

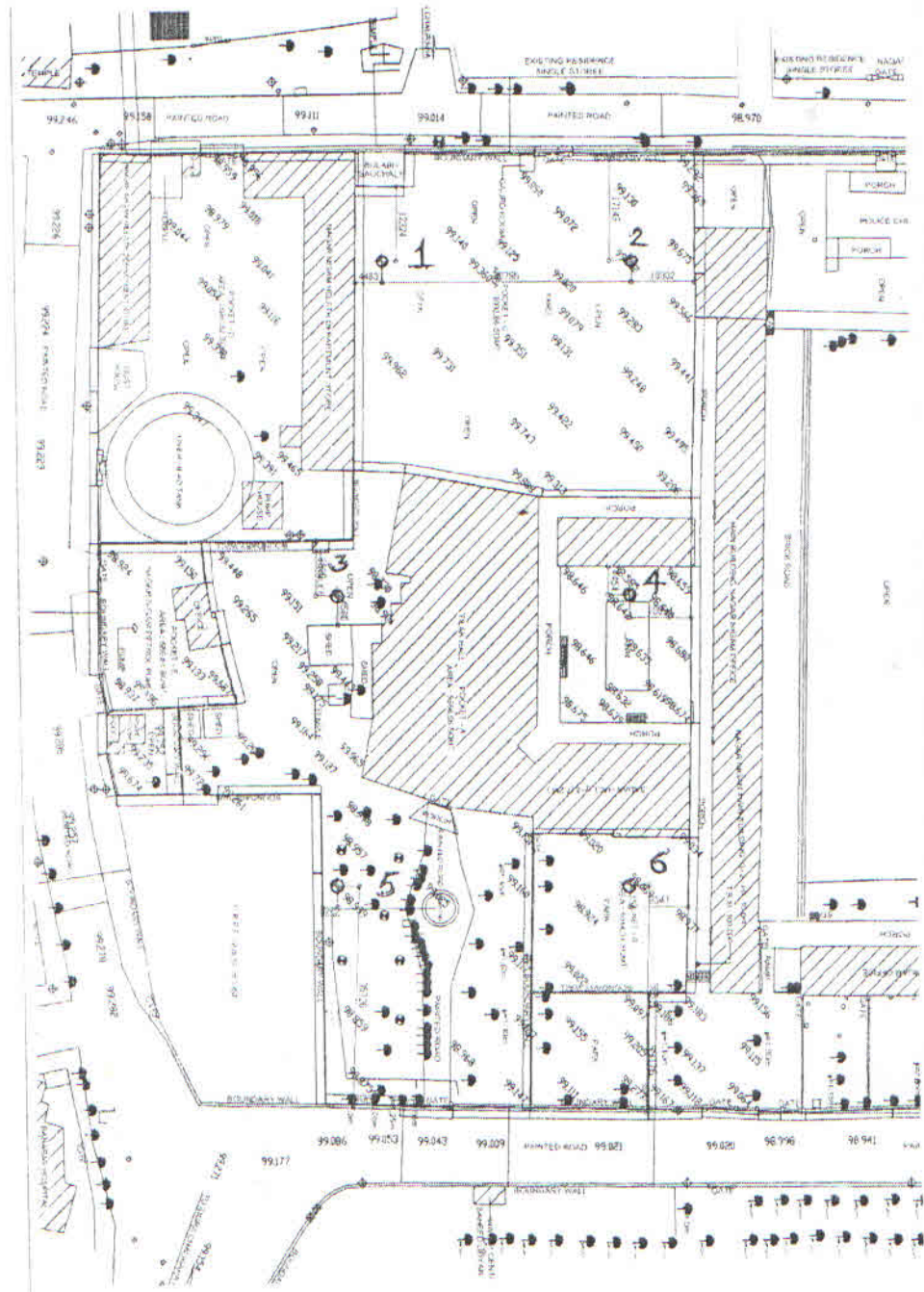
[illegible]

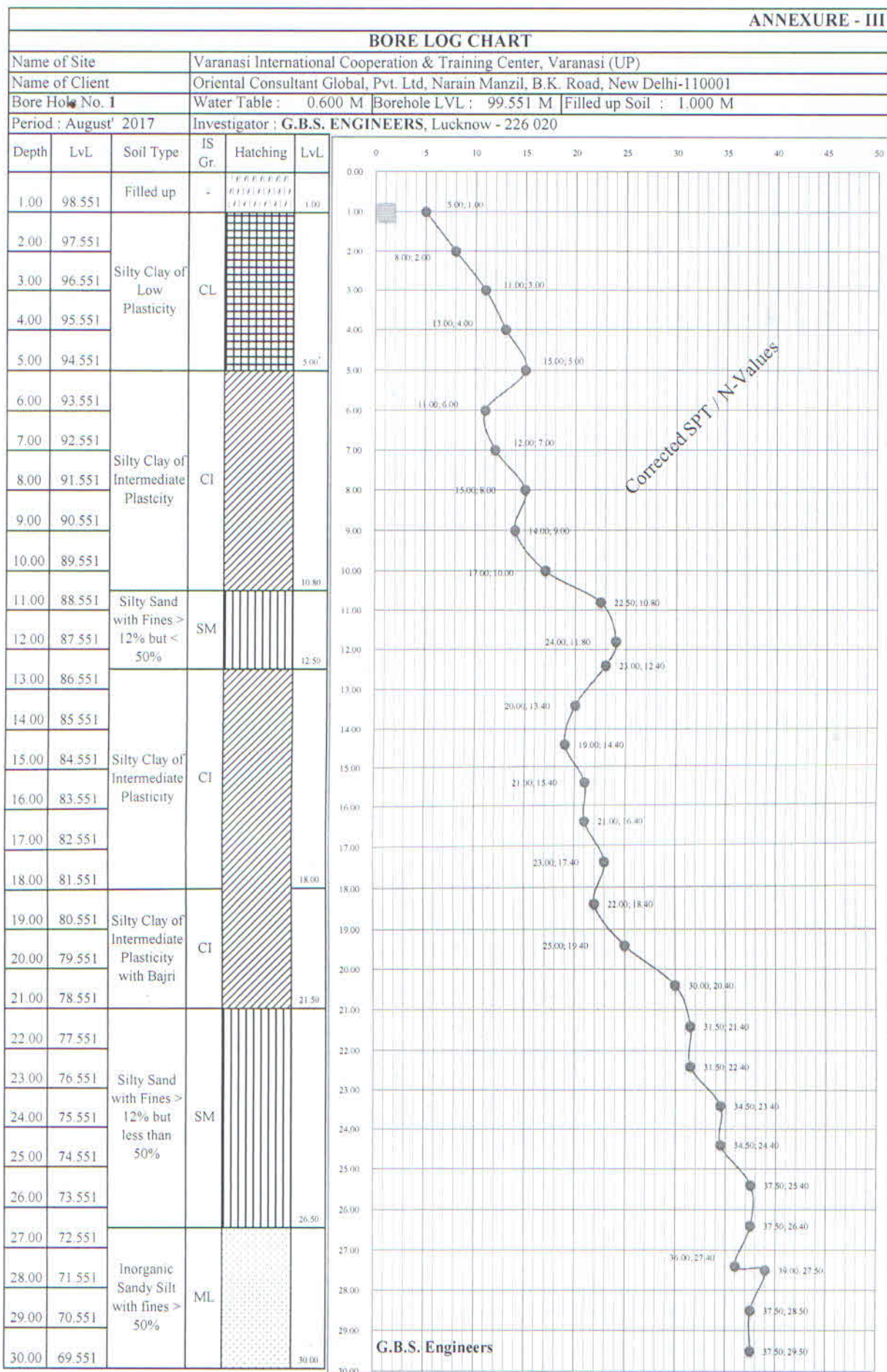
ANNEXURE – XIV

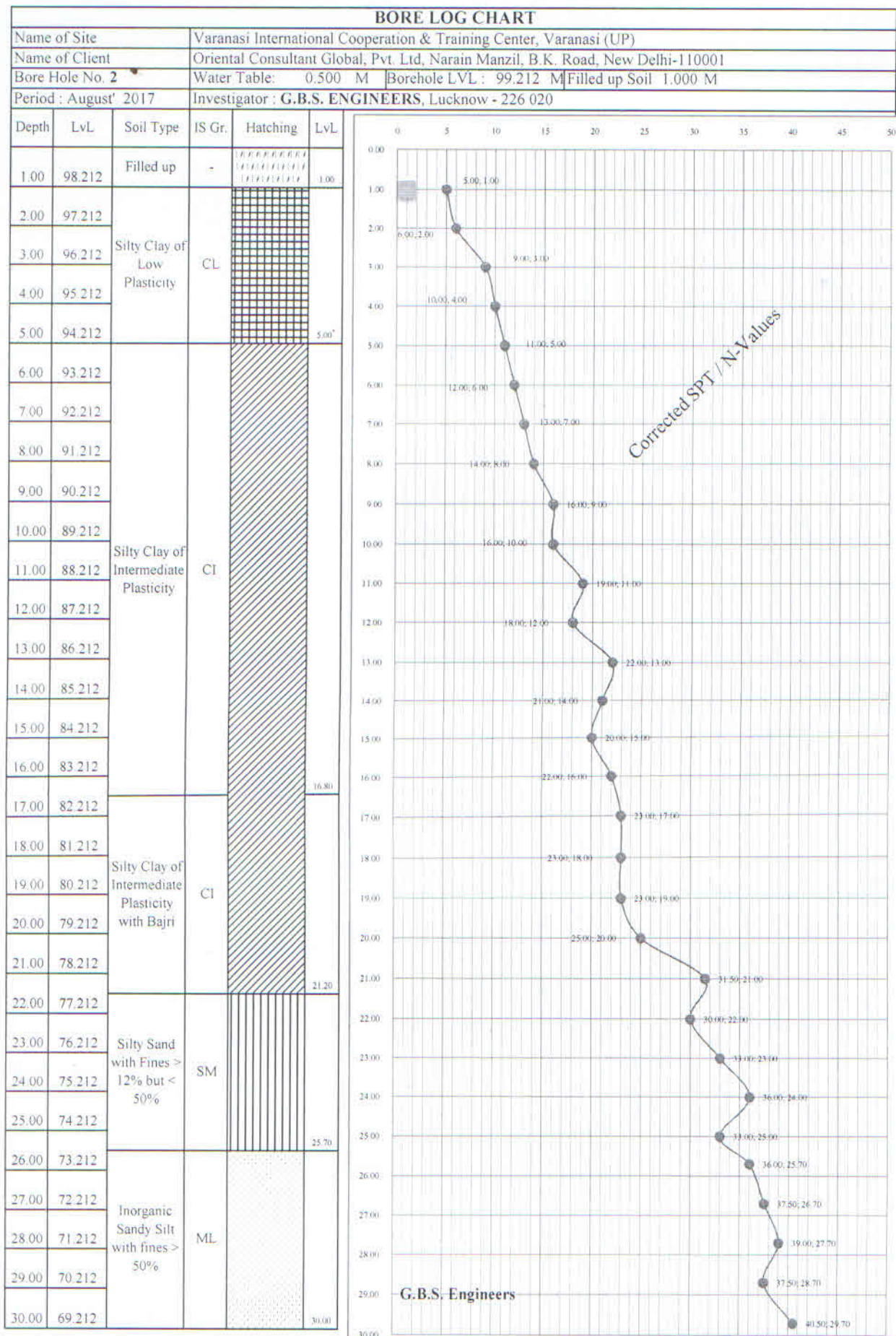
Layout Plan For Investigation Points

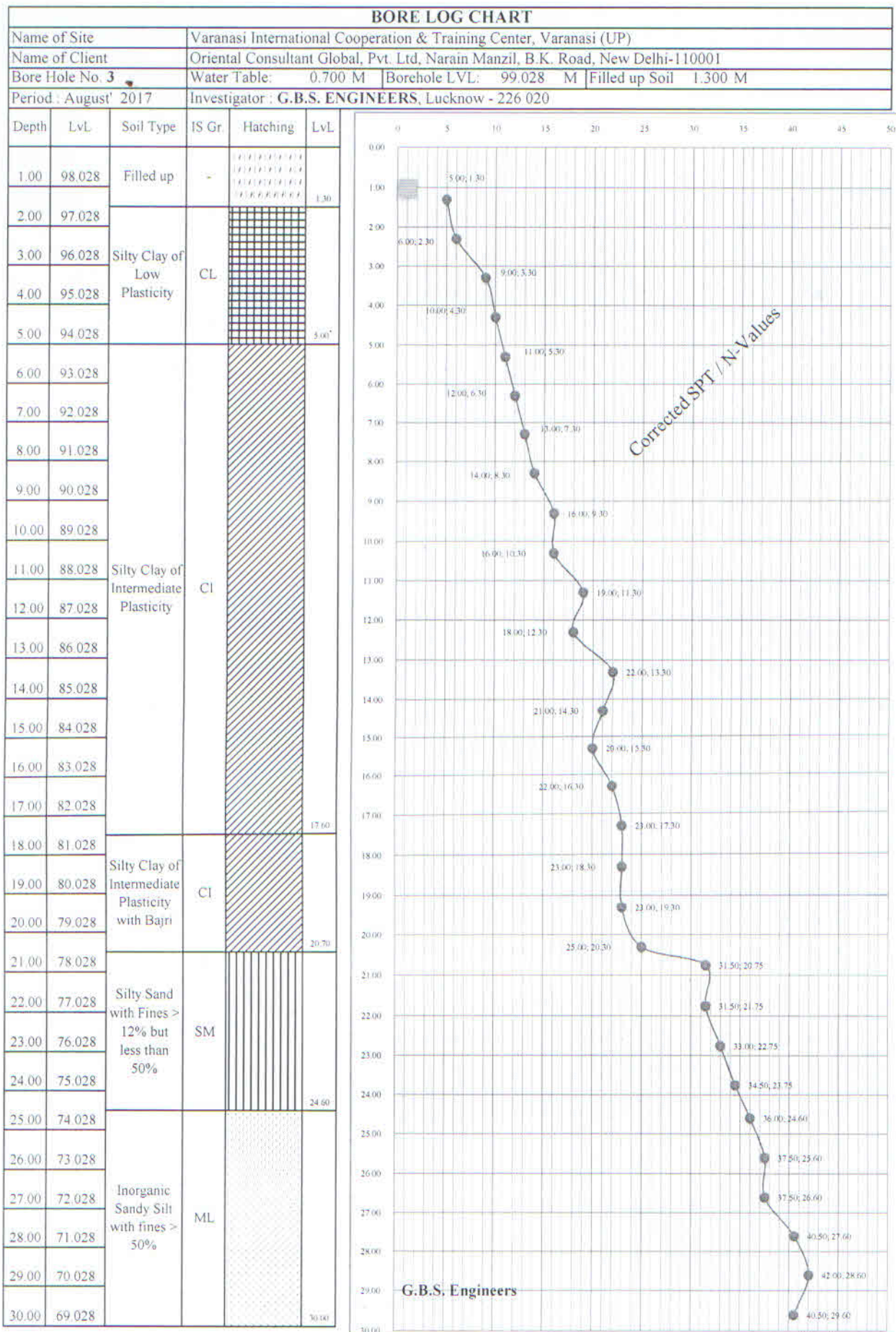
Name of Site : Varanasi International Cooperation & Training Center, Varanasi (UP)

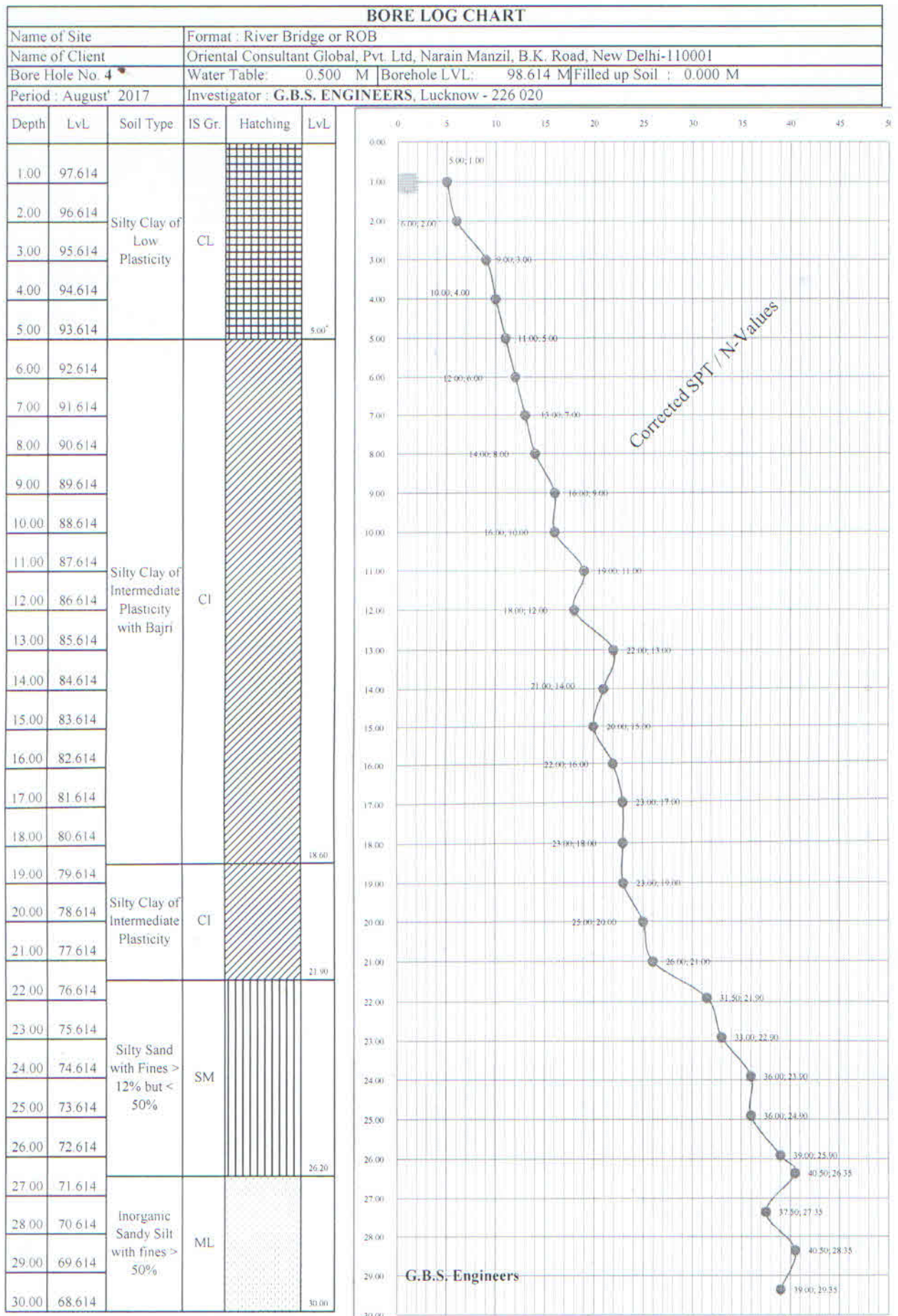
Name of Client : Oriental Consultant Global, Pvt. Ltd, Narain Manzil, B.K. Road, New Delhi-01

