, hospitality and tourism business.
- Fluent in English both verbal and written.
- Excellent command of computer applications.

c) Entity Establishment

Primary duties and responsibilities:

- Prepare entity establishment plan for SPV of the Smart City assisted by the Consultants.
- Prepare operations management plan with regulations and budget assisted by the Consultants.
- Coordinate with PD, EE and OM to set-up VCC operations to be ready for opening on-schedule.
- Coordinate with SPV of the Smart City of Varanasi to effectuate ownership of VCC.
- Coordinate with academic, art, hospitality and tourism institutions, industries, and authorities concerned for setting up a convention bureau in Varanasi.
- Conduct training programmes for VCC personnel.

Required qualifications:

- BA in Business Management or Business Administration.
- Knows and ensures all laws, codes, ordinances, policies, procedures, risk management, safety precautions, rules/regulations and emergency procedures.
- Fluent in English both verbal and written.
- Excellent command of computer applications.

(3) Oversees training in Japan

It is strongly recommended to dispatch preparatory team staff for a training programme in Japan.

The purpose is to inspect and experience the international standard of convention centres and their operations, so that it will be easy to visualize issues during the design development stage.

Since Varanasi and Kyoto made an agreement to promote their partnership in August 2014 and some world class convention centres are located in Kyoto, the training programme should include not only inspection of convention centres, museums, theatres and auditoriums in Kyoto, but also inspection of the backyards of these facilities with explanatory sessions which will enhance the understanding of facility operations and maintenance.

Kyoto also has advanced experience in providing incentive tours for both domestic and overseas visitors, utilizing various tourist attractions including cultural heritages, arts and performances and cuisines.

7.2.5. Necessity of Advisory Committee during the Implementation Stage

An Advisory Committee (AC) for VCC operations should be established and it must be able to provide various advice related to design development and operations planning during the implementation stage.

Expected participants and specialists are as follows:

Expected participants of AC	Representatives from the Ministry of Tourism, Ministry of Culture, Banaras Hindu University (BHU), other institutions / artists and private sector associations (tourism industry, hotels and real estate agencies in Varanasi).
Expected specialties	Profound knowledge for MICE on cultural, academic and commercial events, understand facility requirements of these events, significance of cultural heritages, attractions, performances and tourism trend in Varanasi.

Expected roles of AC during the study, planning and design stages are as follows:

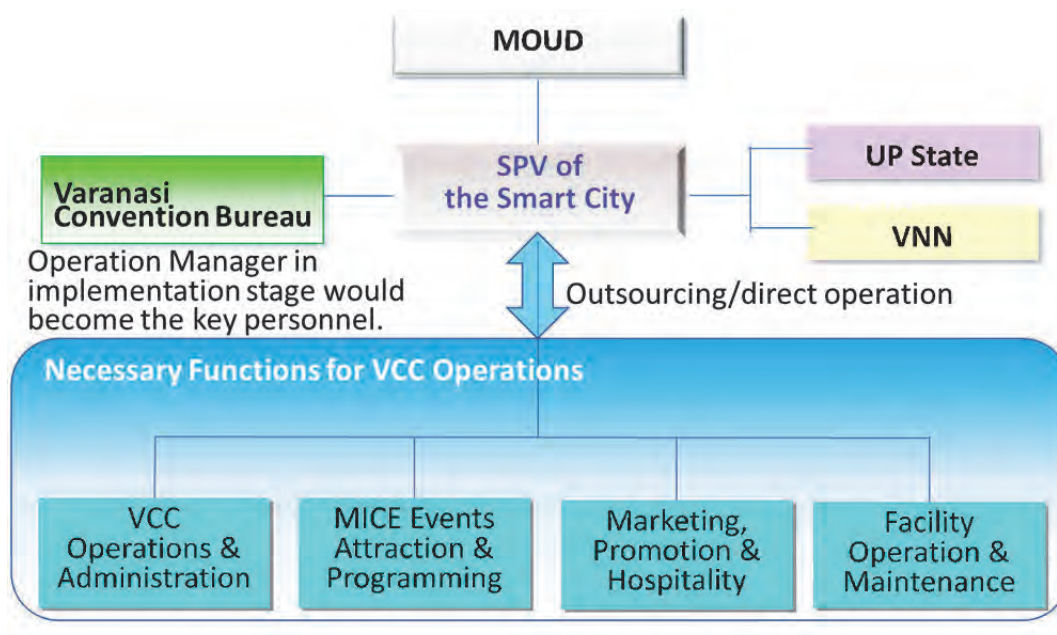
- Provide advice and direction to PMU on needs and possible usages such as MICE events and incentive tourism to be held at VCC.
- Provide advice on design and planning requirements for VCC facilities.
- Provide advice on marketing and promotion of VCC.

- Provide advice on potential future events to be held in VCC.
- Discussing creating policy, structure and networks of “Varanasi Convention Bureau.”

7.2.6. Operations Organization of VCC

Operations and management of VCC can be fully/partially outsourced to a private company with the support of Varanasi Convention Bureau which is evolved from the Advisory Committee.

Envisaged Operations Organization Structure is as shown below.



Source: JST

Figure 7.2.4 Operations Organization Structure

7.3. Rough Estimation of Project Cost

The approximate project cost of VCC is estimated based on the consideration of the following matters. The calculation method of the estimated project cost is "the proposed building scale (m^2) x construction unit price ($/m^2$)". However, the project cost roughly estimated in this chapter is only preliminary, thus review is necessary when deciding the details of the project in the future.

- Proposed building scale (m^2): the floor area of the proposed building was set through consultation with GOI and the site survey conducted during this survey (refer to Chapter 6).
- Construction cost per unit area (m^2): since this project will be conducted under a Grant Aid scheme, the unit price from various sources, such as CPWD Plinth Area Rate 2012, “Construction Cost Handbook India 2016”, similar projects in India, interviews with Indian contractors and consultants, and other Japan Grant Aid projects in India are compared and studied and the unit price used in this project was calculated based on this study.
- Other necessary expenses: VAT and preliminary expense (contingency fee) are not included, but price escalation and consultant fee for design supervision are.

7.3.1. Study on Construction Cost

(1) Comparison of the building cost per unit area

The currency rate used is from JICA's rate on March 2017 (1 INR = 1.68481 JPY, 1 USD = 112.217 JPY).

a) Construction cost in India

- The unit price from CPWD Plinth Area Rate 2012 (used in DPR)

On-the-ground: 60,540 INR /m² (102,000 JPY/m²), underground: 11,502 INR /m² (19,380 JPY/ m²). According to the local consultant, that unit price for underground construction is somewhat less than the market rate.

- The unit price from "Construction Cost Handbook India 2016"

On-the-ground: 91,980 INR /m² (154,970 JPY/m²), underground: 17,980 INR /m² (30,300 JPY/ m²)

- The unit price from interviews

JST conducted interviews with the local consultants about construction cost of similar facilities in India.

The unit cost of NASC (National Agriculture Science Complex)⁴, as one example, which is still under construction in Delhi is 70,000 INR /m² (117,940 JPY/m²) for both on-the ground and underground facilities.

On the other hand, although the unit cost of Mahatma Mandir is 110,100 INR/ m² (185,500 JPY/m²), there are many unclear points thus it is not adopted.