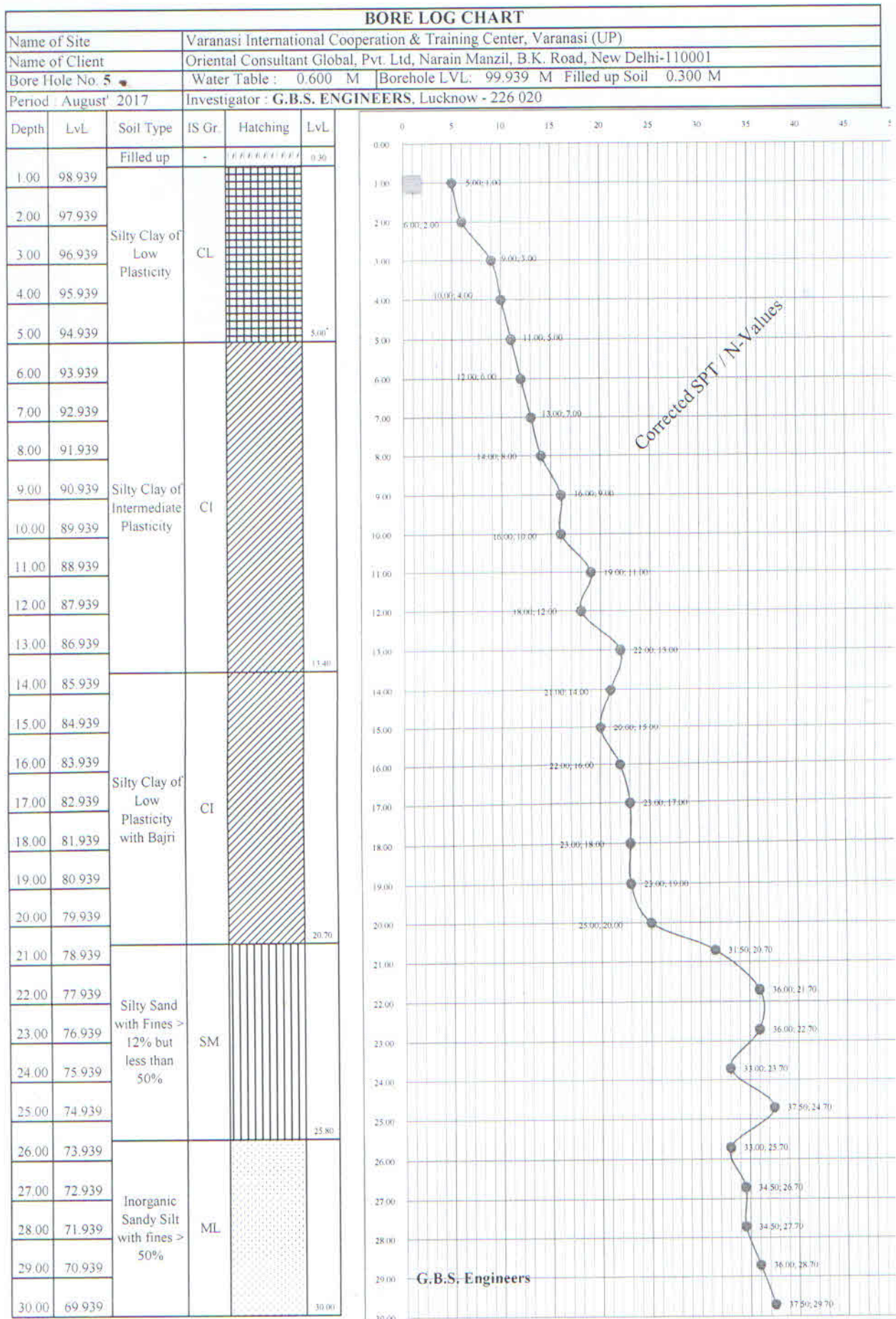


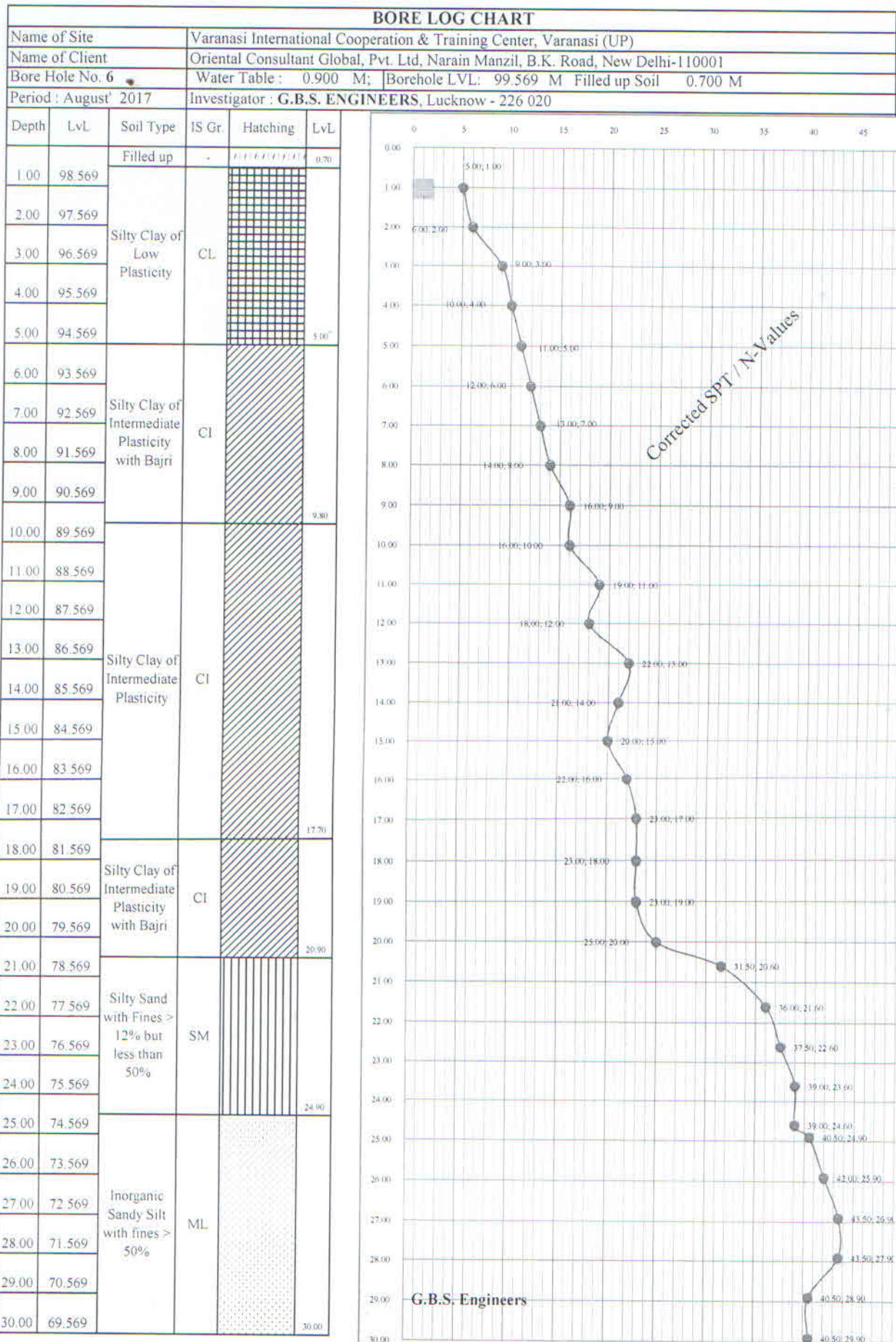




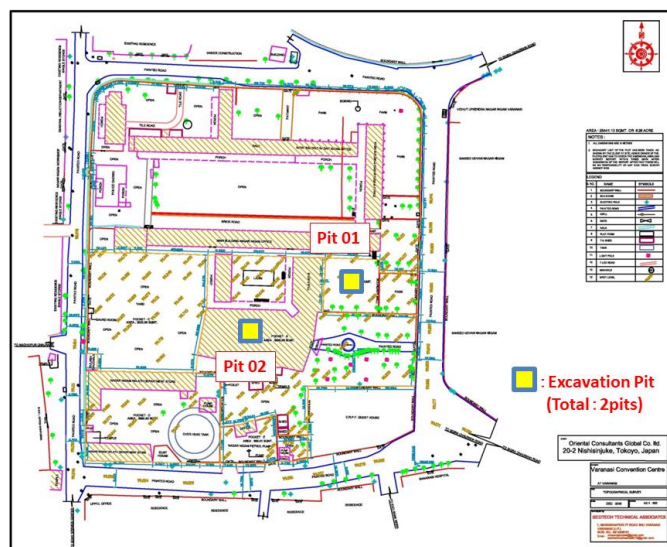








添付資料 8-3: 試掘調査状況



試掘実施ポイント

ピット 1

ピット 2



12/3 10:00 時点



12/07 10:00 時点



12/4 12:30 時点



12/7 14:00 時点



वाराणसी विकास प्राधिकरण, वाराणसी

सेवा में,

सहायक कार्यपालक (अभियन्ता),
केन्द्रीय लोक निर्माण विभाग,
वाराणसी।

पत्रांक-77/17 /वि0प्रा0/निपात/2017-18

दिनांक : 9-1-18

विषय : नगर निगम परिसर स्थित मौजूदा प्रेक्षागृह के स्थान पर प्रस्तावित
इण्टरनेशनल कार्पोरेशन एण्ड ट्रेनिंग सेन्टर मानचित्र स्वीकृति के सम्बन्ध में।

महोदय,

कृपया उपरोक्त विषयक का सन्दर्भ ग्रहण करने का कष्ट करें। आप द्वारा प्रस्तुत नगर निगम परिसर स्थित मौजूदा प्रेक्षागृह के स्थान पर प्रस्तावित इण्टरनेशनल कार्पोरेशन एण्ड ट्रेनिंग सेन्टर बनाने की स्वीकृत अध्यक्ष/आयुक्त, वाराणसी विकास प्राधिकरण द्वारा दिनांक 03.01.18 द्वारा निम्न शर्तों के साथ स्वीकृत किया गया है :-

1. आपको वर्तमान विकास प्राधिकरण भवन निर्माण एवं विकास उपविधि, 2016 में दिये गये निर्देशों/शर्तों का पालन करना होगा।
2. रेन वाटर हार्वेस्टिंग एवं सोलर हीटिंग की व्यवस्था स्थल पर सुनिश्चित करना होगा।
3. भूखण्ड पर प्रति हेक्टेयर 125 पेड़ की दर से कुल 165 पेड़ लगाना होगा।
4. नगर निगम/जल कल विभाग की अनापत्ति प्रमाण पत्र स्वयं प्राप्त करना होगा।
5. विद्युत, फायर एवं श्रम कल्याण विभाग, कार्यालय जिला प्रशासन की अनापत्ति तथा भूकम्परोधी प्रमाण पत्र, स्ट्रक्चर डिजाइन आदि प्रस्तावक को स्वयं प्राप्त करना होगा।

भवदीय,


जोनल अधिकारी।

पत्रांक- /वि0प्रा0/ /2017-18

दिनांक :

प्रतिलिपि : सचिव महोदय को सादर सूचनार्थ प्रेषित।


जोनल अधिकारी।

英訳：建築確認許可証

Varanasi Development Authority, VARANASI.

To,

Assistant Executive (Engineer)

Central Public Works Department

Varanasi,

Letter reference-77/17 convention center Vi Pra/2017/18

Dated-9-January-2018

Subject- Regarding approval of the map for the proposed international corporation and training center in the current location of auditorium situated in the premises of Nagar Nigam.

Sir,

Please take note the context of the aforesaid subject. Your offer to construct the International Corporation and training center in the current location of the auditorium situated in the premises of Nagar Nigam has been accepted by the commissioner Varanasi Development Authority on 03-01-18 along with the following conditions.

#1-You will adhere to the guidelines and conditions reflecting in the current Development Authority building construction and development Bye laws 2016.

#2-You will ensure the arrangement of Rain Water Harvesting and Solar Heating in the location.

#3-You will manage the plantation of a total of 165 trees at the rate of 125 trees per hectare in the location.

#4-You will obtain by yourself, the No objection certificate of Nagar Nigam/Water Supply department.

#5-The proposer will obtain by himself the No objection certificate of electricity, fire, labor welfare department, city administration office, and earthquake resistant certification, structure design etc.

Warm Regards,

Zonal officer.

Date

C.C:

To Secretary for purpose of intimation

添付資料 8-5 : 消防法における許可書

कार्यालय संयुक्त निदेशक, फायर सर्विस मुख्यालय, उ०प्र० लखनऊ

पत्रांक: एफएस/जीडी/1076-2017

दिनांक: नवम्बर, 21, 2017

सेवा में,

कार्यपालक अभियन्ता,
बी०एच०यू० परियोजना मण्डल-1
के०लो०नि० वि०, वाराणसी

विषय:- वाराणसी कनवेंशन सेन्टर, नगर निगम, सिगरा, वाराणसी का बी०एच०यू० परियोजना मण्डल-1 के०लो०नि० वि०, वाराणसी द्वारा भवन निर्माण हेतु प्रोविजनल अग्निशमन अनापत्ति प्रमाण पत्र के संबंध में।

कृपया उपरोक्त विषयक आपके प्रार्थना पत्र संख्या: 23 (142)/पी.एम.बी.एच.यू./2017/1437 दिनांक: 10.11.2017 द्वारा प्रस्तुत संशोधित मानचित्र व यू.आई.डी. नम्बर-2017/35600/VNS/varansi/225/JD दिनांक: 23.09.2017 के माध्यम से उक्त प्रश्नगत प्रस्तावित भवन की प्रोविजनल अग्निशमन अनापत्ति प्रमाण पत्र निर्गत किये जाने का अनुरोध किया गया है।

उक्त प्रश्नगत प्रस्तावित भवन के मानचित्रों में प्रस्तावित अग्निशमन व्यवस्थाओं एवं अभिलेखों का परीक्षण श्री योगेन्द्र चौरसिया, अग्निशमन अधिकारी, चेतगंज, वाराणसी/श्री राकेश राय, मुख्य अग्निशमन अधिकारी, वाराणसी/श्री योगेश बाबू द्विवेदी, उप निदेशक, फायर सर्विस वाराणसी परिक्षेत्र, वाराणसी द्वारा किया गया। उनकी आख्या दिनांक: 18.11.2017 का सुसंगत मानकों के अनुसार परीशीलन किया गया, जिसका विवरण निम्नवत् है:-

भवन की संरचना:-		
PROJECT SITE AREA=		13,196.48 SQ.MT.
PERMISSIBLE BUILDING COVERGE AREA=		5,278.59 SQ.MT.
PERMISSIBLE COVERAGE RATIO =		40.00 %
PROPOSED BUILDING COVERED AREA		4,241.75 SQ.MT.
PERMISSIBLE COVERAGE RATIO		32.14 %
PERMISSIBLE FLOOR AREA		26,392.96 SQ.MT.
PERMISSIBLE F.A.R.		2.00
PROPOSED AREA UNDER F.A.R.		5,144.13 SQ.MT.
PROPOSED F.A.R.		0.39
BASEMENT AREA		4,459.50 SQ.MT.
LANDSCAPE AREA		2,751.54 SQ.MT.
ROAD AREA		2,825.25 SQ.MT.
SITE AREA		25,485.30 SQ.MT.
PROJECT SITE AREA (A)		13,196.48 SQ.MT.
PROPOSED BUILDING COVERAGE AREAS		
1. MAIN BUILDING		3,859.70 SQ.MT.
2. GARBAGE ST/OUTDOOR WC-M/F		41.75 SQ.MT.
3. RAMP ROOF 1		217.58 SQ.MT.
4. RAMP ROOF 2		122.72 SQ.MT.
TOTAL (B)		4,241.75 SQ.MT.
BUILDING COVERAGE RATIO (B/A)		32.14 %
FLOOR AREA(F.A.R.)		
	1. MAIN BUILDING	2.GARBAGE ST/ TOTAL

		OUTDOOR WC-M/F	
1 ST FLOOR LEVEL	1,380.50 SQ.MT.		
GROUND FLOOR LEVEL	3,721.87 SQ.MT.		
TOTAL FLOOR AREA	5,102.37 SQ.MT.	41.76 SQ.MT.	5,144.13 SQ.MT. (AREA UNDER F.A.R.)

भवन का अधिभोग एवं हैजार्ड श्रेणी:- प्रस्तावित भवन का अधिभोग एन.बी.सी. 2016 पार्ट IV ग्रुप-डी एसेम्बली भवन की श्रेणी के अन्तर्गत वर्गीकृत किया गया है।

ढांचागत व्यवस्था:-

1. **पहुँच मार्ग:-** प्रस्तावित भवन के सामने प्रस्तुत मानचित्र पर सड़क की चौड़ाई 12.00 मीटर प्राविधानित है।
2. **प्रवेश द्वार की चौड़ाई:-** प्रस्तावित भवन के मानचित्र में तीन प्रवेश द्वार जिसमें प्रथम एवं दूसरे की क्रमशः चौड़ाई 06.00 मीटर एवं तीसरे की चौड़ाई 04.50 मीटर प्राविधानित है।
3. **सेटबैक :-** भवन के चारों तरफ न्युमनतम् 10.00 मीटर सेटबैक प्राविधानित है। प्रस्तावित भवन का सेटबैक भवन विनियमावली के मानकों के अनुसार है। सेटबैक को हमेशा अवरोध मुक्त रखा जाय। सेटबैक में किसी भी प्रकार का स्थाई/अस्थायी निर्माण कार्य मान्य नहीं होगा। सेटबैक के छत की लोड वियरिंग क्षमता 45 टन से कम न रखी जाय।
4. **निकास मार्ग:-** प्रस्तावित भवन के प्रथम तल से भूतल पर आने हेतु 06 स्टेयर केस प्रत्येक की चौड़ाई 02.00 मीटर तथा मेजनाइन तल से प्रथम तल पर आने हेतु 03 स्टेयर केस प्रत्येक की चौड़ाई 02.00 मीटर है एवं 02 स्टेयर केस प्रत्येक की चौड़ाई 02.00 मीटर जो ऊपरी तलों से बेसमेन्ट में आ रही है। इसे 02.00 घन्टा रेटिंग डोर से भूतल पर टर्मिनेट कर दिया जाय तथा बेसमेन्ट से ऊपर जाने हेतु स्टेयर केस सीधे पेरीफरी पर खुले। प्रस्तावित भवन के बेसमेन्ट में दो रैम्प जिसमें एक रैम्प की चौड़ाई 04.00 मीटर एवं दूसरे रैम्प की चौड़ाई 07.20 मीटर का प्राविधानित है। जिसका ढाल 1:8 मानचित्र में प्राविधानित है एवं उस पर फिसलन रहित सतह बिछाई जाय। भवन के बेसमेन्ट का प्रयोग ने-नल बिल्डिंग कोड आफ इण्डिया-2016 पार्ट III के क्लाज-12.9 के अनुरूप किया जाना आवश्यक होगा।
5. **ऊँचाई:-** प्रस्तावित भवन की ऊँचाई 23.70 मीटर प्राविधानित है।
6. **रिफ्यूज एरिया का विवरण:-** निल।

प्रस्तावित अग्निशमन सुरक्षा व्यवस्था एवं जीवरक्षा प्रणाली:- एन.बी.सी.-2016 के मानकों के अनुसार निम्नांकित अग्नि-मन सुरक्षा व्यवस्थाएं पूर्ण किया जाना अनिवार्य है।

1. **भूमिगत टैंक:-** एन.बी.सी.-2016 के मानकों के अनुसार भूमिगत टैंक 1,50,000 लीटर क्षमता का स्थापित किया जाना आवश्यक है।
2. **पम्प:-** टैंक के पास पम्प रुम में 2280 एलपीएम क्षमता का मुख्य विद्युत चालित पम्प-एक अदद, 2280 एलपीएम क्षमता का डीजल चालित पम्प-एक अदद, 2280 एलपीएम क्षमता का विद्युत चालित स्पिंकलर पम्प-एक अदद, 180 एलपीएम क्षमता का विद्युत चालित जॉकी पम्प-दो अदद, 450 एलपीएम क्षमता का वाटर कर्टन पम्प मानचित्र पर प्राविधानित है।
3. **होजरील:-** प्रस्तावित भवन में होजरील लैण्डिंग वाल्व आई.एस.-3844 के मानकों के अनुसार स्थापित किया जाना आवश्यक है।
4. **वेट राइजर सिस्टम:-** प्रस्तावित भवन में वेट राइजर सिस्टम ने-नल बिल्डिंग कोड आफ इण्डिया-2016 के मानकों के अनुसार स्थापित किया जाना आवश्यक है।
5. **यार्ड हाइड्रैन्ट:-** प्रस्तावित भवन परिसर में यार्ड हाइड्रैन्ट होज कैबिनेट एवं उसमें डिलीवरी होज पाइप तथा ब्रांच एवं फायर सर्विस इनलेट ने-नल बिल्डिंग कोड आफ इण्डिया-2016 एवं आईएस 13039:1991 के मानकों के अनुसार स्थापित किया जाना आवश्यक है।
6. **मैनुअली आपरेटेड इलेक्ट्रिक फायर अलार्म सिस्टम :-** प्रस्तावित भवन में मैनुअली आपरेटेड इलेक्ट्रिक फायर अलार्म सिस्टम ने-नल बिल्डिंग कोड आफ इण्डिया-2016 के मानकों के अनुसार स्थापित किया जाना आवश्यक है।
7. **स्वचालित डिटेक्शन एण्ड फायर अलार्म सिस्टम:-** प्रस्तावित भवन में आटोमेटिक डिटेक्शन एण्ड फायर अलार्म सिस्टम ने-नल बिल्डिंग कोड आफ इण्डिया-2016 के मानकों के अनुसार स्थापित किया जाना आवश्यक है।
8. **स्वचालित स्पिंकलर सिस्टम:-** प्रस्तावित सम्पूर्ण भवन में आटोमेटिक स्पिंकलर सिस्टम नेशनल बिल्डिंग कोड आफ इण्डिया-2016 के मानकों के अनुसार स्थापित किया जाना आवश्यक है एवं 2280 एलपीएम क्षमता का स्वचालित इलेक्ट्रिकल पम्प स्पिंकलर सिस्टम के लिये पूर्ण रूप से डेडीकेटेड होगा।
9. **टैरेस टैंक:-** प्रस्तावित भवन के टैरेस पर 10,000 लीटर क्षमता का टैरेस टैंक स्थापित कराया जाना आवश्यक है।

10. **प्राथमिक अग्निशमन उपकरण):-** प्रस्तावित भवन में प्राथमिक अग्निशमन उपकरण आई.एस.-2190:2010 के अनुसार अधिष्ठापित कराया जाना आवश्यक है।
11. **स्मोक एक्सट्रैक्सन:-**
 ए- फायर चेकडोर, स्मोक चेकडोर की लोकेशन व रेटिंग 02.00 घन्टा।
 बी- स्मोक रिजर वायर एवं अनुमानित स्मोक लेयर आदि को आधारित करते हुए सम्पूर्ण भवन में एक्सट्रैक्सन सिस्टम नेशनल बिल्डिंग कोड आफ इण्डिया-2016 के मानकों के अनुसार स्थापित किया जाना आवश्यक होगा एवं स्मोक मैनेजमेन्ट सिस्टम का विस्तृत प्लान एक माह के अन्दर उपलब्ध कराया जाय अन्यथा की स्थिति में निर्गत प्रोविजनल अनापत्ति प्रमाण पत्र स्वतः समाप्त हो जायेगी एवं इसके लिये कार्यपालक अभियन्ता, बी0एच0यू0 परियोजना मण्डल-1 के0लो0नि0 वि0, वाराणसी पूर्ण रूप से उत्तरदायी होंगे।
12. **एक्जिट साइनेज:-** सम्पूर्ण भवन में एक्जिट साइनेज स्थापित किया जाना आवश्यक है।
13. **पी0ए0 सिस्टम:-** पी0ए0 सिस्टम की व्यवस्था का प्राविधान सम्पूर्ण भवन में किया जाना आवश्यक है।
14. प्रस्तावित भवन में वैकल्पिक विद्युत श्रोत हेतु जनरेटर के अतिरिक्त अन्य व्यवस्था किया जाना आवश्यक है।
15. प्रस्तावित भवन में विद्युत व्यवस्था आई0एस0 1646:1997 के अनुरूप किया जाय।
16. कन्वेन्शन सेन्टर में प्रस्तावित सीटिंग अरेजमेन्ट में दीवार 3 फिट की दूरी नहीं रखी गयी है। इसका संशोधित मानचित्र में उपरोक्त कमी के अतिरिक्त निकास मार्ग की उचित संख्या बढ़ाकर एक माह में अधोहस्ताक्षरी को उपलब्ध कराना सुनिश्चित करें अन्यथा की स्थिति में सशर्त निर्गत प्रोविजनल अनापत्ति प्रमाण पत्र स्वतः ही निरस्त समझा जायेगा।

उपरोक्तानुसार वाराणसी कन्वेन्शन सेन्टर, नगर निगम, सिगरा, वाराणसी में प्रस्तावित भवन निर्माण हेतु प्रोविजनल अग्निशमन अनापत्ति प्रमाण पत्र इस शर्त के निर्गत किया जाता है कि आवेदक द्वारा भवन में अग्नि से सुरक्षा सम्बन्धी सभी प्रस्तावित प्राविधान भवन निनियमावली तथा नेशनल बिल्डिंग कोड आफ इण्डिया-2016 में उल्लिखित मानकों के अनुसार कराये जायें तथा भवन के निर्माणोपरान्त भवन का प्रयोग करने से पहले भवन में प्राविधानित अग्नि से सुरक्षा व्यवस्थाये मानकों के अनुसार भौतिक रूप से स्थापित कर उनका निरीक्षण/परीक्षण अग्निशमन विभाग से प्राविधानित अग्निशमन व्यवस्थाये मानकों के अनुसार भौतिक रूप से स्थापित कर उनका भौतिक निरीक्षण/परीक्षण अग्निशमन विभाग द्वारा गठित कमेटी से कराकर अन्तिम अग्निशमन अनापत्ति प्रमाण पत्र प्राप्त किया जायेगा अन्यथा निर्गत प्रोविजनल अनापत्ति प्रमाण पत्र स्वतः ही निरस्त मान लिया जायेगा एवं किसी भी प्रकार की जनहानि एवं घटना के लिये कार्यपालक अभियन्ता, बी0एच0यू0 परियोजना मण्डल-1, के0लो0नि0 वि0, वाराणसी पूर्ण रूप से उत्तरदायी होंगे।

बिन्दु संख्या-11 पर वांछित स्मोक मैनेजमेन्ट प्लान का विस्तृत विवरण एक माह में उपलब्ध कराया जाय, अन्यथा की स्थिति में यह निर्गत प्रोविजनल अनापत्ति प्रमाण पत्र स्वतः समाप्त हो जायेगा।

(अरविन्द कुमार)

संयुक्त निदेशक

फायर सर्विस मुख्यालय

उ0प्र0 लखनऊ।

प्रतिलिपि:- उप निदेशक, फायर सर्विस वाराणसी परिक्षेत्र, वाराणसी/मुख्य अग्निशमन अधिकारी, वाराणसी/अग्निशमन अधिकारी, चेतगंज, वाराणसी को इस निर्देश के साथ प्रेषित कि उपरोक्तानुसार अनुपालन सुनिश्चित करायें तथा प्रस्तावित कन्वेन्शन सेन्टर के बेसमेन्ट के लिये स्मोक मैनेजमेन्ट प्लान एक माह में अधोहस्ताक्षरी को हस्ताक्षरित करते हुए उपलब्ध कराये।

2. आयुक्त, वाराणसी मण्डल, वाराणसी को इस अनुरोध के साथ प्रेषित है कि उपरोक्तानुसार अनुपालन कराने एवं बिन्दु संख्या-11 पर वांछित स्मोक मैनेजमेन्ट प्लान का विस्तृत विवरण उपलब्ध कराने हेतु अपने स्तर से भी निर्देशित करने का कष्ट करें।
3. जिलाधिकारी, वाराणसी को इस अनुरोध के साथ प्रेषित है कि उपरोक्तानुसार अनुपालन कराने एवं बिन्दु संख्या-11 पर वांछित स्मोक मैनेजमेन्ट प्लान का विस्तृत विवरण उपलब्ध कराने हेतु अपने स्तर से भी निर्देशित करने का कष्ट करें।
4. नगर आयुक्त, वाराणसी को इस अनुरोध के साथ प्रेषित है कि उपरोक्तानुसार अनुपालन कराने एवं बिन्दु संख्या-11 पर वांछित स्मोक मैनेजमेन्ट प्लान का विस्तृत विवरण उपलब्ध कराने हेतु अपने स्तर से भी निर्देशित करने का कष्ट करें।

Office of the Joint Director, Fire Fighting Service Head Quarter, (UP) Lucknow.

Letter reference-FS/GD/1076-2017

Date 21 Nov 2017

To,
Executive Engineer
BHU Planning Circle-1
CPWD Varanasi

Subject- Regarding provisional Fire Fighting NOC certificate of Varanasi Convention Center, Nagar Nigam Sagra for the building construction by CPWD BHU planning circle -1

It has been requested to release a provisional fire fighting NO OBJECTION CERTIFICATE for the proposed building in subject by means of your application no 23 (142) /PMBHU/2017/1437 dated 10-Nove. 2017 and the modified maps and UID number 2017/35600/VNS/Varanasi/225/JD dated 23 Sep. 2017 submitted for the proposed building in subject.

The proposed fire fighting systems and documentations proposed in the maps of the building in subject have been surveyed by Mr. Yogendra Chaurasia firefighting officer, Chetganj, Varanasi, Mr. Rakesh Rai, chief firefighting officer Varanasi, Mr. Yogesh Babu Dwivedi, Deputy Director Fire service, Varanasi region. Their report dated 18 Nov 2017 has been in perusal in accordance to the relevant standards, following are those details-

Please get additional text translated. Ideally the entire letter. If not then at least the parts marked in rectangle in the attachment.

Occupancy & Hazard Category Of The Building - the occupancy of the proposed building has been notified under the category of assembly building NBC 2016 Part IV group D.

- 1- Approach road – A 12 meter road is provisioned on the map in front of the proposed building.
- 2- Width of the entrance gate – In the plan of the proposed building three gates have been provided, of which the width of the First and second gates are 6 meters respectively and the third gate width is 4.5 meters.
- 3- Setback – A minimum of 10 meter set back has been provided on all the four sides of the periphery of the building. The setback of the proposed building is in accordance to the standards of the building regulations. Setback is to be kept always obstacle free. Any temporary/permanent construction in the setback will be unacceptable. The load bearing capacity of the basement slab in the setback is to be maintained at not less than 45 tones.
- 4- Exit way – in the proposed building, there are 6 staircases each of width 2.0 meters to come down from 1st floor to ground floor. To come down from mezzanine floor to ground floor there are 3 staircase each of 2 meter width and 2 staircases of 2 meter width each for coming from the upper floor to the basement floor. These should be terminated on ground floor by 2 hour rating door and the stair case to go upwards from basement, to open directly on the periphery. Two ramps are provided in the proposed building with one ramp 4 meter wide and another ramp 7.20 meter wide. As per the proposed plan the slope of which is **1:8** and to be coated with an anti-skid layer. It would be necessary to use the basement of the building according to the clauses **12.9** of the National Building Codes of India **2016** Part 3.
- 5- Height – the height of the proposed building is proposed as **23.70** meters.
- 6- Refuge area description – Nil.

Proposed Fire Fighting Safety System and Life Saving System – the following firefighting arrangements are necessary to be completed in accordance with the standards of NBC 2016.

- 1- Underground Tank – It is necessary to provide an underground tank of 150,000 liters according to the NBC 2016 standards.
- 2- Pump – In a pump room next to the tank 2280 LPM capacity electricity operated 1 number of pump, in the pump house near the tank, 2280 LPM capacity diesel operated pump-1 number, 2280 LPM capacity electricity operated sprinkler pump-1 number, 180 LPM capacity electricity operated jockey pump 2 numbers, 450 LPM capacity water curtain pump-1 number have been proposed in the plan.
- 3- Hose Reel – it is essential to establish hose reel landing valve in the proposed building according to the IS 3844 standards.
- 4- Wet Riser System - it is essential to establish hose reel landing valve in the proposed building according to the IS 3844 standards.
- 5- Yard Hydrant - it is essential to establish yard hydrant hose cabinet, and delivery hose pipe there in, and branch & fire service inlet in the proposed building according to the National Building Code of India-2016, and IS 13039:1991 standards.
- 6- Manually Operated Electric Fire Alarm System - it is essential to establish Manually Operated Electric Fire Alarm System in the proposed building according to the National Building Code of India-2016, standards.

- 7- Automatic Detection & Fire Alarm System - it is essential to establish Automatic Detection & Fire Alarm System in the proposed building according to the National Building Code of India-2016, standards.
- 8- Automatic Sprinkler System - it is essential to establish Automatic Sprinkler System in the proposed entire building according to the national building code of India-2016 standards, and the 2280 LPM capacity automatic electrical pump will be fully dedicated to sprinkler system.
- 9- Terrace Tank - it is essential to establish a 10,000 liter Terrace Tank on the terrace of the proposed building.
- 10- Elementary Fire Fighting Equipment - it is essential to establish Elementary Fire Fighting Equipment in the proposed building according to the IS 2190:2010 standards.
- 11- Smoke Extraction –
 - A – The location of fire check door, smoke check door and rating 2 hour
 - B – It would be necessary to establish a smoke extraction system in the entire building on the basis of the smoke reservoir and estimated smoke layer etc., according to the national building code of India 2016 and an exclusive plan of smoke management system must be made available in a month, otherwise the issued no objection certificate will automatically be cancelled and for which executive engineer CPWD BHU planning region-1 will be solely responsible.
- 12- Exit Signage – It is necessary to establish Exit Signage in the entire building.
- 13- P A System - It is necessary to establish P A System in the entire building.
- 14- It is essential to arrange an optional electricity supply system other than generator.
- 15- The electrical systems are to be established according to the IS 1646:1997.
- 16- - In the proposed seating arrangement in the convention center, a distance of three feet is not maintained from the wall. After refining the above by providing appropriate additional exit ways, please provide the revised plan to the under signee within a month otherwise the issued conditional provisional no objection certificate will be automatically cancelled.

According to the afore said and for the proposed construction of the Varanasi convention center in Nagar Nigam Varanasi, a provisional firefighting no objection certificate is being issued on such condition that in the building all the proposed firefighting provisions will be constructed by the applicant according to the standards as mentioned in the building construction regulation and national building code of India 2016, and after the completion of construction of the building and prior to start the use of the building, all the provisioned firefighting systems must be physically installed and observed/investigated according to the provisions & standards as established by the fire department and then must be physically inspected/investigated by the committee so formulated by firefighting department, and consecutively obtain the final no objection certificate otherwise the provisional certificate will deem automatically to be cancelled and the executive engineer CPWD Varanasi, shall be solely responsible for any untoward incident, accident or loss of life.

A detailed description of the desired smoke management plan on the point no 11, to be provided within a month, otherwise this no objection certificate shall deem to be automatically cancelled.

Arvind Kumar

Joint Director

Fire Service HQ

Lucknow

Copied Forwarded to:

- 1- Deputy Director Fire Services Varanasi zone, Varanasi, Chief Firefighting Officer Varanasi, Firefighting Officer Chetganj Varanasi, with instruction to get the afore said compliance executed and, to make the smoke management plan for the basement of the proposed convention center, available to the under signatory within a month.
- 2- Commissioner Varanasi with a request to get the compliance of the aforesaid executed and to ensure to instruct accordingly from his level also to make the detailed description available of the desirable smoke management plan on the above point no- 11.
- 3- District Collector, Varanasi with a request to get the compliance of the aforesaid executed and to ensure to instruct accordingly from his level also to make the detailed description available of the desirable smoke management plan on the above point no- 11.
- 4- City Commissioner, Varanasi with a request to get the compliance of the aforesaid executed and to ensure to instruct accordingly from his level also to make the detailed description available of the desirable smoke management plan on the above point no- 11.

添付資料 8-6 : 植栽伐採における許可書

कार्यालय प्रभागीय वनाधिकारी, वाराणसी वन प्रभाग, वाराणसी

(वन भवन, एच0आई0जी0-36, अशोक विहार कालोनी, फेज-1, पहड़िया, वाराणसी)

दूरभाष-0542 2585574

ई-मेल-dfovrns@yahoo.in

पत्रांक-

/ 22-1, दिनांक, वाराणसी, मार्च, 21, 2018

सेवा में,

नगर आयुक्त

नगर निगम, वाराणसी।

विषय:- Regarding issue of NOC for felling trees for Varanasi Convention Centre (VCC) site in the campus of Nagar Nigam, Varanasi.