From the interview with the local contractors, the unit cost of office buildings is around 70,000 INR /m² (117,940 JPY/ m²) for on-the-ground facility and 28,000 INR /m² (47,170 JPY/m²) for underground.

- The construction unit cost from other JICA Grant Aid (GA) projects in India

The unit cost in "The Project for Improvement of the Institute of Child Health and Hospital for Children, Chennai" is 185,000 JPY/m² (109,805 INR/m²) for both on-the-ground and underground facilities, with a consideration of the price change rate at the time of this survey.

b) Construction cost in Japan

Construction cost of a convention centre in Japan is roughly in the range of 300,000 – 600,000 JPY/ m². Considering the wide variation, the intermediate number of 450,000 JPY/ m² from the basic plan of the convention area in Himeji city is used, whereas in India the unit cost of underground-construction NASC is 172,800 JPY/ m², which is only 40% of the unit cost in Japan.

⁴ NASC (National Agriculture Science Complex) is under construction and located in the NASC complex Delhi (refer to Chapter 4.1 (6))

(2) Comparison of construction material and labour cost

a) Comparison of construction material cost in Japan and India

In India, the cost of concrete is about 10% cheaper than Japan but for reinforcing bar it is 5% higher than that of Japan. Moreover, form work for concrete is about 25% of that in Japan and soil excavation work is about 40%. Most of the materials are cheaper in India and can be procured from India.

Table 7.3.1 Comparison of Construction Material Cost

(Unit: JPY, 1 INR=1.725 JPY)

Equipment	Specification	Quantity	Unit	India (JPY)	Japan (JPY)
Concrete work	Grade 30	1	m ³	11,816	13,100
Re-bar work	SD295A SD345	1	t	112,125	107,000
Form work	Standard	1	m ²	1,122	4,400
Soil excavation work	Standard	1	m ³	336	870

Source: JST

b) Comparison of labour cost in Japan and India

Labour cost in India is approximately 1/23 to 1/25 of the Japanese unit cost. Only a few specific equipment installation works require dispatch of skilled workers, because various skilled workers are available in India.

Table 7.3.2 Comparison of Labour cost in India

(Unit: JPY, 1 INR=1.725 JPY)

Labour	Quantity	Unit	India (JPY)	Japan (JPY)
Plaster work	1	day	1,121	25,800
Tile work	1	day	1,294	21,000
Rebar work	1	day	1,121	25,700
Carpenter	1	day	1,121	23,900
Paint work	1	day	1,035	26,300
Electric work	1	day	1,294	23,300
Piping work	1	day	1,294	20,500
Ordinary worker	1	day	776	19,800

Source: Construction Cost Handbook India 2016

(3) Special facilities · Stage equipment

In order to use the main hall effectively, JST studied the possibility of introducing movable partitions, acoustic systems and stage lighting systems that would be appropriate/ preferable for showing the culture of Varanasi (music, dance, play) in the main hall of VCC.

As described in Chapter 6, JST studied the 2 alternatives (Alt. X and Alt. Y for 1,200 seats) as follows.

Table 7.3.3 Comparison Study of Alternative X and Y

	Stage Setting	Sound System, Lighting Facilities	Floor	Chairs	Movable Partitions
Plan X	No Fly Tower	Minimum setting + back up with rental facilities	Flat Floor	Front side: Stacking Chairs Back side: Retractable Chairs	Yes
Plan Y	Fly Tower Some battens	Minimum setting + back up with rental facilities	Front side: Flat Floor Back side: Stepped Floor	Front side: Stacking Chairs Back side: Fixed Chairs	Yes

Source: JST

As a result, it was confirmed that due to budget limitation neither Alt. X nor Y can install full set of the facilities/ equipment, thus JST is proposing to cover the necessary equipment within the budget.

(4) Considerations on the Cost Estimation

The cost estimation for this project considers the following 2 things:

a) Japanese contractor's expenses

Since this project uses a Grant Aid scheme, it is necessary to estimate and include the overhead rate for the Japanese contractor which is calculated as 30%.

b) Using the collected data (adjustment of unit cost by building type)

As there is no data for convention centres in the Construction Cost Handbook India 2016, the cost for business hotels x 1.25 is used for VCC.

Also, the cost data acquired from the interviews were for offices, so the cost x 1.5 is used for VCC. These ratios were referred from the Japan Building Cost Information.

c) Consumer Price Variation

The table below shows expected consumer price inflation from 2014 to 2021.

Table 7.3.4 Average Expected Consumer Price from 2014 to 2021

Fiscal year	2014	2015	2016	2017	2018	2019	2020	2021
Inflation of average consumer price (%)	5.927	4.932	5.294	5.155	5.26	5.199	5.03	4.94

Source: International Monetary Fund (IMF)

Based on the consumer price index by IMF, the price in India has been increasing around 5% each year. The building cost per unit area to be applied for this project is estimated based on the inflation rate of average consumer prices (%), and the assumption that the Tender will be held in May 2018.

d) Consultant fee for design and construction supervision

The Consultant fee for design and construction supervision in this project is calculated based on the calculation criteria of the Ministry of Land, Infrastructure and Transport of Japan.

(5) Project cost calculation

The results of considering the above points are summarized below.

Table 7.3.5 Project Cost Calculation

	Unit Cost (JPY/m ²)		Inflation(%)		With consideration of GA	Adjustment by use		Estimated Unit Cost (JPY/m ²)		Average Unit Cost (JPY/m ²)	
	above ground	under ground	above ground	under ground		above ground	under ground	above ground	under ground	above ground	under ground
1 CC in Japan	450,000							-	-		
2 CPWD	102,000	19,380	1.16334	1.16334	1.3	1.00	1.0	155,000	30,000	230,000	48,000
3 Handbook 2016	154,970	30,300	1.07334	1.07334	1.3	1.25	1.0	271,000	43,000		
4 Interview	117,940	47,200	1.12640	1.12600	1.3	1.5	1.0	260,000	70,000		
5 GA project	185,000		1.21309		1.0	1.0		224,500		180,000	
6 Average bid results	119,840		1.1716		1.0	1.0		140,500			
7 NASC	117,940		1.12640		1.3	1.0		172,800			
8 Mahatma Mandir	185,500		1.16334		1.0	1.0		215,800		no details→ not adopted	

Source: JST

In many cases in India, the unit cost of underground facilities and those for on-the ground are estimated separately. Cost of underground construction in India is lower than that of Japan, and underground construction cost is estimated as roughly 15% to 20% of the cost of the on-the-ground part.

As a result of analysing the table above, the average unit cost for separate calculation among No.2, 3, and 4 is 230,000 JPY/m² for on-the-ground facility. However, for underground work, JST adopted the higher cost 70,000 JPY/m² instead of average cost, from interview (No.4) to estimate the total project cost with consideration of unknown factors since the result of the geotechnical survey has not been received.

On the other hand, the average among No.5, 6, 7 is around 180,000 JPY/ m².

Since the design of the building is not fixed yet, JST apply the following floor area and 230,000 JPY/ m² for on-the-ground and 70,000 JPY/ m² for underground to calculate the total construction cost.