सन्दर्भ:- आपका पत्र संख्या-342/अ0न0आ0/2017-18 दिनांक 20.03.2017 ।

महोदय,

कार्यापालक अभियन्ता, बी0एच0यू0 परियोजना मण्डल-1, केन्द्रीय लोक निर्माण विभाग, बी0एच0यू0 वाराणसी के पत्रांक- 23(142)/पी.एम.बी.एच.यू./2017/1612 दिनांक 30.12.2017 तथा पत्रांक-23(142)/पी.एम.बी.एच.यू./2018/118 दिनांक 02.02.2018 द्वारा वाराणसी कॉन्वेंशन सेन्टर के निर्माण कार्य में बाधक वृक्षों का मूल्यांकन एवं पातन अनुमति मांगी गई थी। इस सम्बन्ध में जॉचोपरान्त कुल 22 वृक्ष निर्माण कार्य में बाधक पाये गये थे, जिसके सन्दर्भ में इस कार्यालय के पत्रांक-2831/22-1 दिनांक 06.02.2018 द्वारा उक्त वृक्षों का मूल्यांकन देते हुए प्रति वृक्ष 100.00 रुपये की दर से 22 वृक्षों का पातन अनुमति शुल्क जमा कराने तथा काटे जाने वाले वृक्षों की दोगुनी संख्या में पौधों का रोपण करा कर उसकी पश्चात्तर्वती देख-रेख कराये जाने के अण्डरटेकिंग देने हेतु लिखा गया था।

उपरोक्त के सम्बन्ध में कार्यापालक अभियन्ता, बी0एच0यू0 परियोजना मण्डल-1, केन्द्रीय लोक निर्माण विभाग, बी0एच0यू0 वाराणसी द्वारा पातन अनुमति शुल्क मु0 2200.00 (दो हजार दो सौ रुपये) मात्र जमा कराये जाने तथा आपके सन्दर्भित पत्र द्वारा काटे जाने वाले 22 वृक्षों की दोगुनी संख्या अर्थात् 44 पौधों का रोपण करा कर उसकी पश्चात्तर्वती देख-रेख कराये जाने का अण्डरटेकिंग प्राप्त होने के उपरान्त उक्त 22 वृक्षों की पातन अनुमति निर्गत की जाती है। वृक्षों का विवरण निम्नवत् है -

क्र0 सं0	प्रजाति	दशा	व्यास वर्ग (सेमी0)	वृक्षों की संख्या
1	अशोक	हरा, खड़ा	10-20	01
2	अशोक	हरा, खड़ा	30-40	08
3	अशोक	हरा, खड़ा	40-50	03
4	अशोक	हरा, खड़ा	60-70	01
5	शहतूत	हरा, खड़ा	10-20	02
6	शहतूत	हरा, खड़ा	30-40	01
7	छितवन	हरा, खड़ा	20-30	02
8	पुत्रंजीवा	हरा, खड़ा	20-30	01
9	नीम	हरा, खड़ा	50-60	01
10	आँवला	हरा, खड़ा	10-20	02
			योग	22 वृक्ष

कृपया उपरोक्त वृक्षों के काटे जाने के उपरान्त प्रकाष्ठ का ढुलान इस कार्यालय से अभिवहन पास लेकर कराया जाये।

भवदीय

(मूलचन्द्र)

प्रभागीय वनाधिकारी
वाराणसी वन प्रभाग, वाराणसी

संख्या- 33957/ सम दिनांकित।

प्रतिलिपि - कार्यापालक अभियन्ता, बी0एच0यू0 परियोजना मण्डल-1, केन्द्रीय लोक निर्माण विभाग, बी0एच0यू0 वाराणसी को उपरोक्त के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

प्रतिलिपि - क्षेत्रीय वन अधिकारी, वाराणसी रेंज को उनके पत्रांक-198/22-1 दिनांक 03.02.2018 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

(मूलचन्द्र)

प्रभागीय वनाधिकारी
वाराणसी वन प्रभाग, वाराणसी

英訳：植栽伐採における許可書

**Office of the Divisional Forest Officer, Varanasi Forest Division,
Varanasi**

(Forest Building, HIG-36, Ashok Vihar Colony, Phase-1, Phedia, Varanasi)

Telephone: - 0542 2585574 / E-Mail:-dfovrns@yahoo.in

Sheet Number: - / 22-1, / Date: - Varanasi, March 21, 2018

To,

Municipal Commissioner,

Varanasi Nagar Nigam

Subject: - Regarding issue of NOC for felling trees of Varanasi convention Centre (VCC) site in the campus of Nagar Nigam, Varanasi.

Context: - Your letter no 342 / A.N.A. / 2017-18 dated 20.3.2017|

Sir,

In ref to the letter number 23 (142) / PMBHU / 2017/1612 dated 30.12.2017 of Executive Engineer, BHU Project Circle-1, Central Public Works Department, BHU Varanasi, and letter number 23 (142) / PMBHU / 2018/118 dated 2.2.2018, seeking fee and permission to cut the trees that are an obstacle in the construction work of Varanasi Convention Center.

In this connection, it was found that only 22 trees are obstructing the construction work. In this context and vide circular - 2831 / 22-1 dated 06.02.2018, it was decided to levy a permit fee of Rs 100/- per tree to be cut and submitting a written undertaking to plant and take care of double the number of trees that are being cut.

In relation to the above, Executive Engineer, B.H.U. Project Circle -1, Central Public Works Department, BHU after depositing the Cutting permission fee of INR 2200.00 (Rupees Two Thousand Two Hundred only) and submitting the undertaking of planting and taking care of 44 trees which is double the number of 22 trees that are being cut, would be permitted to cut the above mentioned 22 trees. The details of the trees are as follows:-

S.No.	Species	Condition	Diameter class (C.M)	Number of trees
1	Ashoka	Green, Standing	10-20	01
2	Ashoka	Green, Standing	30-40	08
3	Ashoka	Green, Standing	40-50	03
4	Ashoka	Green, Standing	60-70	01
5	Mulberry (Shatut)	Green, Standing	10-20	02
6	Mulberry (Shatut)	Green, Standing	30-40	01
7	Chitvan	Green, Standing	20-30	02
8	Putrjiva	Green, Standing	20-30	01
9	Azadirachta indica (Neem)	Green, Standing	50-60	01
10	Indian Gooseberry (Amla)	Green, Standing	10-20	02
			Total	22

After the above trees have been cut, the transportation of the cut trees should be done after collecting a pass from this office.

Yours faithfully

(Moolchandra)

Divisional Forest Officer

Varanasi Forest Division, Varanasi.

Number: - 3395 / even dated.

Copy:- Executive Engineer, B.H.U. Project Circle-1, Central Public Works Department, BHU, Varanasi, in the order of the above, sent for information and necessary action.

Copy: - Regional Forest Officer, Varanasi Range sent to the notice and necessary action in the order of his letter -198 / 22-1 dated 03.02.2018.

(Moolchander)

Divisional Forest Officer

Varanasi Forest Division, Varanasi.

添付資料 8-7:VCC 運営において連携可能な組織

1. 連携可能な組織

VCC へのイベント誘致を成功させるため、インド国内のコンベンションセンター、劇場における主要なイベントスポンサーの調査を行った。上記、対象イベントを行うにあたり、想定されるスポンサーを以下にまとめる。

表 A8-6-1 イベント種別とスポンサー候補

イベント種別	内訳	スポンサー候補
文化 芸術 演劇	ヒンディ劇、 ヒンダスタン音楽劇、 バレエ、コメディ、歌舞伎、 古典音楽、カタックダンス、 バラタナティヤム舞踊	国立演劇学校 (NSD) インド文化交流評議会 (ICCR) サンギートナタックアカデミー カタックケンドラ 国際交流基金
コンベンション セミナー 会議	会社表彰式 株主総会 学会 講義	民間企業 ヴァラナシ・ヒンドゥー大学 (BHU) 財団 NGO 観光省
コミュニティ 学校イベント	学校表彰式、学校年次祝典、学 生パフォーマンス	現地コミュニティ 学校

(出典: JST)

2. スポンサー候補

主要なスポンサー候補の概要は、以下のとおりである。

(1) 国立演劇学校 (National School of Drama: NSD)

1959年に設立された文化省傘下のインドで唯一の演劇訓練機関。現代インド演劇、古典インド演劇、西洋演劇、シアター建築、舞台技術、舞台照明などの分野で大学院3年間のコースを有している。またインド国内各地で演劇祭を開催しており、デリー市内のカマリ・オーディトリウムで2017年1月～2月の22日間にわたり現代演劇祭を開催した。ヴァラナシ市においても2017年8、9月の2か月間にわたりインド全国から集めた演劇の生徒を対象に、ヴァラナシ市内にあるナガリ・ナタック・マンダリオーディトリウム (Nagari Natak Mandali) にて古典演劇のワークショップを行い、成果発表会を開催している。このように現在行っている NSD の活動を VCC にて行うことで、VCC の稼働率を上げることができる。

(2) インド文化交流評議会 (ICCR : International Council for Cultural Relations)

1950年に設立されたインド文化交流を目的とした政府系機関。インド文化団体による海外公演 (アウトゴーイング) 及び海外の文化団体によるインド公演 (インカミング) の企画、資金支援を行っている。2014年度にインド国内で開催したイベント数は118、内UP州内のヴァラナシ市、ラクナウ市で行われたイベント数は4つであり、これらのイベントをVCCにて行うことができる可能性がある。また、BHU内にICCRのリージョナルオフィスが設置されており、VCCとの連携が可能である。

(3) サンギートナタックアカデミー

1952年に設立された教育省傘下の機関であり、インドの古典音楽、舞踊、演劇などの文化の保存、促進を目的としている。インド国内でイベントを開催し、2016年度は年間97イベントのうち3イベントをヴァラナシ市で開催した。

(4) 国際交流基金（ジャパン・ファウンデーション）

外務省所管の独立行政法人であり、南アジアにはニューデリーのみ事務所を有し、①文化技術交流、②日本語能力支援、③日本研究者の支援の3つを主に行っている。ヴァラナシではBHUでの日本語教育の支援、BHU内のギャラリーにおける日本の世界遺産の写真展、日本舞踊の専門家によるガートでの舞踊イベントを企画したことがあり、VCCとの連携が可能であることについて確認している。

(5) ヴァラナシ・ヒンドゥー大学（BHU）

BHUは6つの研究所、14の学部、約140の学科から構成される総合大学であり、35,000人以上の学生を抱える。工学部、医学部、経営学部、舞台芸術学部などはインド国内の有数の学部として知られる。構内に1,500名を収容できるコンベンションホールを有し、年間約130件の学会やセミナーを行っている。しかし老朽化が進み空調設備や中小会議室なども設置されていないため、ヒアリングの中で国内外からのゲストを誘致できるホールの新設が必要であるとの認識が確認されており、VCCとの連携が可能である。

(6) UP州観光省

外国人観光客が集中する10月～3月の間、ヴァラナシ市の歴史、文化、芸術、演劇を紹介する自主事業をUP州観光省と協力して企画できる可能性がある。長期的にはヴァラナシ市在住の音楽家、舞踊家、演出家などで構成されるVCC独自の音楽団や舞踊団を結成することも検討できる。

添付資料8-8：民間委託における政府／民間企業の役割分担

1. 民間委託における政府／民間企業の役割分担の参考事例

インド国内外のコンベンションセンター、オーディトリウム運営における政府／民間企業の役割分担について調査を行った。

(1) Jai Prakash Narain International Centre (JPNIC、ラクノウ)

現在建設中であり、ラクナウ開発庁 (LDA) が開発主体、Jai Prakash Narain International Centre Society (JPNICS)が運営主体となっているコンベンションセンター。延床面積は 97,496 m²、総事業費は 86.4 億 INR。運営・維持管理については民間委託としてレベニューシェア方式を採用している。民間オペレーターは州政府に対して①年間 3,150 万 INR、②売上高の 18%、どちらか高い方を支払う条件で入札を行い、ホテルグループが落札した。JPNIC はホテル、ドミトリー、スポーツ施設、博物館を有する複合施設であり、また個人メンバーシップ、法人メンバーシップ制を用意し、複数の収益源があるため、レベニューシェア方式が機能すると判断されたものと考えられる。

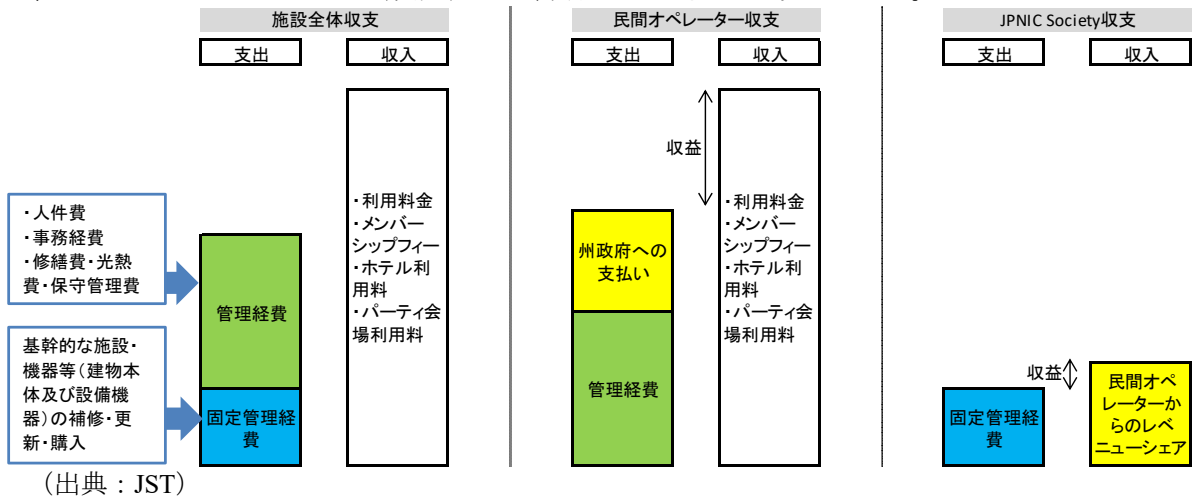


図 A8-7-1 JPNIC 収益シェア方式

また JPNIC における政府／民間企業の役割分担は以下表のとおり。

表 A8-7-1 JPNIC における政府／民間企業の役割分担

項目	詳細	JPNIC Society	民間オペレーター
<経営>			
1. 契約	民間オペレーター入札、JPNIC Society との運営業務委託契約	✓	
2. 資金調達	運営に必要な資金の確保		✓
3. 料金設定	オペレーターの収入となる施設利用料金の基準・決定	✓	
4. 運営ガイドライン、政策決定	運営に係るガイドライン制定、方針決定	✓	
5. 財務、会計	運営に係る財務、会計、JPNIC Society へのレベニューシェア	✓	✓
<運営>			
6. イベント誘致、プログラム計画	運営ガイドラインに沿ったイベント誘致、プログラム計画		✓
7. スタッフ採用、給与支払い	館長、設備、舞台、事業・広報など適切な人員配置		✓
8. 資産管理	基幹的な施設・機器等（建物本体及び設備機器）の補修・更新・購入	✓	
9. 日常的な運営・維持管理	基幹的な施設・機器等以外の補修・更新・購入		✓
10. 電気水道代支払い	運営に係る電気水道代の支払い		✓
11. 施設競合リスク	競合施設による利用者減、収入減		✓
12. 需要変動リスク	当初の需要見込みと異なる状況		✓
13. 管理運営費の膨張リスク	JPNIC Society 以外の要因による運営費の膨張		✓
14. 管理運営リスク	施設、機器の不備又は施設管理上の瑕疵及び火災等事故による臨時休館等に伴うもの		✓

(出典：JPNIC)

(2) 大阪市中央公会堂

大阪市が所有の国指定の重要文化財である歴史的建造物における市民の文化活動、会議その他各種行事の誘致を民間企業が委託を受けて実施している。5年に一度入札を通じて指定管理者を選定する仕組みであり、支出から収入を差し引いた不足分を指定管理料として大阪市より指定管理者に支払われる。

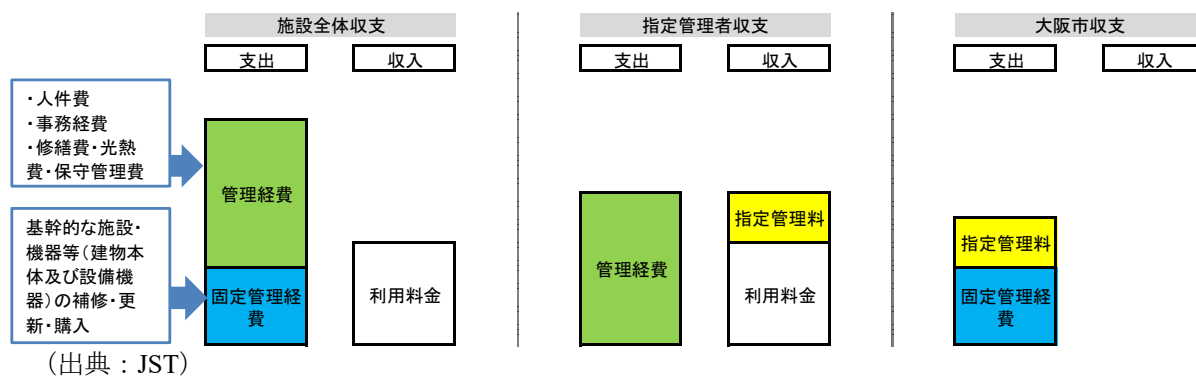


図 A8-7-2 指定管理者収益構造

指定管理者は入札時に人件費、事務経費、修繕費・光熱費・保守管理費などから構成される管理経費及び利用料金による収入の想定をし、指定管理料が決定される。想定よりも収入が増えた場合、及び管理経費が低く抑えられた場合は指定管理者の利益となるため、指定管理者のインセンティブが高まり、サービスの質や量が向上することが期待される。反対に予想よりも収入が減った場合、及び管理経費が膨張した場合も指定管理者が損失を負担することとなる。

現在の大阪市中央公会堂の指定管理者はサントリーパブリシティサービス株式会社であり、指定管理者は以下の目標値達成が求められている。

- ・ ホール（1,161 人収容）、中会議室（500 人収容）、小会議室（150 人収容）の稼働率 65%を目標とする。
- ・ 全国的または国際的な芸術文化のイベント、学会、講演会の誘致件数年間 10 件以上を目標とする。