Table 7.3.6 Estimation of total Construction Cost

	Floor Area	Direct Construction Cost (1,000 JPY)	Consultant Fee (1,000 JPY)	Available Budget for Special Facilities (1,000 JPY)	Total Cost (1,000 JPY)
Alternative X & Y	5,000 m ² above ground 4,500 m ² underground	1,465,000	225,000	310,000	2,000,000

Source: JST

Total direct construction cost for Alt. X and Y is estimated as JPY 1,465 million. With consideration of the Consultant fee 225 million JPY and a total budget 2,000 million JPY, the

available budget for special facilities such as stage setting, movable partitions, sound system, etc. is 310 million JPY for Alternative X and Y.

Due to the limited budget, the result shows that a full set of stage settings, lighting, sound system, and the movable partition would be difficult to install for all the alternatives.

7.3.2. Schedule of construction work

Regarding the schedule planning, it is necessary to fully consider the special circumstances of Varanasi, India. It is advisable to avoid construction during the rainy season (June – September), especially for earth work, building frame work, etc. because it affects the construction term and cost.

The construction period for alternatives X and Y is estimated to be 20 months, which is based on the assumption that the necessary procedures, examinations, and construction under the responsibility of GOI are conducted promptly and smoothly.

7.4. Economic and Financial Evaluation

7.4.1. Demand Forecast

Due to a lack of statistical data to estimate the market size of the MICE industry in India, the demand forecast of VCC can be estimated by referring to the occupancy rates of the existing MICE venues. A market survey has been conducted to observe general information on the MICE venues. The following table shows that BHU recorded the highest occupancy rates of 93% by utilizing their big hall with 1,500 person capacity as well as the small halls of each faculty. The average occupancy rate of the ten MICE venues is 52%.

Table 7.4.1 Occupancy Rates at MICE Venues in India (2016)

MICE Venue	Occupancy Rate
Banaras Hindu University (BHU)	93%
Indian Habitat Centre	80%
India International Centre	80%
Indian Islamic Culture Centre	75%
Hyderabad International Convention Centre	40%
Mahatma Mandir	40%
Brilliant Convention Centre (BCC)	35%
KGMC Scientific Convention Centre	30%
Bangalore International Exhibition Centre	30%
Indira Gandhi Pratishthan	15%

Source: JST

7.4.2. Economic Benefit

The economic analysis can be conducted for quantitative assessment of economic costs and benefits which will show economic benefits to the economy. The economic benefits will be composed of tourist expenditures and revenue of MICE facilities and the revenue of MICE facilities will include hall tariff, museum entry fee, restaurant floor rental fee and car parking fee. The quantitative analysis of tourist

expenditures, museum entry fees, restaurant floor rental fees and car parking fees will be conducted after the future expansion plan of VCC will be finalized.

(1) Tourist Expenditures

From the interview of 38 international tourists in Varanasi with various nationalities such as Thailand, China, Japan, Nepal, US, UK and Brazil, and 25 national tourists from different states such as Bihar, Gujarat, Delhi, Maharashtra and Rajasthan, the average expenditure spent per trip has been examined. The results show that international tourists spend an average of INR 18,206 per trip, whereas national tourists spend about 26% of that, an average of INR 4,716 per trip. By implementing the project, the increasing number of tourists driven by the establishment of VCC will generate more income in the local economy from the tourist expenditures, an economic benefit.

Table 7.4.2 The Average Expenditure of International and Domestic Tourists per Trip

(Unit: INR)

Average Expenditure-	Reaching the destination (By air/ Rail/ Road/ Water)	Hotel	Food	Local Travel/ Conveyance	Entry Tickets to Monuments, Parks, Cultural Centres etc	Shopping	Entertainment- Movies, Pubs, Shows etc	Other	Total
International Tourists	6,319	2,928	1,503	1,661	1,289	1,791	705	2,010	18,206
Domestic Tourists	1,221	942	730	446	334	411	340	292	4,716

Source: JST

(2) Revenue of MICE Facilities

The revenues of MICE facilities will be generated through i) hall tariff, ii) museum tariff, iii) restaurant floor rental fees and iv) car parking fees. The estimation of tariff revenues is examined as follows.

– Hall Tariff

The hall size, tariff and unit rate of the 9 relevant MICE venues in India has been summarized in the following table. It shows that private MICE venues such as Bangalore International Exhibition Centre (BIEC) charge higher rates, while the public ones such as BHU and Mahatma Mandir charge lower. The hall tariff of VCC is likely to be set similar to public MICE venues in India.

Table 7.4.3 Hall size and tariff at MICE Venues in India

MICE Venue	Area sqm	Tariff (Rs.)	Unit Rate (Rs/sqm)
Bangalore International Exhibition Centre (BIEC)	1,393	200,000	145
Indira Gandhi Pratishthan	1,858	195,000	105
Pragati Maidan- ITPO	791	60,000	76
KGMC Scientific Convention Centre	1,393	100,000	72
Mahatma Mandir	5,574	446,250	70
Hyderabad International Convention Centre	15,300	841,500	55
Brilliant Convention Centre (BCC)	2,000	110,000	55
Indian Islamic Culture Centre	713	30,000	42
Banaras Hindu University (BHU)	1,393	30,000	22

Source: JST

– Museum Entry Fee

The tariff of the proposed museum at VCC will be determined by analysing the entrance fees of tourist monuments/museums across India. The following table shows the entrance fees of Indian/ Foreigner at major tourism destinations. It is likely that the entrance fees of INR 200-500 for foreigners and INR 10-30 for locals can be collected.

Table 7.4.4 Entrance Fees at Tourist Destinations in India

No.	Tourist Destination	Location	Entry Fee (Rs.)	
			Indian	Foreigner
1	Taj Mahal	Agra	20	1,000
2	Red Fort	Delhi	10	250
3	Humayun Tomb	Delhi	10	250
4	Qutub Minar	Delhi	10	250
5	Jantar Mantar	Jaipur	40	200
6	Amer Fort	Jaipur	25	200
7	Jaisalmer Fort	Jaisalmer	30	50
8	Sun Temple	Konarak	30	250
9	Charminar	Hyderabad	5	100
10	Agra Fort	Agra	20	300
11	Hawa Mahal	Jaipur	10	50
12	The Indian Museum	Kolkata	20	500
13	National Museum	Delhi	20	650

Source: various HP

– Restaurant Floor Rental

A restaurant might be located inside the VCC to provide snacks and drinks to participants. The restaurant management will be outsourced to a private company, and VCC will collect the monthly rental fee. JST has found through the interviews that the office rental fee around VCC site is INR 900/ sqm/ month, and that rate will be applied to the restaurant floor size.

– Car Parking Fee

A car parking will be developed in the basement of VCC, which car parking fee from users will be collected by VCC. The car parking fee will be INR 480/ day, based on the airport car parking fee in Varanasi, and 60% of the participants will be estimated to use car parking.

7.4.3. Economic Cost

a) Construction

The construction cost of X and Y has been estimated as JPY 2 billion with the following facilities.

Table 7.4.5 VCC Facility Overview

	Floor Area (sqm)	Number of Seats	Floor Area for Rent (sqm)	Construction Cost (1,000 JPY)	Facilities
X	5,500	1,200	1,200	2,000,000	Flat floor + movable seats
Y	5,500	1,200	1,200	2,000,000	Fixed seats

Source: JST

b) O&M

The O&M cost has been estimated by examining the variable costs (utility cost: electricity and water) and the fixed costs (maintenance and repair costs).

– Electricity

The electricity volume and the annual electricity cost with the different occupancy rates have been estimated as shown in the following tables. The power unit rate of INR 10/kWh has been applied.

Table 7.4.6 Electricity Volume

(Unit: kW)

	AC	Lightning	Others	Total
X & Y	407	110	165	682

Source: JST

Table 7.4.7 Annual Electricity Cost

(Unit: INR)

Occupancy Rate	30%	40%	50%	60%	70%	80%	90%
Number of Days	110	146	183	219	256	292	329
Number of Hours	660	876	1098	1314	1536	1752	1974
X & Y	4,499,000	5,971,400	7,484,700	8,957,100	10,470,400	11,942,800	13,456,100

Source: JST

– Water

Based on the interviews with the CPWD Varanasi office, the water running cost would be a lump-sum of INR 7,600 per year regardless the size of the facility. Considering the VCC as a government facility, water charge can be set lower than the commercial rates.

– Maintenance and Repair

The annual repair cost can be estimated as 1% of the construction cost and the maintenance cost for equipment and security can be estimated as JPY 3 million, therefore, the total of INR 13,650,000 for X&Y has been estimated.

– Labour Cost

A total of 25 staff is assumed to be directly hired for the operation of VCC including a General Manager, Executive Engineer, Marketing and Public Relations, Technical (IT), Finance and Accounting, General Administration and Human Resources and Technical (Utility and Cleaning).

Table 7.4.8 Annual Labour Cost

(Unit: INR)

	No.	INR/year	Total
General Manager	1	2,000,000	2,000,000
Chief Engineer	1	1,700,000	1,700,000
Marketing & Public Relation	2	1,700,000	3,400,000
Technical (IT)	2	700,000	1,400,000
Finance and Accounting	2	600,000	1,200,000
General Administration & HR	2	600,000	1,200,000
Technical (Utility, Garden/cleaning)	15	240,000	3,600,000
Total	25		14,500,000

Source: JST

– Total

By combining the variable and fixed O&M costs, the total O&M costs can be estimated as in the following table.

Table 7.4.9 Total O&M Cost

(Unit: INR)

Occupancy Rate	30%	40%	50%	60%	70%	80%	90%
X & Y	32,656,600	34,129,000	35,642,300	37,114,700	38,628,000	40,100,400	41,613,700

Source: JST

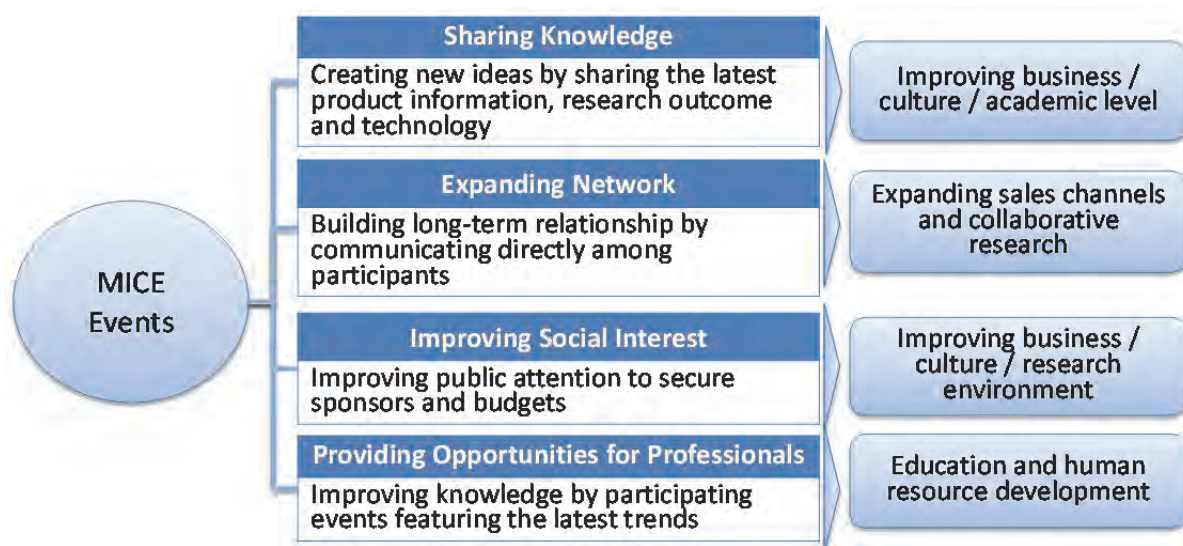
7.4.4. Financial Scheme of the Project

The management structure of VCC is shown in Figure 7.2.3 - Preparatory Office within PMU. PMU shall consist of MOUD, Central Public Works Department (CPWD), VMC and Special Purpose Vehicle (SPV) of Smart City. The asset is owned by GOI, and the O&M system has two options; 1) O&M by GOI or 2) O&M outsourced to a private company. Since the O&M of a MICE facility requires specific know-how and experience to organize events, it is likely that outsourcing O&M to a private company will be more beneficial to VCC. Although in this case, the O&M cost is assumed to be higher, a detailed analysis has not been made at this stage, thus a general O&M cost (3% of construction cost) will be applied to this Survey.

7.4.5. Financial Evaluation

(1) Financial Evaluation of MICE Business

MICE facilities in general bring direct as well as indirect impacts to the economy. The direct impacts include participants' and sponsors' expenses, and the indirect impacts include production promotion, income generation, job creation and tax increase. Beside economic impacts, MICE facilities have social impacts such as in cultural and academic fields as shown in the following graph.



Source: JST

Figure 7.4.1 Socio-Economic Impacts of MICE Events

GOI expects socio-economic benefits can be achieved by promoting MICE since earning profits from MICE facilities is difficult. On the other hand, private MICE developers/ operators make a profit by organizing private events such as weddings or developing hotels adjacent to the MICE facilities.

(2) Financial Revenue

The revenue of a MICE facility such as i) hall tariff, ii) museum entry fees, iii) restaurant floor rental and iv) car parking fees will be considered as financial revenue of VCC. Since the planning of the museum, restaurant and car parking has not been finalized, only the hall tariff will be included in the financial evaluation.

(3) Financial Cost

Since the construction cost will be covered by an ODA grant, the construction cost will not be included in the financial evaluation. In order to guarantee the sustainability of the project, O&M cost of 60 million JPY will be considered for the financial evaluation.

(4) Financial Evaluation

A rough financial evaluation has been conducted by examining the balance between the hall rental tariff and annual occupancy rate. The annual O&M cost shown in Table 7.4.9 and the hall rental area of 1,200 sqm for X&Y have been applied. The following table for X&Y shows that the financial balance will only be positive if the hall rental tariff is INR 150/sqm and they have a 60% occupancy rate. When the hall tariff is INR 200/sqm, a 40% occupancy rate is enough to generate profits.