また役割分担として以下の負担区分が定められている。

表 A8-7-2 大阪市中心公会堂における大阪市／指定管理者の役割分担

項目	詳細	大阪市	指定管理者
<経営>			
1. 契約	指定管理者入札、大阪市との運営業務委託契約	✓	
2. 資金調達	運営に必要な資金の確保		✓
3. 料金設定	条例の定める範囲内での施設料金の決定		✓
4. 運営ガイドライン、政策決定	運営に係るガイドライン制定、方針決定	✓	
5. 財務、会計	運営に係る財務、会計	✓	✓
<運営>			
6. イベント誘致、プログラム計画	運営ガイドラインに沿ったイベント誘致、プログラム計画		✓
7. スタッフ採用、給与支払い	館長、設備、舞台、事業・広報など適切な人員配置		✓
8. 資産管理	基幹的な施設・機器等（建物本体及び設備機器）の補修・更新・購入	✓	
9. 日常的な運営・維持管理	基幹的な施設・機器等以外の補修・更新・購入		✓
10. 電気水道代支払い	運営に係る電気水道代の支払い		✓
11. 施設競合リスク	競合施設による利用者減、収入減		✓
12. 需要変動リスク	当初の需要見込みと異なる状況		✓
13. 管理運営費の膨張リスク	JPNIC Society 以外の要因による運営費の膨張		✓
14. 管理運営リスク	施設、機器の不備又は施設管理上の瑕疵及び火災等事故による臨時休館等に伴うもの		✓

（出典：大阪市中心公会堂指定管理者募集要項）

添付資料 8-9：コンベンションセンター運営におけるオーナー／オペレーターの役割分担

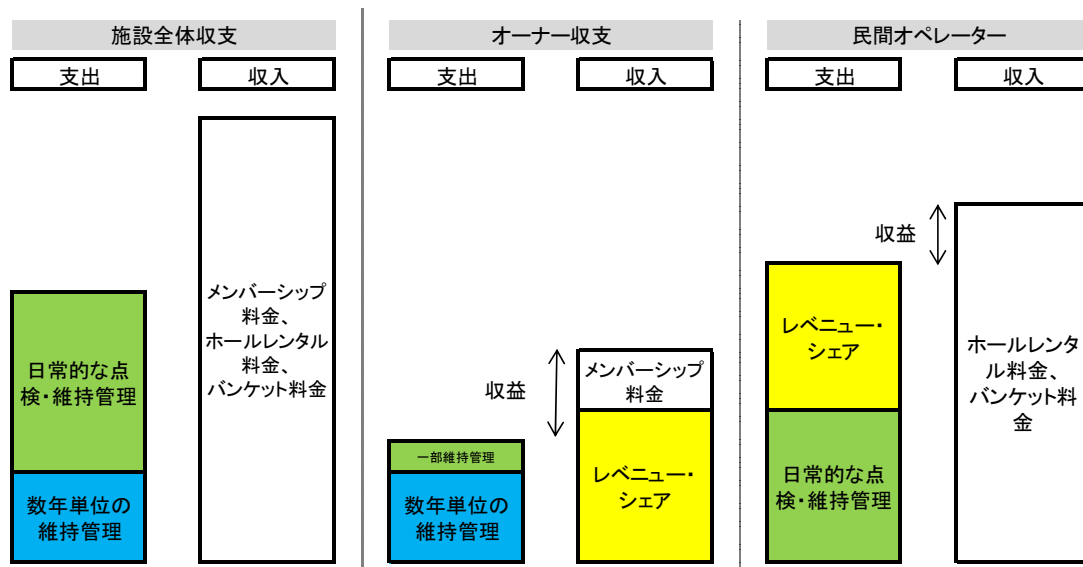
インド国内のコンベンションセンター、オーディトリウム運営におけるオーナー／オペレーターの役割分担について調査を行った。

(1) インディアン・ハビタット・センター（India Habitat Centre：IHC、デリー）

1993 年に、設立されたインド国内で有数のコンベンションセンターであり、都市住宅省や住宅・都市開発公社（Housing and Urban Development Corporation：HUDCO）などのメンバーによって構成される運営委員会により運営されている。延床面積は約 90,000 m²であり、100～500 名収容のオーディトリウム、中小会議室、展示場、ホステル、レストランなどを有する複合施設となっている。文化、芸術、ビジネスに関連したイベントを誘致している。

維持管理は民間委託としてレベニュー・シェア方式を採用しており、現在のオペレーターの Old World Hospitality Pvt. Ltd.（OWH）は、IHC と 10 年間の契約を締結している。

- ・ OWH は日常的な点検・維持管理費を負担し、ホールレンタル料金、バンケット料金を収入として受け取る。
- ・ OWH は IHC に対して収入の一部をレベニュー・シェアとして IHC に納める。全体の収入が増えればレベニュー・シェアも増えるため、IHC にとっても収入拡大のメリットがある。
- ・ IHC はメンバーシップ料金を受け取り、また一部の清掃などの維持管理業務を委託せずに行っている。
- ・ OWH の会計の透明性については、OWH のメンバーに IHC の会計士が常駐し日々の会計を確認することで担保されている。



（出典：JST）

図 A8-8-1 IHC におけるオーナー／オペレーターの支出、収入分担

表 A8-8-1 IHC におけるオーナー／オペレーターの役割分担

項目	オーナー (IHC)	民間オペレーター (OWH)
<マネジメント>		
料金設定	✓ (料金委員会が決定)	
運営ガイドライン、方針決定	✓	
入札実施	✓	
イベントマーケティング、プログラム作成		✓
売上負担	✓ (メンバーシップ)	✓ (ホールレンタル、バンケット)
<費用負担>		
日常的な点検・維持管理に係る経費	✓ (一部清掃)	✓
数年単位で必要な維持管理に係る経費	✓	
マーケティング、広告に係る経費		✓
光熱費		✓

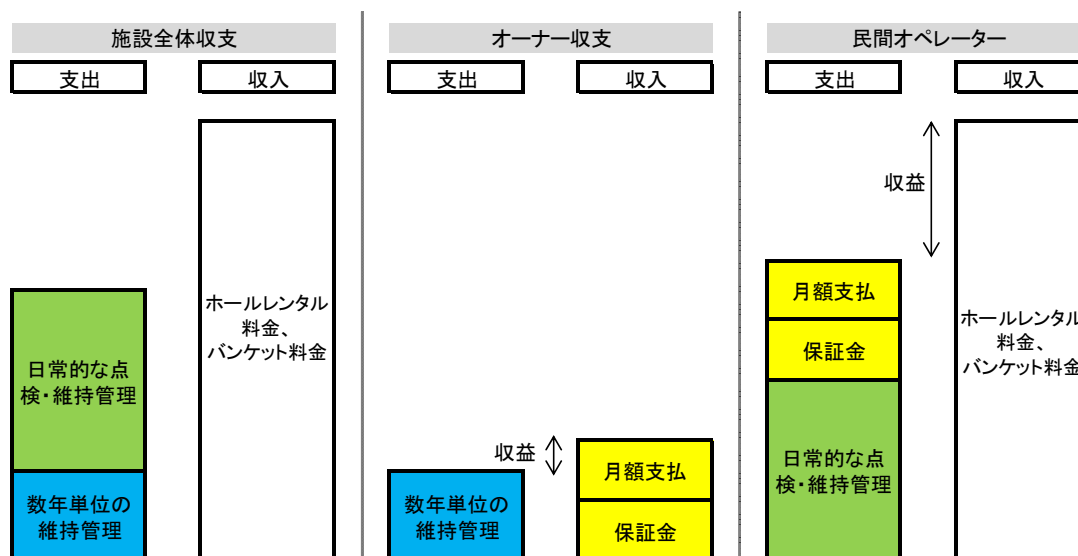
(出典：JPNIC)

(2) National Cooperative Union of India Auditorium (NCUI オーディトリウム、デリー)

NCUI はインド全国の協同組合の集合体であり、組合メンバーの会合用に NCUI オーディトリウムを建設した。50～620 名収容のオーディトリウム、中小会議室、展示場を有する。主に、ビジネス関連の会議を誘致している。

維持管理はイベントマネジメント会社の Axis Communications (Axis) が NCUI より委託を受け行っている。契約期間は 3 年間。

- ・ Axis は日常的な点検・維持管理費を負担し、ホールレンタル料金、バンケット料金を収入として受け取る。
- ・ Axis は NCUI に対して毎月一定額を NCUI に納める。また契約時に保証金を納めている。Axis の収入が増えても NCUI への支払額は一定のため、NCUI にとって収入拡大のメリットはない。
- ・ NCUI は数年単位の維持管理費をすぐに支払う契約となっているが、ヒアリングによると Axis が立て替え払いを行い、NCUI へ請求している。



(出典：JST)

図 A8-8-2 NCUI におけるオーナー／オペレーターの支出、収入分担

表 A8-8-2 IHC におけるオーナー／オペレーターの役割分担

項目	オーナー (NCUI)	民間オペレーター (Axis)
<マネジメント>		
料金設定	✓ (Axis が提案し NCUI が決定)	✓
運営ガイドライン、方針決定	✓	
入札実施	✓	
イベントマーケティング、プログラム作成		✓
売上負担		✓
<費用負担>		
日常的な点検・維持管理に係る経費		✓
数年単位で必要な維持管理に係る経費	✓	
マーケティング、広告に係る経費		✓
光熱費		✓

(出典：JST)

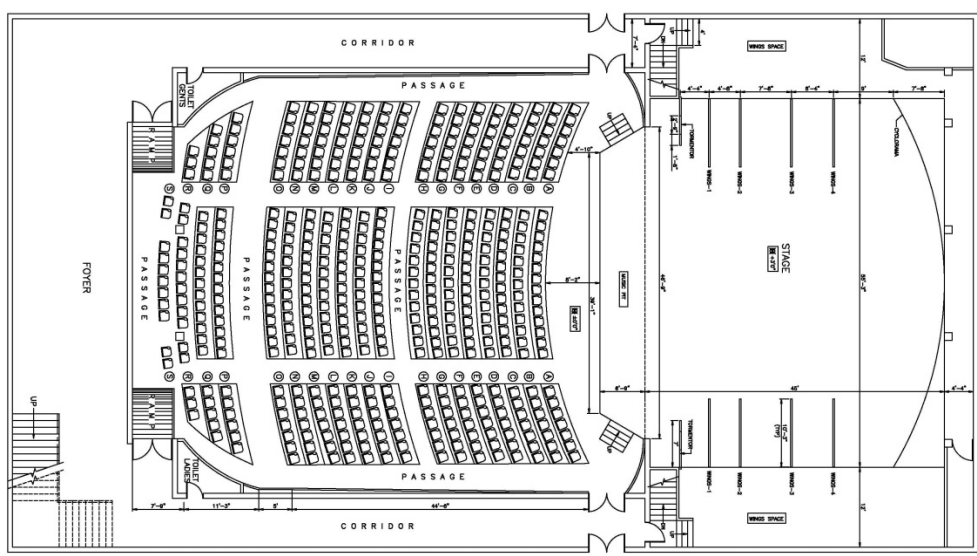
添付資料8-10：類似施設事例

1. カマニオーディトリウム（ニューデリー）



ホール全景。座席数は、632 席。ステージの大きさは、15m×14m。

固定式座席。クッション性もあり、座り心地は良い。



平面図

1. 所在地	ニューデリー
2. 設立年	1971 年
3. 運営形態・団体	トラスト（バラティヤ・カラ・ケンドウラ・トラスト）
4. 施設概要	(1) ロビー (2) 売店 (3) 楽屋（2 部屋、男女別、シャワールーム併設） (4) コントロール室 (5) トイレ（男性用、女性用）
5. 劇場設備	(1) 客席：632 席 (2) ステージサイズ：幅 15.0m、奥行き 14.0m (3) バトン：21 本 (4) フライタワー：高さ 14.0m (5) 音響設備：JBL スピーカー、Crown アンプ、サンドミキサー（32 チャンネル）

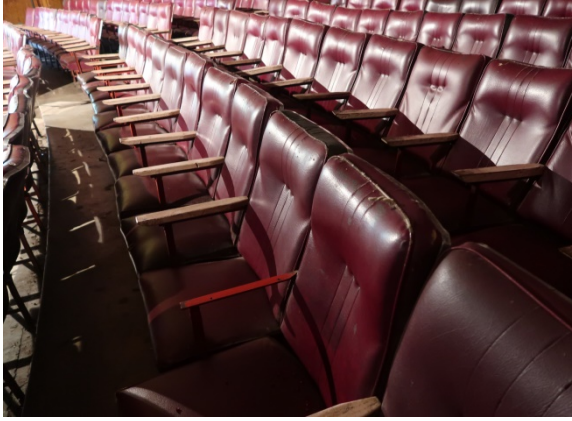
出典：カマニオーディトリウム HP <<http://kamaniauditorium.org/>>

2. シリフォート・オーディトリウム（ニューデリー）

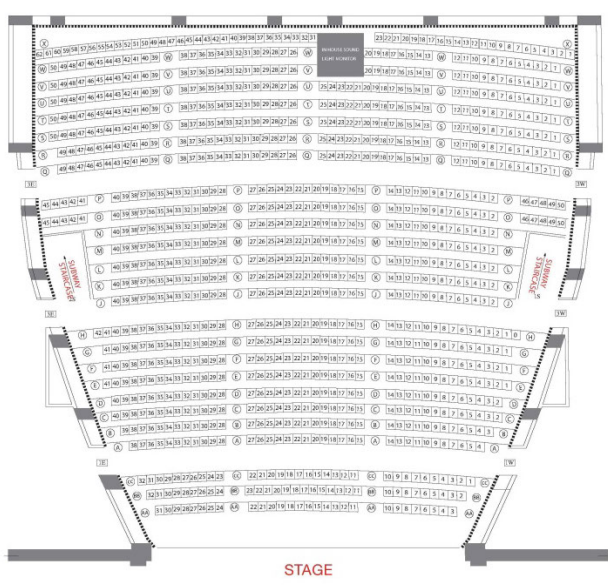
			
ホール全景。座席数は、1865 席。ステージの大きさは、26.30m ×9.30m。		二階席もあり、照明設備、音響設備も充実している。	
			
控室。男女別、トイレ、シャワー付き。		ホール入口付近ホワイエ。ドリンクや軽食が提供される場としても利用される。	
1. 所在地	ニューデリー		
2. 設立年	1982 年		
3. 運営形態・団体	情報放送省 Directorate of Film Festival (DFF) directly 所管		
4. 施設概要	(1) ロビー (2) 売店（個人オーナー） (3) 楽屋（2 部屋、男女別、トイレ・シャワー室併設） (4) コントロール室 (5) トイレ（男性用、女性用） (6) VIP ラウンジ (7) 駐車場（屋外、無料）		
5. 劇場設備	(1) 観客席：1,865 席 (2) ステージ：幅 26.30m、奥行き 9.30m (3) スクリーン：幅 16.76m、高さ 7.31m (4) 照明設備：2048 DMX (5) 音響設備；デジタルコンソールモデル（64 チャンネル）		
6. その他	さらに 3 つの劇場を所有している。 劇場 2：観客席 396 席、投影設備あり 劇場 3：観客席 273 席 劇場 4：観客席 67 席、		

出典：<<http://www.delhievents.com/2008/08/siri-fort-auditorium.html>>

3. ナタック・マンダリ (ヴァラナシ)

	
客席全景。空調設備、音響設備は後付けである為、露出となっている。	ステージ設備。フライングバーも数本設置されている。
	
客席椅子はかなり、使い込んだ状況であり、壊れているものも見受けられる。	控室。前面タイル貼りの床と大型の鏡が設置されている。
1. 所在地	ヴァラナシ
2. 設立年	1909 年
3. 運営形態・団体	私設トラスト
4. 施設概要	(1) 楽屋 (2 部屋) (2) トイレ (男性用、女性用) (3) 収納庫 (舞台下) (4) 空調設備
5. 劇場設備	(1) 観客席 ; 850 席 (うち 1 階部分 656 席) (2) ステージ : 幅 9.9m、奥行き 6.3m (3) 照明設備 : パーライト 4 台、スポットライト 4 台 (4) 音響設備 : センタースピーカー 1 台、置型スピーカー 2 台、マイク 10 本 (5) 非常用発電機 : 1 台 (15kw)

4. 国立舞台劇場（ムンバイ）

	
メインホール	平面図
1. 所在地	ムンバイ
2. 設立年	1969 年
3. 運営形態・団体	—
4. 施設概要	(1) 5 ホール (2) 楽屋 (10 室) (3) 駐車場 (地下および屋外)
5. 劇場設備	<u>メインホール (Jamshed bhabha シアター)</u> (1) 観客席 : 1,109 席 (2) ステージ : 幅 23.7m、奥行 14.6m, (3) オーケストラピット (4) コントロール室 (4 部屋) (5) 照明設備 : 照明バー (6 本)

出典 : < <http://www.ncpamumbai.com/> >

5. ヴィギャン・バワン (ニューデリー)

	
外観	メインホール (カンファレンスホール)
	
ホール 3	ホール 6
6. 所在地	ニューデリー
7. 設立年	1956 年
8. 運営形態・団体	住宅都市省 CPWD 所管
9. 施設概要	(1) メインホール (カンファレンス) と 6 つの中小ホールを所有。 メインホール : 1,285 席 ホール 1 : 68 席 (分割時 : 34 席+34 席) ホール 2 : 150 席 (分割時 : 75 席+75 席) ホール 3 : 178 席 ホール 4 : 278 席 ホール 6 : 378 席 (2) 楽屋, ラウンジ, VIP ルーム (3) 厨房 (4) トイレ (男性用、女性用) (5) 非常用発電機

出典 : <<https://i0.wp.com/blog.hubilo.com/wp-content/uploads/2017/04/4.jpg?resize=1024%2C683>>

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

1.0 INTRODUCTION

In December 2015, during a summit meeting between Japan and India, the Prime Minister Modi expressed his expectation that the two sides will explore the development of a convention center in Varanasi. Following the above announcement, the Detailed Project Reports (DPR) was prepared by the India side, and JICA (Japanese International Cooperation Agency) conducted the Preparatory Survey to verify the feasibility of the project and to develop the schematic and detailed design of the VCC.

The result of the schematic design was presented at the India-Japan Joint meeting in September 2017, in which it was stated that the two Prime Ministers welcomed the Exchange of Notes for the construction of a state-of-art Convention Centre in Varanasi as a symbol of friendship between Japan and India by Japan's Grant Aid.

The objective of the Project is to construct a VCC that will provide opportunities for social and cultural interactions and the exchange of knowledge, thereby contributing to the socio-economic and tourism development of Varanasi.

The latitude and longitude of the proposed project site is 25°18'46.21"N and 82°59'8.96"E respectively. The terrain of the project site & its surrounding area is plain. The site and study area falls under the premises of Varanasi Municipal Corporation. The soil characteristic of the area is Sandy to sandy loam, Loam to clay loam, Sodic soils/saline (Source: SREP Varanasi, District (2006).