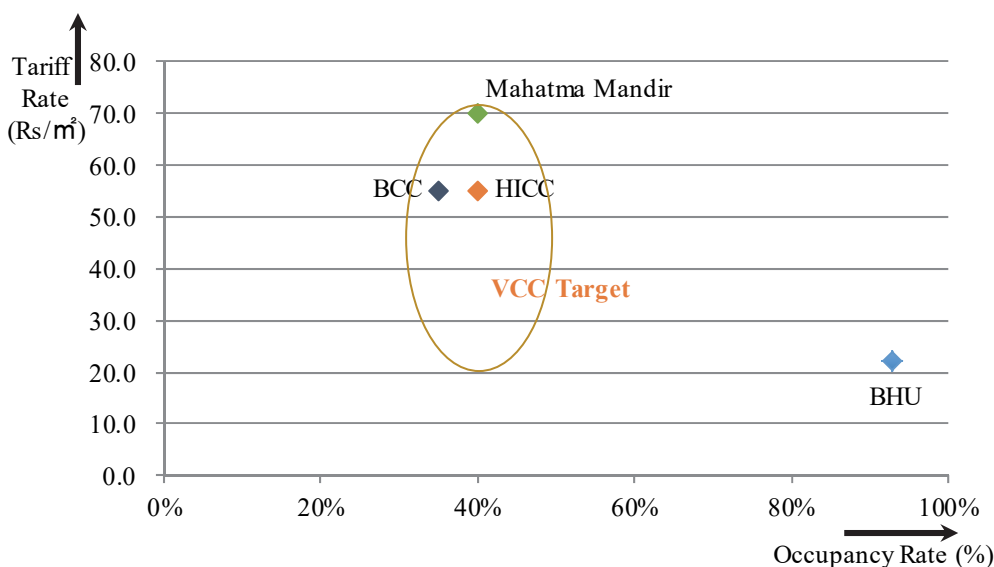
Table 7.4.10 Financial Evaluation of X & Y

(Unit: INR)

	Rs.20/m ²	Rs.40/m ²	Rs.70/m ²	Rs.100/m ²	Rs.150/m ²	Rs.200/m ²	Rs.250/m ²
30%	-30,016,600	-27,376,600	-23,416,600	-19,456,600	-12,856,600	-6,256,600	343,400
40%	-30,625,000	-27,121,000	-21,865,000	-16,609,000	-7,849,000	911,000	9,671,000
50%	-31,250,300	-26,858,300	-20,270,300	-13,682,300	-2,702,300	8,277,700	19,257,700
60%	-31,858,700	-26,602,700	-18,718,700	-10,834,700	2,305,300	15,445,300	28,585,300
70%	-32,484,000	-26,340,000	-17,124,000	-7,908,000	7,452,000	22,812,000	38,172,000
80%	-33,092,400	-26,084,400	-15,572,400	-5,060,400	12,459,600	29,979,600	47,499,600
90%	-33,717,700	-25,821,700	-13,977,700	-2,133,700	59,220,000	37,346,300	57,086,300

Source: JST

Based on the preliminary assumptions, the hall rental tariff can be determined to be between the rates of BHU (INR 20/sqm) and Mahatma Mandir (INR 70/sqm), and the occupancy rate can be expected to be around the rates of Mahatma Mandir and HICC (40%). Competition with relevant facilities is assumed, therefore, a benchmark tariff between INR 20/sqm and INR 70/sqm would be appropriate. In the case of applying the lower tariff as a public facility, VCC should consider receiving subsidy from the government to fill the gap between revenues and expenses.



Source: JST

Figure 7.4.2 Target Occupancy Rate and Tariff Rate at VCC

(5) Financial Status of Varanasi Nagar Nigam (VMC)

The financial status of VMC in FY 2008-2009 to FY 2012-2013 shows that the fiscal surplus has been maintained due to increasing tax income, non-tax income and capital income from the central government, state government and donor agencies. The fiscal balance of INR 452 million surplus at the end of FY 2013 shows that the O&M cost of VCC (INR 35.6 million) can also be covered within the VMC budget. The coverage ratio by VMC will be determined in line with other upcoming infrastructure projects in Varanasi.

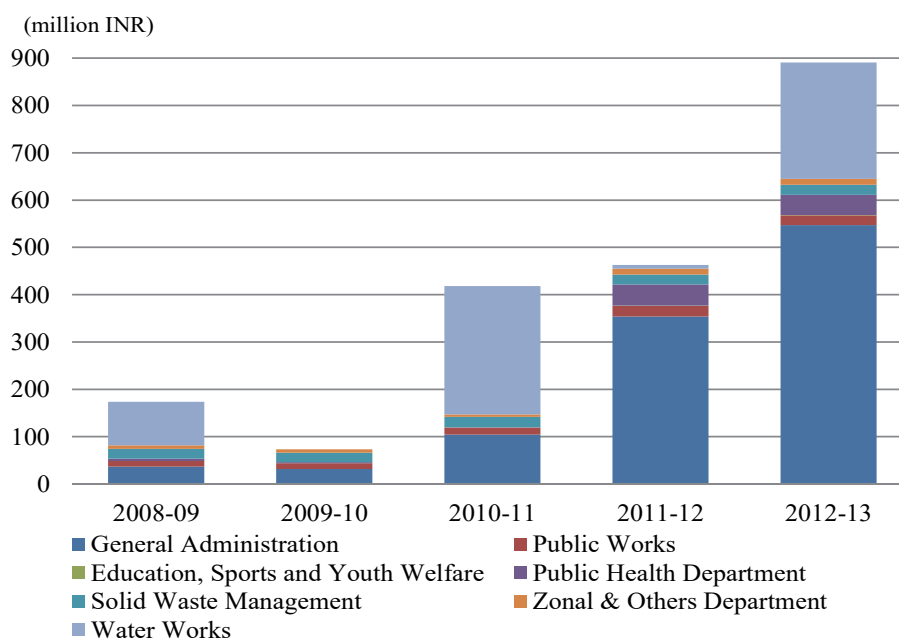
Table 7.4.11 Financial Statement of VMC

(Unit: INR)

Head of account	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Balance	388,900,000	523,100,000	112,900,000	545,200,000	255,100,000
Revenue receipts					
A Own sources	377,800,000	467,500,000	572,100,000	1,012,600,000	1,211,700,000
i) Tax income	131,800,000	149,600,000	161,700,000	290,800,000	300,800,000
ii) Non-tax income	246,000,000	317,900,000	410,400,000	721,800,000	910,900,000
B Assigned revenues and grants	401,500,000	358,100,000	790,900,000	749,800,000	872,000,000
Total	779,300,000	825,600,000	1,363,000,000	1,762,400,000	2,083,700,000
Revenue expenditure					
A Salaries	635,700,000	520,400,000	768,100,000	916,300,000	1,044,600,000
B Operations and maintenance	174,100,000	73,100,000	418,300,000	462,900,000	890,300,000
Total	809,800,000	593,500,000	1,186,400,000	1,379,200,000	1,934,900,000
Capital income	1,461,200,000	788,600,000	719,500,000	1,927,000,000	2,508,500,000
Capital expenditure	1,296,500,000	1,430,900,000	463,800,000	2,600,300,000	2,460,400,000
Closing balance incl. opening balance	523,100,000	112,900,000	545,200,000	255,100,000	452,000,000

Source: City Development Plan for Varanasi, 2041

In O&M expense, expenditures from different departments of VMC are shown in the following figure. During FY 2012-2013, the major share of 62% in O&M expenses has been incurred by the General Administration Department, followed by Water Works at 27%. The O&M expense of VCC will be included in the category of Public Works, which is only 2% of the total O&M expense.



Source: City Development Plan for Varanasi, 2041

Figure 7.4.3 O&M Expense of VMC

7.4.6. Project Indicators

Tentative project indicators after 5 years of implementing the project are proposed for evaluating the project effects.

Table 7.4.12 Project Indicators

Indicator	Item	Number
Operation Indicator	Number of visitors at VCC	85,400 visitors Estimation: by applying the occupancy rate of 40%, the hall will be filled for events 146 days each year. The average duration of one event is 1.2 days, and 122 events will be organized per year. Approximately 70% of the hall is estimated to be filled by participants; therefore, 85,400 visitors are expected.
	Number of events at VCC	122 events Estimation: same as above
	Number of international events at VCC	12 events Estimation: 1 international event per month
Effect Indicator	Number of tourists	25,620 tourists Estimation: out of 85,400 visitors, 30% of visitors are estimated to be coming from outside Varanasi.

Source: JST

Following the quantitative indicators, the qualitative indicators are proposed as follows:

- Improve international reputation of Varanasi
- Economic spill-over effects in local industries such as tourism, services, commerce, transportation, agriculture and finance
- Enhance social/ cultural/ academic level in Varanasi
- Strengthen local cultural activities
- Enhance relationship of Varanasi and Kyoto to promote mutual cooperation
- Support the capacity building of government staff through training programs

7.5. Undertakings by GOI

If this project is implemented, GOI will carry out the following scope of works, which details shall be agreed to by GOI during the Preparatory Survey.

7.5.1. Responsibilities of the Indian side

(1) Tax Exemption

Under the Japan Grant Aid Scheme, the tax for equipment and materials purchased for the project shall be exempted or borne by GOI.

Based on the verified contract, all of the equipment and services provided, and Japanese workers who are involved in this Project shall be exempted from custom tariffs, income tax and other domestic taxes.

(2) Assistance with Entry Permit and Visa

Based on the verified contract, assistance with entry permits and visas will be provided by GOI to Japanese nationals who will be involved in this project.

7.5.2. Portions by the Indian Side

In addition to the above, there are some portions of works to be implemented by the Indian side according to the Grant Aid scheme. The major items by the Indian side are noted as follows:

- (1) Land acquisition and clearance of the site, such as demolishing and removing trees and roots, existing facilities and base, garden and back-filling and levelling of the site before the construction starts.
- (2) Obtaining the necessary approvals for planning, building and operations, from the relevant authorities.
- (3) Provide temporary power and water supply for construction, and provide the utility network that is necessary for the facility operation.
- (4) Improving the traffic circulation around the VCC.
- (5) To purchase and install furniture, curtains and carpets, etc.
- (6) Landscaping and planting in the site.
- (7) Establish a PMU and assign the necessary staff for the preparation stage
- (8) Establish proper organization to operate VCC properly.
- (9) Securing the necessary budget for operation and maintenance of VCC.

Appendices

Appendices

1.	Member list of the Survey Team	A-1-1
2.	Survey Schedule	A-2-1
3.	List of Parties Concerned in the Recipient Country.....	A-3-1
4.	Topographic Survey Map	A-4-1
5.	Study on the Exhibition.....	A-5-1
6.	MICE Business Report.....	A-6-1
7.	EIA Report.....	A-7-1
8.	Soil Investigation.....	A-8-1

Member list of the Survey Team

Name	Assignment	Authority/Firm
Ms. Yuko SASA	Chief Consultant / Architectural Planning 1/ Natural Conditions Survey	Oriental Consultants Global Co., Ltd.
Mr. Ashish LAHOTI	Vice Chief Consultant / Architectural Planning2	Nikken Sekkei Ltd.
Mr. Michiro OIZUMI	Architectural Design	Nikken Sekkei Ltd.
Mr. Atsushi OKAMURA	Convention Center/ Concept / Market Survey	Nomura Research Institute, Ltd.
Mr. Takuya MIZOGUCHI	Convention Center Operation	Nomura Research Institute, Ltd.
Mr. Yuichi FUKUOKA	Organization Strengthening / Implementation System	Oriental Consultants Global Co., Ltd.
Mr. Shigeru YOSHINO	Convention Center Facility Design	Nikken Sekkei Ltd.
Mr. Yoichi AOKI	Convention Center Facility Design 2	Nikken Sekkei Ltd.
Mr. Toru TOSHIDA	Facility Planning	Nikken Sekkei Ltd.
Mr. Teruo JURI	Procurement and Construction Planning / Cost Estimation	Oriental Consultants Global Co., Ltd.
Mr. Sampei NAKANISHI	Environmental and Social Considerations	Oriental Consultants Global Co., Ltd.
Ms. Yasumi TSUTSUI	Environmental and Social Considerations	Oriental Consultants Global Co., Ltd.
Ms. Yuka KATO	Economic Analysis	Oriental Consultants Global Co., Ltd.
Mr. Kazuki ABEYAMA	Exhibition planning of Environmental Education	Oriental Consultants Global Co., Ltd.
Ms. Kino SAWANOBORI	Exhibition Design, Equipment Planning	Oriental Consultants Global Co., Ltd.
Ms. Hikari SHIRAIWA	Assistant	Oriental Consultants Global Co., Ltd.

Schedule for a Field Survey (as of Nov 22) 2016.11.22

	Day		Chief Consultant /Architectural Planning 1/ Natural Conditions Survey	Vice Chief Consultant / Architectural Planning2	Organization Strengthening/Implem entation System	Assistant
			Yuko SASA	Lahoti Ashish	Yuichi FUKUOKA	Hikari SHIRAIWA
0	Nov. 21	Mon.				Tokyo(NRT) ⇒ Delhi(DEL)
1	Nov. 22	Tue	Tokyo(NRT) ⇒Delhi(DEL)			Prepare the meeting
2	Nov. 23	Wed	Meeting with JICA/Embassy of JAPAN Meeting with MoUD, NBCC, MEA, EoJ, JICA		Tokyo(NRT) ⇒ Delhi(DEL)	Along withTeam Chief Consultant
3	Nov. 24	Thu	AM: Meeting with related organizations		Along withTeam Chief Consultant	Along withTeam Chief Consultant
			PM: Delhi⇒Varanasi		Along withTeam Chief Consultant	Along withTeam Chief Consultant
4	Nov. 25	Fri	Meeting with Varanasi City		Along withTeam Chief Consultant	Along withTeam Chief Consultant
5	Nov. 26	Sat	AM: Varanasi⇒Delhi		Along withTeam Chief Consultant	Along withTeam Chief Consultant
			Meeting with Local Employees		Along withTeam Chief Consultant	Along withTeam Chief Consultant
			Delhi(DEL)→		Delhi(DEL)→	Delhi(DEL)→
6	Nov. 27	Sun	→Tokyo(NRT)		→Tokyo(NRT)	→Tokyo(NRT)