The plot area of the proposed project is approx. 3.3 acres, i.e. 13,354 sq. m. and falls under Category B2 [Built-up area < 20,000 m² as per EIA Notification 2006]. Hence, it does not require Environmental Clearance from the SEIAA (State Environment Impact Assessment Authority), Government of Uttar Pradesh / EAC (Environment Assessment Committee) of MoEF & CC, GOI. The detail of the proposed project site is given in **Table-1.0**.

Table-1.0: Details of Proposed Project Site

Sl. No.	Parameters	Remarks
1.	Name of the proposed project	Construction of convention centre in Varanasi.
2.	Total project area	Approx 3.3 Acres (13,060sq. m.)
3.	Area provided for proposed development of convention centre.	Approx 10,560 sq. m.
4.	Total built-up area	Approx 9,600 sq. m.
5.	Total ground coverage	Approx 40% (4240 sq. m.)
6.	Height of the proposed building	Ground floor + 28 meter
7.	Latitude and longitude	25°18'46.21"N, 82°59'8.96"E

Environment Management Plan for
Varanasi Convention Centre

Sl. No.	Parameters	Remarks
8.	Total population	Permanent – 25 persons Floating – 1210 persons
9.	Total water requirement	25 kld
10.	Total discharge	Permanent-1 kld Floating-20 kld
11.	Proposed capacity of STP(Sewage Treatment Plant)	Sewage treatment plant is not installed, because sewage is discharged to city sewer line.
12.	Total power requirement	Approx. 800 kW
13.	Power backup	100% (2 DG sets, 500KVA/1 set)
14.	Total number of ECS	Surface –18 Basement –102
15.	Total solid waste generation	Permanent – 25 kg / day Floating – 1,200 kg/day Say – Approx. 1.2 TPD
There is proposal of obtaining GRIHA rating for the proposed project.		

The objective of the preparation of Environmental Management Plan (EMP) is to identification and prediction of impacts and suggestive mitigation measures for prevention of environmental aspects.

The Environmental Management plan (EMP) is a site specific plan developed to ensure that the project is implemented in an environmentally sustainable manner and understand the potential environmental risks arising from the proposed project and take appropriate actions to minimize those risks. EMP also ensures that the project implementation is carried out in accordance with the planned design and by taking appropriate mitigation actions to reduce adverse environmental impacts during the construction of proposed convention center.

The key benefits of the EMP are that it provides the organization with means of managing its environmental performance thereby allowing it to contribute to improved environmental quality. The other benefits include cost control and improved relations with the stake holders.

Various activities are likely to have some impact on the environmental attributes during its construction as well as operational phase. The impact assessment matrix given in **Table -2.0 & 3.0** reveals the impact associated with each activity of the project on various environmental parameters during construction and operational phases respectively before any mitigation measures are implanted.

Adequate environmental management measures will be incorporated during the entire planning, construction and operating stages of the project to minimize any adverse environmental impact and assure sustainable development of the area. The detailed Environment Management Plan during construction and operation phases have been given in **Table -2.0 & 3.0** respectively.

Environment Management Plan for
Varanasi Convention Centre

Table-2.0: Prediction of Impact during Construction Phase & Their Mitigation Measure

Environmental component	Project Activity	Potential Impact	Mitigation Measure
Air	Site Clearance/ Operation	Dust Pollution	Sprinkling of water above the area before Clearing.
	Heavy Vehicle Maintenance/ Operation	Air Pollution Dust Generation	• Vehicles used for transportation of material will be covered with tarpaulin. • Vehicles used for Construction work will be regularly maintained and will be requested to contractor to adhere to CPCB(Central Pollution Control Board) norms.
	Construction of structure and earth work	Dust due to cutting and filling	Wetting of area before clearing.
Noise	Heavy Vehicle Maintenance	Increased vehicular noise	Vehicles used for Construction work shall be regularly maintained and will be requested to contractor to adhere to CPCB norms
	Construction of structure and earth	Noise from vibrators, Concrete batching plants etc.	• Proper maintenance of equipment. • Providing ear plugs to workers employed in close vicinity of noise producing machine.
	DG set operation	Increased noise levels	• DG set adhering to CPCB norms. • Proper maintenance of DG Set.
Water	Construction Staff Water Requirement	Strain on local water sources	Drinking water will be met from municipal supply.
Soil	Storage of petroleum and other chemicals	Pollution due to mixing of construction material.	• Storage of petroleum and other chemicals on impervious floor. • Careful handling of materials will be ensured.
	Construction debris and earth material.	Pollution due to mixing of concrete with soil.	• Mixed Concrete and such debris will be unloading on impervious metal sheets. • Waste or spillage will be collected and sent to the nearest disposal site with the appropriate treatment.
	Transportation of hazardous material	Accidental spilling of hazardous material	• Construction Process does not involve transportation of hazardous material such as lubricant oil and enamel paint except in very small quantities.

Environment Management Plan for
Varanasi Convention Centre

Environmental component	Project Activity	Potential Impact	Mitigation Measure
			In transportation of these materials, all precaution as required by regulation will be taken.
	Demolition waste from existing office building	Contamination of soil	Demolition waste from existing office building will be collected, segregated and handled to authorize recyclers.
	Heavy Vehicle Maintenance/ Operation	Oil spillage	Use of electrically operated machines to the possible extent. Oil tray will be kept below all potential oil spillage points for final disposal of spillage to authorized recyclers.
	Solid waste generation	Improper disposal of plastic/kitchen waste.	Segregation of solid waste will be practiced and segregated waste will be handed over to authorized agency of Nagar Nigam for final disposal.
Ecology	Construction of Structure and earth work	Migration of fauna due to construction	Use of electrically operated machines to the possible extent, and proper maintenance of machines to keep noise level low.

Environment Management Plan for
Varanasi Convention Centre

Table-3.0: Prediction of Impact during Operation Phase & Their Mitigation Measure

Environmental component	Project Activity	Potential Impact	Mitigation Measure
Air	Traffic movement on Road	Increased concentration of air pollution at some location	• Although the bidirectional traffic is adopted in the surrounding area now, installation of one-way traffic is considered for reducing congestion. •
	DG set operation	Air Pollution	• DG set adhering to CPCB Norms. • Proper maintenance of DG set. • Exhaust ventilation with chimney in DG set will be installed.
Noise	Traffic movement on Road	Increased vehicular noise at some location	• Although the bidirectional traffic is adopted in the surrounding area now, installation of one-way traffic is considered for reducing congestion.
	DG set operation	Noise from DG set	• DG set will be enclosed in acoustic enclosure with soundproof casing.
Water	Water Requirement	Strain on Ground water	• No ground water is used for drinking water. • Drinking water will be supplied by municipal supply.
Soil	Operation	Soil contamination due to surface run off / Oil and grease dripping from vehicle	Oil and grease spilled in the basement car parking will be pumped up to the waste water pipe connected to the existing city sewer line.
	Solid waste generation	Improper disposal of plastic/kitchen waste.	Segregation of solid waste at source will be practiced and segregated waste will be handed over to authorized agency of Nagar Nigam for final disposal.
Ecology	Operation	Increased exposure to anthropogenic activities.	Enactment and enforcement of laws regulating human intrusion.

2.0 LAND ENVIRONMENT

2.1 Impacts & Management

In the proposed project, soil would be excavated at project site for foundations of convention centre. The construction poses impact on surrounding environment and surrounding land-use directly or indirectly. The possible impact on topography and geology of the area will be negligible due to cutting, filling, excavation of earthworks for piling activities, making roads; construction activities. The impact on soil during construction phase will be marginal and reversible in the nature.

Mitigation measure

It is proposed to remove vegetative cover only from the specific site on which construction is to take place and allowing minimal disturbance to the vegetation in adjacent areas. Land clearing activities only confined to necessary areas. The top soil will be stripped from construction areas and sent to the nearest disposal site with the appropriate treatment. The number, frequency and area of movement of heavy machinery will also be restricted. There will not be any significant impact on topography from the project.

3.0 AIR POLLUTION

Air pollution is the imbalance in air quality to such an extent to cause deleterious effects. The air pollutant concentration at particular time is the function of quantity and type of pollutant introduced into the atmosphere and ability of atmosphere to disperse/absorb these and also on various physicochemical dissipation processes liable to remove the air pollutants through self- dissipation.

The primary air pollutants emitted from various identifiable sources viz. point sources, line sources and non- point sources remain scattered in atmosphere in same chemical form in which these are emitted from sources while secondary pollutants are formed in atmosphere by reaction of two or more primary pollutants.

The point sources include emissions from domestic sources, whereas line sources include vehicular emissions and non-point sources include fugitive emissions from construction activities, dust arising from unpaved and paved areas, road construction, etc.

3.1 CONSTRUCTION PHASE

During site preparation, mechanical shovels and earth movers will be used for site clearance, cut & fill & other site levelling activities. The major construction activities will involve earth work, transportation of construction materials, handling, laying and joining of pipelines, building of structures. These activities will generate dust particles which will be mobilized by wind and affect the ambient air quality. These activities will cause a general increase in levels of suspended particulate matter in ambient air. However, this increase in concentration will be of temporary nature and localized. A marginal increase in the levels of oxides of nitrogen, carbon monoxide and hydrocarbons is envisaged due to movement of vehicles for

Environment Management Plan for Varanasi Convention Centre

transportation of construction material and diesel generator required during construction phase.

Fugitive dust emissions:

Fugitive dust is a type of non- point source air pollution - small airborne particles that do not originate from a specific point. Fugitive dust originates in small quantities over large areas. Significant sources include construction activities, road construction, paved road dust, unpaved road dust, etc

1. Construction Activities:

Construction activities are significant source of dust emissions that may have a substantial temporary impact on local air quality. Construction activities that are the most significant sources of fugitive emissions are:

- a. Earth moving, due to excavation, handling, storage and disposal of soil and subsoil materials.
- b. Construction aggregate usage, due to the transport, unloading, storage & use of dry & dusty materials (such as cement, sand, etc.).

3.2 OPERATION PHASE

The main source of pollution will be fugitive emissions from traffic movements and point source emissions from increase in concentration of gases from the exhaust of DG sets.

4.0 WATER ENVIRONMENT

4.1 CONSTRUCTION PHASE

Water Conservation Techniques:

Best construction practices will be adopted to reduce the water demand for construction activities:

- Use of curing water: Spraying of curing water and after liberal curing, all concrete structures will be covered with gunny bags, followed by spraying of water.
- Discouraging the washing of vehicles and equipment on the construction site. Workers will not be allowed to wash their personal vehicles on site. Vehicles and equipment that regularly leave the construction site should be washed offsite.

Environment Management Plan for
Varanasi Convention Centre

Table-4.0: Water Management Plan

Source	Management
• Groundwater contamination due to domestic sewage. • Open defecation / other allied activity. • Dust emissions due to vehicular movement. • Impact of water movement on and off site and its associated erosions, sedimentation and potential pollution effects.	• Septic tanks followed by soak pits to prevent groundwater contamination. • Provide adequate number sanitation facility and awareness to workers on the subject. • Controlled water sprinkling @ of 1.0 – 1.5 L / sq.m. at the interval of 1 hr is recommended (water requirement subjected climatic / site conditions). • Soil and water management structures will be in place prior to the commencement of construction works, and any activities likely to generate erosion and sedimentation impacts. • Silt fencing with sausage, temporary silt fencing will be installed at selected locations across the site. • Stockpiles will not be located in proximity to existing or proposed drainage lines and storm water inlets. • Provisions will be made to ensure the construction vehicles stick to the access track to prevent mud & dirt being deposited on roads.
• Significant water demand for construction	• Curing water will be sprayed and after liberal curing all concrete structures will be covered with gunny bags, this will conserve water.
• Unsanitary conditions during rainy season.	• Separate toilet facility for male and female and hand washing facility will be provided. • Potable water will be provided and placed in / at various locations readily accessible to all. • The employer will notify each employee of the location of the sanitation facilities and water and will allow each employee reasonable opportunities during the workday to use them. And the employer also will inform the importance good hygiene practices, communicable diseases. • The civil contractor will be held responsible for site sanitation and will be bound by the management to adhere to healthy level of sanitation.

4.2 POST CONSTRUCTION PHASE

4.2.1 Water requirement

Daily fresh water demand will be 25 KLD (9125 cu. m./annum). The fresh water demand will be provided by VMC as per agreement.

Water conservation techniques

Following water conservation techniques have been proposed for the project:

- **Native & xeriscaping plant species:** Choose native plant species that need less water.
- **Creating Hydrozones:** Grouping of plant according to their water needs to provide adequate water to all plants without over or under-watering.
- **Maintain Healthy Soil:** Healthy soils are the basis for a water-smart landscape; they effectively cycle nutrients, minimize runoff, retain water, and absorb excess nutrients, sediments, and pollutants.
- **Mulching:** Incorporate mulch around shrubs and garden plants to help reduce evaporation, inhibit weed growth, moderate soil temperature, and prevent erosion. Adding organic matter and aerating soil can improve its ability to hold water.
- Avoid watering during the heat of the day. Water early in the morning to reduce the evaporation rate.
- Drought tolerant species will be selected.
- Turfs will be avoided to the extent possible.
- Central shut off valve will be provided.
- Sprinkler landscaping system will be used to conserve water.

4.2.2 Waste water generation & treatment

In the peak day, once a week, when the event is held, approximate 20 KLD waste water will be generated. In the normal day, 1 KLD waste water will be generated.

Sewage treatment plant is not installed, because connection pipe (150φ) from the site boundary up to the city sewer pipe(300φ), which exists in south road 3,600mm below ground, will be constructed.

4.2.3 Impact & Management

Investigated environmental impacts	Measures for minimizing and / or offsetting adverse impacts identified and their Mitigation measures
------------------------------------	--

Environment Management Plan for
Varanasi Convention Centre

• Waste water leakage • Odor generation • Seepage to groundwater	• Check valve, flange, at regular defined interval. • Regular physicochemical monitoring of groundwater
--	--

4.2.4 Storm Water Management

Construction phase Contaminant	Sources	Impact Mitigation
Sediment & Floatables	Streets, lawns, driveways, roads, construction activities,	During construction, sediment fencing or other erosion control devices will be used to mitigate the short-term adverse impacts of sedimentation.
Oil & Grease	Roads, driveways, parking lots etc.	Oil & Grease trap will be provided to remove oil & grease, suspended matter, and ensure the quality of groundwater.

5.0 SOLID WASTE MANAGEMENT

5.1 Applicable Rules

- Construction & Demolition Waste Management Rules, 2016
- Solid Waste Management Rules, 2016
- Plastic Waste Management Rules, 2016
- Electronic waste Management Rules, 2016
- Hazardous & Other Waste Management Rules, 2016
- Bio-Medical Waste Management Rules, 2016

5.2 Construction phase

Construction material is the main source of waste during construction phase. Most of the construction waste shall be used in land filling and wastes like iron, plastic waste shall be handed over to authorized recycles.

Management of Construction waste as per C&D Rules, 2016 (Duties of the waste generator):

- The responsibility of collection, segregation of concrete, soil and others and storage of construction and demolition waste generated will be of the management.
- It will be ensured that the other waste (such as solid waste) does not get mixed with the construction waste and is stored and disposed separately.

Environment Management Plan for Varanasi Convention Centre

- The waste will be segregated into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar.
- The waste generated will be kept within the premises and later deposited to the waste collection centre made by the local body. It will be ensured that there is no littering or deposition of construction waste so as to prevent obstruction to the traffic or the public or drains.
- Relevant charges will be paid for collection, transportation, processing and disposal as notified by the concerned authorities.

5.3 Post Construction Phase

In the peak day, once a week, when the event is held, approximate 1,200 kg/day solid waste will be generated. In the normal day, 25 kg/day solid waste will be generated.

5.4 Waste Management

Solid Waste Management: as per Solid Waste Management Rules, 2016:
The solid waste generated from the project premises will be segregated and stored in three separate bins namely, bio-degradable, non biodegradable and domestic hazardous wastes. The segregated waste from all three bins will be handed over to authorized waste pickers or waste collectors.
The used sanitary waste will be suitably wrapped and the same will be placed in the bin meant for dry waste or non-biodegradable waste.
The horticulture and garden waste generated from the premises will be kept separately and will be disposed off as per the directions of the local body.
No waste will be thrown, burnt or buried on streets, open public spaces outside his premises or in the drain or water bodies.
The recyclable material will be either the authorized waste pickers or the authorised recyclers. The biodegradable waste will be processes, treated and disposed off through composting or bio-methanation within the premises itself. The residua waste will be given to waste collectors
Plastic Waste Management: as per Plastic Waste Management Rules, 2016
Adequate steps will be taken to minimize the generation of plastic waste at source.
The plastic waste so generated will not be littered and it will be ensured that the segregated waste will be stored at source and handed over to the registered waste pickers, registered recyclers or waste collection agencies.
E-Waste Management : as per E-Waste Management Rules, 2016
It will be ensured that the E-waste generated, is channelized through collection centre or dealer of authorised producer or dismantler or recycler or through the designated take back service provider of the producer to authorised dismantler or recycler
Care will be taken that the end-of-life electrical and electronic equipment are not admixed with e-waste containing radioactive material

6.0 NOISE ENVIRONMENT

Noise will be generated during construction as well as post construction phase.

Environment Management Plan for Varanasi Convention Centre

6.1 Construction Phase

During the construction phase, certain activities (such as piling), use of equipment (such as concrete mixer, concrete vibrator, compressors), and movements of vehicles, etc. may generate the noise. The generation of noise is a short term impact and will be limited to the construction site area.

SOURCES	MANAGEMENT
• Vehicular traffic • Heavy moving machinery • Operation of D.G. set, etc.	• The construction area will be shielded from all four sides. • Complete construction work especially heavy earth work will be done during day time. • The vehicles will be regularly maintained and optimum use of the same will be made. • Moving parts of the machines will be maintained properly so as to avoid metal-to-metal impact noise. • The D.G. set used will be eco-friendly with minimum noise. • Ear plugs will be provided to the workers.

6.2 Post construction phase

SOURCES	MANAGEMENT
• Operation of D.G. sets	• D.G. sets will be housed in acoustic enclosure with soundproof casing designated to meet CPCB standards, which will help to contain the noise within the permissible standards
• Road traffic	• Although the bidirectional traffic is adopted in the surrounding area now, installation of one-way traffic is considered for reducing congestion • Landscape area will help to absorb noise.

7.0 ENERGY CONSERVATION

- LED shall be used to reduce the power consumption during the operation phase of the project.
- All capacitors will be provided with Harmonic Filters to avoid distortion in Voltage.
- Automatic Power Factor correction panel with capacitor will be used for Common Load & Fixed Capacitor for Transformer to minimize the losses.
- Insulation of exposed walls and roof will be done to minimize heat gains inside the building. This will help to reduce the air conditioning demand of the buildings.