NMCG:National Mission for Clean Ganga, MoWR: Ministry of Water Resources
 NGRBA: National Ganga River Basin Authority, NBCC: National Building Construction Company

Place :

	Varanasi
	Delhi
	Ahmadabad
	Hyderabad
	Lucknow
	Moving Day

Schedule for a Field Survey 2016.12.05

Day	Chief Consultant / Architectural Planning 1/ Natural Conditions Survey		Vice Chief Consultant / Architectural Planning2		Architectural Design	Convention Center / Concept / Market Survey	Convention Center Operation	Facility Planning	Environmental and Social Considerations	Economic Analysis	Exhibition planning of Environmental Education	Exhibition Design, Equipment Planning	Architectural Design Assistant	Assistant
	Yuko SASA	Lahoti Ashish	Michio Ozumi	Atsushi OKAMURA	Takuya MIZOGUCHI	Toru YOSHIDA	Sampei NAKANISHI	Yuka KATO	Kazuki ABEYAMA	Kino SAWANOBORI	Yoichi AOKI	Hikari SHIRAWA		
1	Dec. 5	Mon	Tokyo(NRT) ⇒Delhi(DEL)							Tokyo(HND) ⇒ Delhi(DEL)				Tokyo(NRT)⇒ Delhi(DEL)
2	Dec. 6	Tue	Meeting with related organizations						Tokyo(NRT) ⇒ Delhi(DEL)	Along with Team Chief Consultant				Along with Team Chief Consultant
3	Dec. 7	Wed	Meeting with related organizations		Tokyo(NRT) ⇒ Delhi(DEL)				Survey on Environmental and Social Considerations	Along with Team Chief Consultant	Tokyo(HND) ⇒ Delhi(DEL)			Along with Team Chief Consultant
4	Dec. 8	Thu	Meeting with related organizations		Along with Chief Consultant	Tokyo(NRT) ⇒ Delhi(DEL)			Survey on Environmental and Social Considerations	Along with Team Chief Consultant	Survey on Exhibition planning			Along with Team Chief Consultant
5	Dec. 9	Fri	AM:Delhi⇒varanasi PM: Meeting with related organizations		Along with Chief Consultant	Market Survey			Along with Team Chief Consultant	Market Survey	Along with Team Chief Consultant			Along with Team Chief Consultant
6	Dec. 10	Sat	Internal meeting		Along with Chief Consultant	AM:Delhi⇒Varanasi Market Survey		Tokyo(NRT) ⇒ Delhi(DEL)	Along with Team Chief Consultant	AM:Delhi⇒varanasi Market Survey	Along with Team Chief Consultant		Tokyo(NRT) ⇒ Delhi(DEL)	Along with Team Chief Consultant
7	Dec. 11	Sun	AM:Market Survey PM:Varanasi(VNS)⇒Delhi(DEL)⇒Ahmadabad(AMD)		Along with Chief Consultant	AM:Market Survey PM:Varanasi(VNS)⇒Delhi(DEL)⇒Ahmadabad(AMD)		Delhi(DEL)⇒ Ahmadabad(AMD)	Survey on Environmental	AM:Market Survey PM:Varanasi(VNS)⇒ Delhi(DEL)⇒ Ahmadabad(AMD)	Survey on Exhibition planning		Delhi(DEL)⇒ Ahmadabad(AMD)	Along with Team Chief Consultant
8	Dec. 12	Mon	Mahatma Mandir		Along with Chief Consultant	Along with Chief Consultant		Along with Chief Consultant	Survey on Environmental	Along with Team Chief Consultant	Survey on Exhibition planning		Along with Team Chief Consultant	Along with Team Chief Consultant
9	Dec. 13	Tue	AM:Mahatma Mandir PM:Ahmadabad(AMD)⇒Hyderabad(HYD)		Along with Chief Consultant	Along with Chief Consultant		Along with Chief Consultant	Varanasi(VNS)⇒ Delhi(DEL)⇒	Along with Team Chief Consultant	Varanasi(VNS)⇒Delhi(DEL)⇒		Along with Team Chief Consultant	Along with Team Chief Consultant
10	Dec. 14	Wed	AM:Hyderabad Convention Center PM:⇒Hyderabad(HYD)⇒Varanasi(VNS)		Along with Chief Consultant	AM:Survey PM:⇒Hyderabad(HYD)⇒Varanasi(VNS)		Along with Chief Consultant	Survey on Environmental and Social Considerations	AM:Survey PM:⇒Hyderabad(HYD) ⇒⇒Varanasi(VNS)	Survey on Exhibition planning		Along with Team Chief Consultant	Along with Team Chief Consultant
11	Dec. 15	Thu	Meeting with related organizations		Along with Chief Consultant	Varanasi(VNS)⇒ Delhi(DEL)⇒	Market Survey	Along with Chief Consultant	Survey on Environmental and Social Considerations	Market Survey	Survey on Exhibition planning		Along with Team Chief Consultant	Along with Team Chief Consultant
12	Dec. 16	Fri	Meeting with related organizations		Varanasi(VNS)⇒ Delhi(DEL)⇒	⇒Tokyo(NRT)	AM:Varanasi(VNS)⇒ Delhi(DEL) Market Survey	Along with Chief Consultant	Survey on Environmental and Social Considerations	Market Survey	Survey on Exhibition planning		Along with Team Chief Consultant	Along with Team Chief Consultant
13	Dec. 17	Sat	Internal meeting		⇒Tokyo(NRT)		Delhi(DEL)⇒	Along with Chief Consultant	Survey on Environmental and Social Considerations	Market Survey	Delhi(DEL)⇒Lucknow(LKO)		Along with Team Chief Consultant	Along with Team Chief Consultant
14	Dec. 18	Sun	AM:Varanasi⇒Lucknow PM:Survey				⇒Tokyo(NRT)	Along with Chief Consultant	Survey on Environmental and Social Considerations	Along with Chief Consultant	Survey on Exhibition planning		Along with Team Chief Consultant	Along with Team Chief Consultant
15	Dec. 19	Mon	Meeting with related organizations					Along with Chief Consultant	Survey on Environmental and Social Considerations	Along with Chief Consultant	Lucknow⇒Delhi(DEL)⇒		Along with Chief Consultant	Along with Chief Consultant
15	Dec. 20	Tue	AM: Meeting with related organizations PM:Lucknow(LCW)⇒Delhi(DEL)					Lucknow⇒Delhi(DEL)⇒	Delhi(DEL)⇒	Lucknow⇒Delhi(DEL) ⇒	⇒Tokyo(NRT)	⇒Tokyo(NRT)	Lucknow⇒ Delhi(DEL)⇒	Lucknow⇒ Delhi(DEL)⇒
16	Dec. 21	Wed	Meeting with related organizations	Meeting with related organizations				⇒Tokyo(NRT)	⇒Tanzania	Meeting with related organizations			⇒Tokyo(NRT)	Meeting with related organizations
16	Dec. 22	Thu	Meeting with related organizations	Meeting with related organizations						Meeting with related organizations				Meeting with related organizations
16	Dec. 23	Fri	Delhi(DEL)⇒							Delhi(DEL)⇒				Delhi(DEL)⇒
17	Dec. 24	Sat	⇒Tokyo(NRT)							⇒Tokyo				⇒Tokyo