Environment Management Plan for
Varanasi Convention Centre

- Emphasis will be given on low maintenance, low wattage and longer life in selection of chokes and lamps for all common area and external light fixtures.

8.0 SOCIO-ECONOMIC IMPACTS

The project will provide employment to the people. Indirect employment is also expected due to the associated activities. It is a positive impact of the project since it will provide employment opportunities to the local people.

Impact: As most of the workers to be employed in the project are local residents no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work. The project proponent shall ensure health and safety of all the employees at work. All efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees.

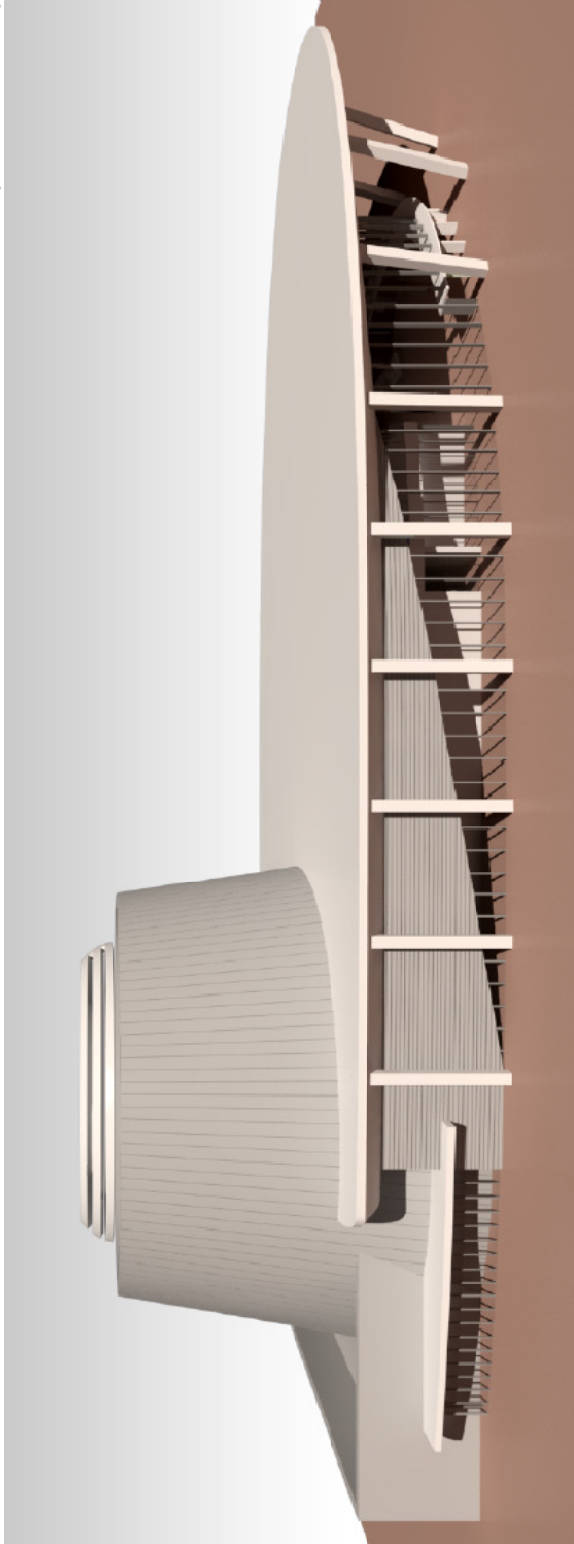
Mitigation: Suitable measures will be taken at the temporary construction labour tents to mitigate anticipated impacts due to temporary accommodation of labourers such as provision of clean drinking water, adequate toilet facilities, water and solid waste disposal system.

Other safety precautions to be maintained at work site including provision of PPE(Personal Protection Equipment), guarding of dangerous machine parts, maintenance of equipment as hoists and lifts etc, and adequate provision of different types of fire extinguishers will be made. All applicable rules and regulations pertaining to health and welfare at the workplace of the people will be applied to all workers.

GRIHA

(Green Rating for Integrated Habitat Assessment)

GREEN BUILDING RATING SYSTEM 2015 (Version 3.0)



GRIHA ASSESSMENT STUDY REPORT
VARANASI CONVENTION CENTER

March 2018

Table of Contents

Particulars	Page No's
Introduction	3
Feasibility Study	4
General features of Proposed Green Building	5
Project Checklist	6
Criteria in Detail	14
Conclusion	43

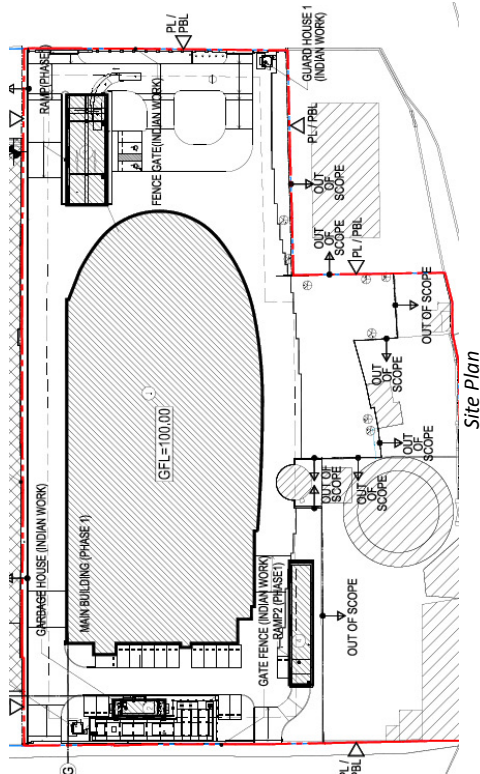


Introduction

The proposed convention centre is located in Varanasi, UP.

SN	Description	Units	Data
1	Project Name		Varanasi Convention Center
2	Green Building Rating Required		3 Star GRIHA RATING
3	Total Site area	Sq. M	13196.4
4	Total Built Up Area	Sq. M	9825.51 (Including Basement & Services)
5	Total Air Conditioned Area	Sq. M	3800
6	No. of buildings	Nos.	1
7	No. of Floors	Nos.	1Basement+Ground+1Floor

As a strong step towards the social corporate responsibility and commitment for protecting the environment, the company has taken an initiative to build this building as a “Green Building”. The project team has evinced keen interest in the same to achieve Green Building Rating. Godrej & Boyce fully appreciates this excellent initiative of the Project team.



Feasibility Study:

Godrej & Boyce was invited to conduct a feasibility study to explore and evaluate the practicability for the project to contend for GRIHA 2015 rating. The GRIHA rating system takes into account the provisions of the National Building Code 2005; the Energy Conservation Building Code 2007 announced by BEE (Bureau of Energy Efficiency) and other IS codes. GRIHA – the National Rating System will evaluate the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a ‘green building’. The rating system, based on accepted energy and environmental principles, will seek to strike a balance between established practices and emerging concepts, both national and international. The following aspects of a green building design are looked into in an integrated way.

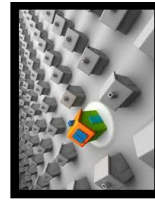
- Site planning
- Building envelope design
- Building system design (HVAC [heating ventilation and air conditioning], lighting, electrical, and water heating)
- Integration of renewable energy sources to generate energy on-site
- Water and waste management
- Selection of ecologically sustainable materials (with high recycled content, rapidly renewable resources with low emission potential and so on)
- Indoor environmental quality (maintains indoor thermal and visual comfort and air quality)

The objective of the feasibility study was to explore, evaluate and recommend:

- Methodology of achieving the prestigious Green building Rating of GRIHA
- Assessment for meeting prerequisites and credit points as mentioned in GRIHA reference guide.
- Benefits to the owner.
- Implementation of the GRIHA certification

Intangible benefits:

- Green corporate image
- Health and safety of the building occupants
- Enhanced occupant comfort
- Higher productivity of occupants
- Imbibe best operating practices from day-one
- Incorporate latest techniques / technologies



Benefits:

A green building has lower resource consumption as compared to conventional buildings. The following is the percentage reduction of various resources in a building and their respective reasons.

- Green buildings consume 40% to 60% (depending on the range of measures adopted) lesser electricity as compared to conventional buildings. This is primarily because they rely on passive architectural interventions in the building design, and high efficiency materials and technologies in the engineering design of the building.
- Green Buildings also attempt to work towards on-site energy generation through renewable energy utilization to cater to its energy needs. For instance, solar thermal systems can help generate hot-water and replace the conventional electrical geyser in buildings. Solar PV panels can help generate electricity which can reduce the buildings dependence on grid power.
- Green buildings consume 40% to 80% (depending on the range of measures adopted) lesser water as compared to conventional buildings. By utilizing ultra low-flow fixtures, dual plumbing systems, waste-water recycling systems and rain-water harvesting, green buildings not only reduce their demand for water use but also look at on-site supply options to cater to its internal and external (landscape) water demands.
- Green buildings generate lesser waste by employing waste management strategies on site. They may also employ waste to energy or waste to resource (like manure, or
- Green buildings ensure proper safety, health and sanitation facilities for the labourers (during construction) and the occupants (while in use).
- Green buildings restrict the use of high ODP (ozone depleting potential) substances in their systems as well as in finishes.
- Green buildings offer higher image and marketability.
- Green buildings generate lesser pollution both during construction as well as while in use. Through best-practices such as proper storage of construction materials, barricading of the site to prevent air and noise pollution during construction, proper storage and disposal of waste during construction and operation, and so on, ensures reduced impact on the surrounding environment.

All of these can be achieved at a minimal incremental cost with an estimated payback period of about 3–5 years (excepting renewable energy for power generation).

Evaluation of the Study:

During the assessment study, a realistic evaluation was made on the possible points that can be aimed for. The study reveals that the project can aspire to achieve “**THREE STAR Rating**” in GRIHA Rating System, but some serious efforts would be required.

The aim would be to achieve at least 4-5 points higher than the threshold points required for the feasible / achievable and desired rating.

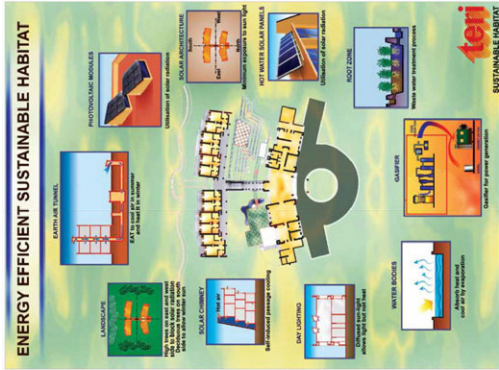
GRIHA

With Total 67.7 Percentile likely points the project can achieve Three Star Level
The summary of evaluation is given as under:

	GRIHA
Total points available	96
Likely / possible	65
Total (Percentile)	67.7

With the participation, ownership and wholehearted effort of the entire project team, it is possible to attempt and aim for the desired and feasible rating.

The detailed point-wise realistic evaluation and action required is highlighted in this report against the respective credits. The checklist of credit points is also attached in this report



Section Wise Break up	Points Attempted
Site Planning	3
Construction Management	9
Energy	7
Occupant comfort and Well-being	10
Water	6
Sustainable Building Materials	10
Solid Waste Management	4
Socio-Economic Strategies	6
Performance Monitoring & Validation	8
Innovation	2

TOTAL MAXIMUM POINTS APPLICABLE	96
TOTAL PERCENTILE	67.7
LIKLEY RATING	3 STAR

Sections	Criterion No.	Criterion Name	Max. Points
Site Planning	1	Site Selection	1
	2	Low-impact design	4
	3	Design to mitigate UHIE	2
	4	Site Imperviousness Factor	1
Construction Management	5	Air and water pollution control	1
	6	Preserve and protect landscape during construction	4
	7	Construction Management Practices	4
	8	Energy efficiency	13
Energy	9	Renewable energy utilization	7
	10	Zero ODP materials	0
	11	Achieving indoor comfort requirements (visual/thermal/acoustic)	6
	12	Maintaining good IAQ	4
Occupant Comfort and Well Being	13	Use of low-VOC paints and other compounds in building interiors	2
	14	Use of low-flow fixtures and systems	4
	15	Reducing landscape water demand	4
	16	Water Quality	2
Water	17	On-site water reuse	5
	18	Rainwater Recharge	2
	19	Utilization of BIS recommended waste materials in building structure	6
	20	Reduction in embodied energy of building structure	4
Sustainable Building Materials	21	Use of low-environmental impact materials in building interiors	4
	22	Avoided post-construction landfill	4
	23	Treat organic waste on site	2
	24	Labour safety and sanitation	1
Solid Waste Management	25	Design for Universal Accessibility	2
	26	Dedicated facilities for service staff	2
	27	Increase in environmental awareness	1
	28	Smart metering and monitoring	8
Socio-Economic Strategies	29	Operation, Maintenance Protocols	0
	30	Performance Assessment for Final Rating	0
	31	Innovation	4
Total			100

New Rating Thresholds	GRIHA Rating
25 – 40	1 star
41 – 55	2 star
56 – 70	3 star
71 – 85	4 star
86 or more	5 star

VARANASI CONVENTION CENTER

Green Building Consultancy – Final GRIHA Assessment Study Report

GRIHA: Project Checklist

Project: VARANASI CONVENTION CENTER

Cr. No.		Criterion name	Max Points	Points Attempted
		Site Planning	8	3
		Site Selection		
1	The site plan must be in conformity with the development plan/master plan/UDPF guidelines (mandatory). This should comply with the provisions of eco-sensitive zone regulations, coastal zone regulations, heritage areas (identified in the master plan or issued separately as specific guidelines), water body zones (in such zones, no construction is permitted in the water-spread and buffer belt of 30 meter minimum around the FTL), various hazard prone area regulations, and others if the site falls under any such area (mandatory with no point allocation).			0
	The project site is a Brownfield site OR a redevelopment project OR there are at least 5 basic services (from the list given in GRIHA) within the campus or within 500m walking distance from main entrance of project.		1	1
	Criterion Total		1	1
		Low-impact design		
2	Reduction in environmental impact through design by adoption of various passive design and low-impact site planning strategies.			
	2 strategies adopted - 1 points		4	1
	Criterion Total		4	1
		Design to mitigate UHIE		
3	The percentage of total site area (visible to sky but not including the landscape area) which is either soft paved AND/OR covered with SRI coating > 0.5 AND/OR shaded by trees/vegetated pergolas/solar panels AND/OR any combination of these strategies		2	1
	More than 25% - 1 point			
	Criterion Total		2	1
		Site imperviousness factor		
4	Net Imperviousness factor of site meets the NBC 2005 norms		1	0
	Criterion Total		1	0
		Construction Management	9	9
		Air and water pollution control		
5	At least 3 measures adopted (from the list given in GRIHA) on site to curb air pollution during construction			0
	Develop and implement a spill prevention plan (to control effects of spill from hazardous materials like bitumen, diesel etc.) on site		1	1
	Criterion Total		1	1



Preserve and protect landscape during construction		
Applicability Check: There are existing mature trees on site that can be preserved	yes	
Applicability Check: Top soil is fertile or can be made fertile through organic means	yes	
All existing mature trees on site are preserved OR transplant mature trees within the site and ensure they survive OR Plant 3 trees for every 1 tree cut of the same native/naturalized species OR any combination of these for all mature trees on site	0	
6		
Increase total number of trees on site by 25% above the pre-construction phase OR Plant 4 trees for every 1 tree cut of the same native/naturalized species	2	2
Preserve top soil during construction, maintain its fertility (during construction phase) and use for landscape post-construction	2	2
Criterion Total	4	4
Construction Management Practices		
Implement staging during construction on site	1	1
Adopt strategies to prevent/reduce movement of soil (not top soil) outside the site through adoption of various strategies (like soil erosion channels, sedimentation control etc.)	1	1
Adopt strategies (at least 3 from the list) to manage construction water	1	1
A construction waste management plan for segregation of construction waste, its safe storage and on-site/off-site recycling is developed and implemented in the project	1	1
Criterion Total	4	4
Energy		7
Energy efficiency		
Applicability Check There are Air Conditioned buildings in the project	yes	
The project meets the mandatory requirements of ECBC & all fans must be BEE star rated	0	
8		
Peak heat gain through building envelope (for each AC building individually) should meet the GRIHA Building Envelope Peak Heat Gain Factor thresholds	2	2
100% of outdoor lighting lamps meet the luminous efficacy requirements of GRIHA	1	1
The project EPI (determined through simulations) is below the GRIHA benchmark	0	
More than 20% reduction - 3 points	10	3
Criterion Total	13	6
9		
Renewable energy utilization		



Would you select Alternative 1 or Alternative 2?