NMCG: National Mission for Clean Ganga, MoWR: Ministry of Water Resources
 NGRBA: National Ganga River Basin Authority, NBCC: National Building Construction Company

A-2-2

				Trip Schedule (Marh 6-18)	as of 9th March				
Name				Yuko SASA	Ashish Murli LAHOTI	Yoichi AOKI	Yuichi FUKUOKA	Teruo JURI	Yuka KATO
Organization				OCG	Nikken	Nikken	OCG	OCG	OCG
Position				Chief Consultant /Architectural Planning1/Natural Conditions Survey	Vice CC / Architectural Planning2	Architectural Design of International Convention Centre2	Organization Strengthening/Implementation System	Procurement and Construction Planning /Cost Estimation	Economic and Financial Analysis
0	5-Mar	Sun							
1	6-Mar	Mon		11:30 NRT - 18:00 DEL by AI307			11:30 NRT - 18:00 DEL by AI307	11:30 NRT - 18:00 DEL by AI307	
2	7-Mar	Tue		Delhi			Delhi	Delhi	6:50 CLM - 10:25 DEL by AI282
3	8-Mar	Wed		Delhi:MOUD			Delhi:MOUD	Delhi:MOUD	Delhi:MOUD
4	9-Mar	Thu		Delhi			Delhi	Delhi	Delhi
5	10-Mar	Fri		Delhi			21:15 DEL -	21:15 DEL -	Delhi
6	11-Mar	Sat	UP Election	Delhi			08:00 NRT by AI306	08:00 NRT by AI306	Delhi
7	12-Mar	Sun		Delhi					Delhi
8	13-Mar	Mon	Holi	Delhi	Reach Delhi by Evening	11:30 NRT - 18:00 DEL by AI307			Delhi
9	14-Mar	Tue		07:45 DEL - 09:10 VNS by 6E4308	07:45 DEL - 09:10 VNS by 6E4308	07:45 DEL - 09:10 VNS by 6E4308			07:45 DEL - 09:10 VNS by 6E4308
10	15-Mar	Wed		Varanasi	Varanasi	Varanasi			Varanasi
11	16-Mar	Thu		21:25 VNS - 23:05 DEL by AI434	21:25 VNS - 23:05 DEL by AI434	21:25 VNS - 23:05 DEL by AI434			21:25 VNS - 23:05 DEL by AI434
12	17-Mar	Fri		Delhi	Delhi	Delhi			Delhi
13	18-Mar	Sat		21:15 DEL -	21:15 DEL -	21:15 DEL -			Delhi
14	19-Mar	Sun		08:00 NRT by AI306	08:00 NRT by AI306	08:00 NRT by AI306			14:35 DEL - 18:10 CLM by AI281

List of Parties Concerned in the Recipient Country

1. Embassy of Japan in India

Mr. Kiyoshi Furuhashi : Counsellor
Mr. Yasuko Nishimura : First Secretary
Mr. Teruo Sugimoto : Second Secretary

2. JICA

M.P.Singh : Chief Dev.Specialist
Seiya Okawara : Country Officer
Momoko Furuhashi : Representative

3. Ministry of Urban Development

Praveen Prakash : J.S
Sumit Gauhar : U.S
V.K.Chaurasia : Advisor (PHEE)
Renu Satija : DS
J.B. Rarurider : Jt. Advisor (PHEE)
Vibhor Sood : PMU (PHEE), GIZ

4. Ministry of External Affairs

Prof Ashok Kumar Chawla : Adviser, Japan
Rajesh Naik : U.S (Japan)

5. CPWD Varanasi

R.P. Singh : Superintending Engineer

6. National Building Construction Corporate

Anil Malla : GM
Anil Yadav : DGM
Umesh G. Naire : Additional General Manager
Dr. P.S. Chopra : Project Manager
Chandsesh Kumar : Project Manager
Smritam Poddar : Project Manager
Balaji Mohan : Architect
Kanwal Kaur : Architect

Appendix-3 List of Parties Concerned in the Recipient Country

- Puneet Dangi : Architect
Nishant Lall : Architect and Urban Designer
DDS. Srovastan : ED. Engineer
7. Varanasi Development Authority
Vinod Kumar Saxsena : Assistant Town Planner
8. Varanasi Municipal Corporation
Ram Gobal Mohale : Mayor
Shrihari Poatap Sahi : Municipal Commissioner
Raj Kumar Agrawal : Cultural Advisor
Mr. Arvind Kumar Srivastava : Executive Engineer
Rajkumar Apraural : Advisor to Mayor
B.K. Dwivedi : Ad. M. C.
R.S. Sengar : Ad. M. C.
9. Ministry of Defense, Varanasi
Shalini Pandey : Directorate General Defense Estates
10. Baranas Hindu University
Dr. Vidula Jayaswal : Former Professor, AIHC & Archeology,
Dr. K.P. Upadhyay : Registrar
D.K. Singh : Professor, Institute of Medical Sciences
Premchand Hombal : Associate, Professor and Head, Department of Dance
Hiralal Prajapati : Professor, Faculty of Visual Arts
Dr. O.P. Upadhyay : Medical Superintendent
Prof. A.K.Singh : An Art & Archeological Museum Director
11. Department of Tourism, Gout of Up
Ravidra Kumar : Regional Tourist Officer
12. India Convention Promotion Bureau
Mr. Chander Mansharamani : Vice Chairman
Ms. Madhu Dubey : Executive Director

Appendix-3 List of Parties Concerned in the Recipient Country

13. Hyderabad Convention Centre

Anmol Pancholy : Director of Sales
TV Madhupal : Sr. Director
S. Madhusudhana Rao : Chief Financial Officer, Emaar

14. Mahatma Mandir

Astosh Salvi : Mech Engineer
Mr. Rupesh : Deputy Manager, iNDEXTb

15. King George's Medical University

Harsh langle : Supervisor for Scientific Convention Centre

16. International Conference & Exhibition Services (ICES) Pvt. Ltd.

Mr. Shyam Nagpal : Managing Director,

17. Indira Gandhi Pratishthan (Lucknow)

Paras Nath : Junior Eng., LDA

18. JAI Prakash Narain International Centre

Rameeh Chandu Vena : Site Supervisor, Roaric Consulting Engineer

19. Brilliant Convention Centre

Mr. Satish Kumar Sharma : Assistant Vice President

20. Arts & Cultural Exchange

Ms. Misako Futsuki : Director

21. The Sulabh International Museum of Toilets

Mr. Raju Singh : Assistant curator

22. Taisei Corporation India Branch

Mr. Hideo Gondo : Chief of India Branch

23. Jain Associates

R.C. Jain : Managing Director

Appendix-3 List of Parties Concerned in the Recipient Country

24. Kajima India Pvt Ltd

Mr. Koji Oura : Managing Director

25. Plan it! by Creative Travel

Mr. Yogesh Bisht : Associate Vice President

26. RITES Limited

P.K. Pawan : SDGM

Y.K. Sharma : Group Managing Director

27. SITE India

Mr. Anup Nai : President