Alternative 1		Alternative 1
Alternative 1: On-site/Off-site renewable energy system installation to offset a part of the annual energy consumption of internal artificial lighting and HVAC systems (Mandatory requirements must be met through On-site renewable energy system)		
Daytime Commercial/Institutional Building	7	
5% (only on site) - 1 points	1	
Alternative 2: Off-site renewable energy system to offset 100% building energy demand		
Criterion Total	7	1
Low ODP materials		
All the insulation used in building should be CFCs and HCFCs free		
All the refrigerant in the HVAC and refrigeration equipment should be CFCs free		0
The fire suppression systems and fire extinguishers installed in the building are free of halon		
Criterion Total	0	

10

Occupant comfort and Well-being

Achieving indoor comfort requirements (visual/thermal/acoustic)		12	10
Comply with either of the two strategies to demonstrate reduction in heat gain through fenestrations and provision of sufficient daylight in indoor living areas			0
Would you select Alternative 1 or Alternative 2?		Alternative 1	

Daylight Alternative 1

The WWR and SRR to not exceed 60% and 5% respectively &; All the fenestrations meet the SHGC requirement of ECBC-2007/Weighted Façade average SHGC meets SHGC requirements of ECBC-2007 OR Alternatively use Tables 9 & 10 of SP 41 to design the shading device for the windows OR Conduct solar path analysis for windows of AC as well as non-AC spaces, to ensure that the window is completely shaded for the duration between 10:00 am on 1st April to 15:00 on 30th September OR Any combination of the above strategies on 100% of the fenestrations		0	2
Minimum of 25% of the living area should meet adequate level of daylight (daylight factors) as prescribed in SP 41		0	
Adequate daylight factors are achieved in more than 50% of total living area		2	
Adequate daylight factors are achieved in more than 75% of total living area		4	
Daylight Alternative 2			

11



12	The mean DA requirements (300 lux or more) are met over the total living area for at least 25% of total annual analysis hours (annual analysis hours – 800 to 1800 each day)	0
	The mean DA requirements (3000 lux or more) are never exceeded over the total living area for across the total annual analysis hours (annual analysis hours – 800 to 1800 each day)	0
	The mean DA requirements (300 lux or more) are met over the total living area for at least 50% of total annual analysis hours (annual analysis hours – 800 to 1800 each day)	0
13	Artificial lighting design to fall within limits (lower and higher range limits) as recommended for space/task specific lighting levels as per NBC and to meet a minimum uniformity ratio of 0.4	0
	The thermal comfort requirements of NBC 2005 OR ASHRAE 55 OR requirements of Indian Adaptive Comfort Model as mentioned in Appendix 1 must be met	0
	The indoor noise levels are within the acceptable limits as specified in NBC 2005 and key noise source on site (like DG sets, chiller plants etc.) should have sufficient acoustic insulation as per NBC 2005 norms	2
	Criterion Total	6
	Maintaining good IAQ	4
14	Applicability Check The project has non - AC spaces/ residential spaces with operable windows	no
	Meet the minimum requirements of	2
	• CPCB National Ambient Air Quality Standard (NAAQS) for quality of fresh air; and	2
	• ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a NBC-2005 for quantity of fresh air	2
	Monitoring the CO ₂ , temperature and RH at the occupied spaces or at AHUs for the air conditioned spaces	2
15	Criterion Total	4
	Use of low-VOC paints and other compounds in building interiors	6
	All interior paints are low-VOC and lead-free	1
	All adhesives and sealants used shall be low-VOC & that interior composite wood-products do not use urea-formaldehyde as a bonding resin	1
	Criterion Total	2
16	Water	15
	Use of low-flow fixtures and systems	6
	Applicability Check All faucets, which are installed in spaces have water head heights greater than 5 m / 17 feet, in a gravity fed systems (without pressure reduction) are exempt from calculations in this criterion	yes
	Reduction in water demand through selection of low-flow fixtures by 30% below the GRIHA base case	0
	Reduction in water demand through selection of low-flow fixtures by 50% below the GRIHA base case	2
17	Reduction in water demand through selection of low-flow fixtures by 70% below the GRIHA base case	4



	Criterion Total		4	2
15	Reducing landscape water demand			
	At least 50% - 4 points		4	4
	Criterion Total		4	4
16	Water Quality			
	Applicability Check			yes
	Total waste water generated on site is more than 10 clad			
	Water used for various purposes like drinking, irrigation etc. shall conform to the BIS standards			0
	The STP & ETP installed on site meets the CPCB norms		2	0
	Criterion Total		2	0
17	On-site water reuse			
	At least 60% - 4 points		5	0
	Criterion Total		5	0
18	Rainwater Recharge			
	Applicability Check			yes
	The CGWB norms suggest that the ground water table is high and ground water recharging should not be done			
	Recharge of surplus rainwater into aquifer (through appropriate filtration measures)		0	0
	Criterion Total		0	0
Sustainable Building Materials				
	Utilization of BIS recommended waste materials in building structure		14	10
19	Utilization of BIS recommended waste materials in building structure			
	Minimum 15% replacement of OPC with fly ash or any BIS recommended waste by weight of cement used in structural concrete		1	
	Minimum than 25% replacement of OPC with fly ash or any BIS recommended waste by weight of cement used in structural concrete		2	2
	Minimum 40% of materials (by volume) in building blocks/bricks should be fly ash or any BIS recommended waste, for 100% load bearing and non-load bearing walls		2	2
	Minimum 15% replacement of OPC with fly ash or any BIS recommended waste in plaster/masonry mortar		1	
	Minimum than 25% replacement of OPC with fly ash or any BIS recommended waste in plaster/masonry mortar		2	2
	Criterion Total		6	6
20	Reduction in embodied energy of building structure			
	Not attempting		4	0
	Criterion Total		4	0
21	Use of low-environmental impact materials in building interiors			
	At least 75% - 4 points		4	4
	Criterion Total		4	4
22	Solid Waste Management		4	4
	Avoided post-construction landfill			

Multi-coloured dustbins/different garbage chutes have been provided to building occupants to ensure segregation of waste at source

Dedicated, segregated and hygienic storage spaces in the project site to store different wastes before treatment /recycling

Contractual tie-ups with waste recyclers for safe recycling for recyclable wastes like metal, paper, plastic, glass etc.

Criterion Total

Treat organic waste on site

Applicability Check

Total waste generation on site is equal to or more than 100 kg/day

23

Strategies to treat all organic (kitchen and landscape) waste on-site and to convert it into a resource (manure, biogas etc.)

Criterion Total

Socio-Economic Strategies

Labour safety and sanitation

Applicability Check

Families are allowed to live and work at construction sites

24

The projects complies with the NBC (2005) safety norms for providing the necessary safety equipment and measures for construction workers

Provisions for drinking water, hygienic working & living conditions and sanitation facilities provided for the workers

Crèche facility for children of construction workers

Criterion Total

Design for Universal Accessibility

25 The project complies with National Building Code norms on Requirements for Planning of Public Buildings Meant for Use of Physically Challenged

Criterion Total

Dedicated facilities for service staff

Dedicated resting rooms for the service staff have been provided in the project

Toilets for the service staff have been provided in the project

Criterion Total

Increase in environmental awareness

Measures adopted to create environmental awareness

Criterion Total

Performance Monitoring & Validation

Smart metering and monitoring

The project complies with Basic metering requirements of GRIHA

The project complies with Extended metering requirements as mentioned in GRIHA

Installation of one-way communicable Smart metering and monitoring system capable of tracking energy and water consumption through a web hosted portal and (also capable of the list mentioned in Appraisal 28.1.3), for at least all meters mentioned in Appraisal 28.1.1 in GRIHA

28

Connect to GRIHA IT platform (linked to smart metering) to allow for two way communication on the list mentioned in Appraisal 28.1.4		3	3
Criterion Total		8	2
Operation & Maintenance Protocols			
29	Provision for a core facility/service group responsible for the O&M of the building's systems after installation as per GRIHA requirements. Inclusion of a specific clause in the contract document of the systems supplier for providing training to the core facility/ service group responsible for the O&M of the building systems after installation, on the operating instructions/dos and don'ts/ maintenance requirements for the specific system, as per GRIHA requirements. Development of a fully documented O&M manual/ CD/ Multimedia /information brochure enlisting the best practices for O&M of the building's systems as per GRIHA requirements	0	0
Criterion Total		0	0
Performance Assessment for Final Rating			
The energy systems, water systems and solid waste management systems of the building are performing as predicted and match the information provided at the time of award of provisional GRIHA rating		0	0
The visual, thermal and acoustic comfort conditions of the building meet the requirements of GRIHA Criterion 11		0	0
30	Any improvement in the following 4 parameters can be attempted by the project, post-GRIHA Provisional Rating, in order to improve its overall GRIHA points tally: • Design to mitigate UHIE – Criterion 3 • Renewable energy installation – Criterion 9 • Noise levels – Criterion 11 • Innovation – Criterion 31	0	0
Criterion Total		0	0
		96	63
Innovation			
31	2 innovation strategies attempted - 2 points	4	2
Criterion Total		4	2
Total		65	
Total (Percentile)		67.7	

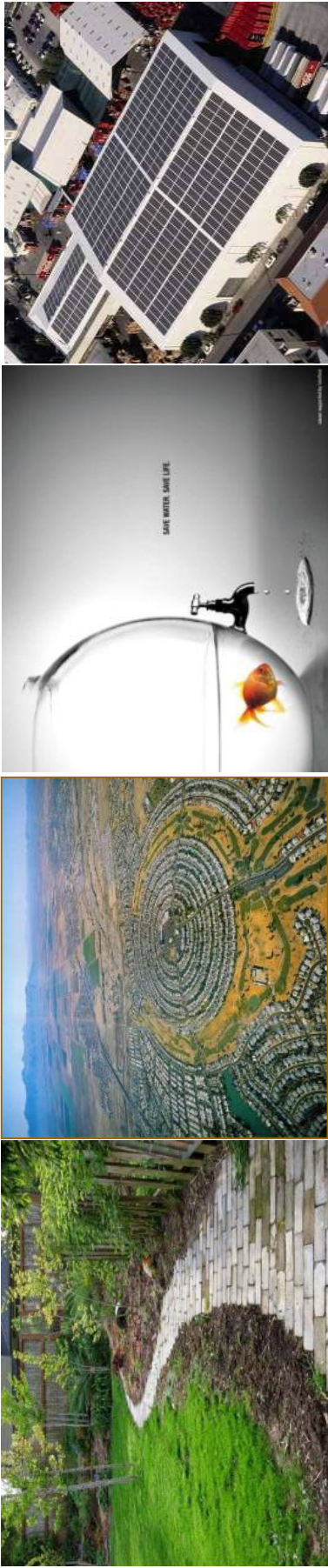


Categories in Detail

GRIHA Rating 2015



(Green Rating for Integrated Habitat Assessment)



Criterion 1: Site Selection

Objective:

Site selection is the first step to a sustainable habitat and needs to be done appropriately. The intent of this criterion is to ensure that the site meets the relevant master plan /local development plans.

Appraisal (maximum points 1)

- 1.1.1: The site plan must be in conformity to the development plan/master plan/UDPIF guidelines (mandatory). This should comply with the provisions of the eco-sensitive zone regulations, coastal zone regulations, heritage areas (identified in the master plan or issued separately as guidelines), water body zones (in such zones, no construction is permitted in the water spread and buffer belt of 30 m minimum around the FTL), various hazard prone area regulations, and others if the site falls under any such area (mandatory with no point allocation).
- 1.1.2: The project site is Brownfield site or a redevelopment project or at least 5 services within the campus or within 500 meter walking distance from main entrance of the project. (1 point) (Services -: Grocery Store, Pharmacy, Bank/ATM, Park, Restaurant, Community Center, Gym, School, Bus Stop)

Compliance:

- 1.2.1: Submit documentation to demonstrate conformity to local development /master plan
- 1.2.2: Submit documentation to demonstrate either:
 - Site was a Brownfield site OR
 - that the project is a redevelopment project OR
 - at least 5 basic service are located within 500 meter walking distance from main entrance of project

Project Specific

Project team will have to provide environment clearance letter from authority and approved building plans for project during final certification.
Since the project is located within the Varanasi city hence all basic amenities will be around site within walking distance. Project team will have to provide actual photographs of all basic amenities. Hence as per above strategy project complies for mandatory and 1 point.

MANDATORY
ANTICIPATED - 1 POINT



Google Image highlighting Basic Amenities

Criterion 2: Low Impact Design

Objective:

The intent of this criterion is to promote design strategies which enable the project to factor in ways in which the natural site features (topographical/microclimatic) can be protected and/or incorporated into the project design.

Appraisal (maximum points 4) :-

- 2.1.1: Demonstrate reduction in environmental impact through design by adoption of various passive design and low-impact site planning strategies.

Number of Strategies adopted	Points
2	1
3	2
4	4

Compliance:

- 2.2.1: Submit analysis to demonstrate compliance with the Low-Impact Design strategies mentioned in the Appraisal 2.1.1
- 2.2.2: Submit drawings to highlight the Low-Impact Design strategies integrated into the building design/site planning
- 2.2.3: Upload photographs, with descriptions, of the measures incorporated

Project Specific

Project team has adopted 3 strategies which demonstrate reduction in environmental impact through design.

Strategies are as follows:-

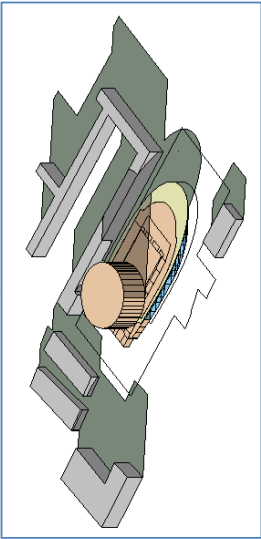
- Annual solar insolation analysis demonstrating that the heat gain in design case is lower than GRIHA base case.
- Sun path analysis highlighting that the building shadow will not impact neighboring building.

Hence as per above strategy project team complies for 2 points only.

ANTICIPATED	- 1 POINT
NOT APPLICABLE	- 3 POINT

Shading Analysis Conclusion:

As per results, the proposed project does not impact the other neighboring towers due to its shadow in the month of March, June, and September . Only in the month of December there will be shadow impact on neighboring building for short time period throughout the day. As per the results in the month of December the shadow on neighboring tower will be at 4:00PM to 5:00PM i.e. for 2 hours there will be shadow effect due to proposed building design. Since the above time slot is not a peak time and will not impact the efficiency of solar hot water system and solar PV system on those towers.



December 22, 1600 Hrs

Heat Gain Analysis Conclusion:

Conclusion:

As per above results the summarized table is mentioned below:-

		Glazing Area (sq ft)			
Proposed Case	North	East	South	West	Total
	0.0	4308.2	2319.8	0.0	6628.0
Baseline	1657.0	1657.0	1657.0	1657.0	6628.0
Total Solar Energy Incident (Btu/hr sqft)					
Proposed Case	North	East	South	West	
	89.5	101.1	307.2	287.2	
Baseline	89.5	323.4	311.1	287.2	
Total Annual Peak Heat gain (Btu/hr sqft)					
Proposed Case	North	East	South	West	
	0	435559.02	712642.56	0	
Baseline	148301.5	535873.8	515492.7	475890.4	
Total Proposed Case Btu/hr					1148201.58
Total Baseline Case Btu/hr					1675558.4
% Reduction of Insolation					31.47%

As per above results the heat gain in proposed design is 31.47% less than baseline building through Window facade. Hence project comply the GRIHA Low Impact design criterion.



Criterion 3: Design to mitigate UHIE

Objective:

The intent of this criterion is to ensure incorporation of site design strategies which assist in reduction of Urban Heat Island Effect (UHIE).

Appraisal (maximum points 2)

- 3.1.1: More than 25% of the site surfaces visible to sky (including building roofs but not the landscape area*) are either soft paved/covered with high SRI coating (SRI > 0.5)/shaded by trees/shaded by vegetated pergolas/shaded by solar panels or any combination of these strategies – (1 point)
- 3.1.2: More than 50% of the site surfaces visible to sky (including building roofs but not the landscape area*) are either soft paved/covered with high SRI coating (SRI > 0.5)/shaded by trees/shaded by vegetated pergolas/shaded by solar panels or any combination of these strategies – (2 points)

Compliance:

- 3.2.1: Submit calculations to demonstrate compliance with Appraisal 3.1.1/3.1.2.
- 3.2.2: Submit site plan, with area statements, highlighting the site surfaces (as mentioned in Appraisal 3.1.1/3.1.2) which are soft paved/covered with high SRI coating/shaded by trees/vegetated pergolas/solar panels.
- 3.2.3: Submit purchase orders for high SRI paints/tiles (if used in the project)
- 3.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team has proposed SOLAR PV system and high SRI roof sheet to reduce the urban heat island effect. Project team has highlight SRI value in technical specs of Sheet Metal Roofing Also project team will proposed open grid pavers on surface parking area.

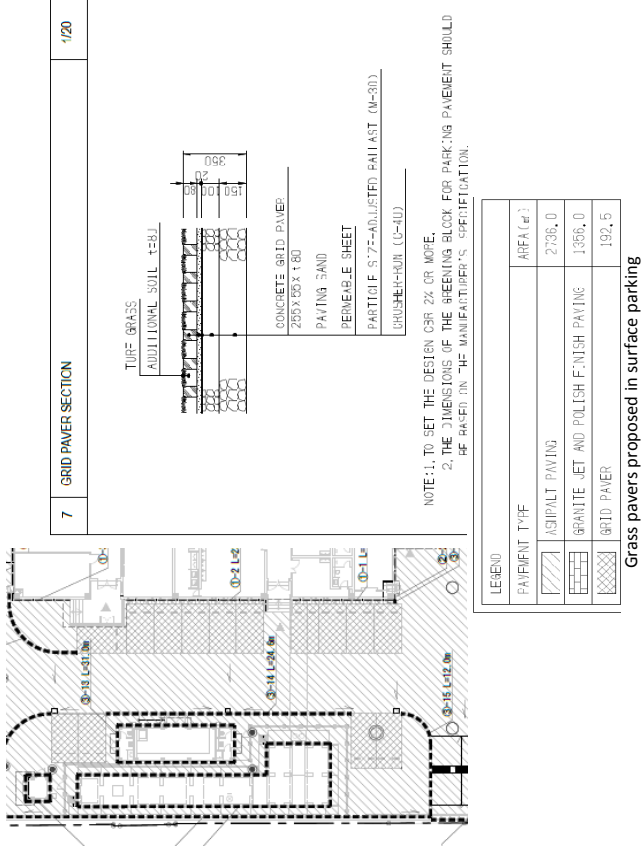
CRITERION 3	
Site area (sq.m.)	13196.4
Landscape area (sq.m.)	2675.8
Net site area	10521
Total area under :	
a. Soft paving (sq.m.)	132.5
b. Paving with vegetated roof / trees / Solar panels (sq.m.)	0
c. Paved area with SRI>0.5 (sq.m.)	0
d. Building roof area under Terrace Garden/High SRI finishes/China Mosaic (sq.m.)	4265.41
Total treated area (sq.m.)	4457.91
Percentage treated area (%)	42.37323418

ANTICIPATED -1 POINT
NOT APPLICABLE -1 POINT

Snap Shot of Tender Documents

2.1 PERFORMANCE REQUIREMENTS	
A.	General Performance: Sheet metal roofing system including, but not limited to, metal roof panels, elets, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, batten, underlayment, and accessories, shall comply with requirements without failure due to defective manufacture, fabrication, or installation, or due to other defects in construction. Sheet metal roofing shall remain watertight.
B.	Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual," British Board of Agreement Certified No 98/3481, or applicable standard of the AHJ.
C.	Energy Performance: Provide sheet metal roofing according to one of the following when tested in accordance with requirements of the AHJ: 1. Three-year, aged, solar reflectance of not less than 0.55 and emissivity of not less than 0.75 2. Three-year, aged, Solar Reflectance Index (SRI) of not less than 68 when calculated according to ASTM E 1980 or applicable standard of the AHJ. a. SRI shall be not less than 78 at time of installation to meet the requirements of GRIHA.

Technical Specs highlighted in Sheet Metal Roofing



Criterion 4: Site Imperviousness Factor

Objective:

High imperviousness on site leads to rapid runoff of rainwater, reduces urban rainwater recharge and contributes to conditions of urban flooding. The intent of this criterion is to ensure implementation of site design measures which assist in reduction of overall site imperviousness factor.

Appraisal (Maximum points 1)

- 4.1.1: Net Imperviousness factor of site meets the NBC 2005 norms & the site is designed such that post-construction storm water discharge from the site is zero* – (1 point)

Compliance:

- 4.2.1: Submit calculations and drawing demonstrating compliance with Net Imperviousness Factor of NBC 2005
- 4.2.2: Submit calculations demonstrating that post construction, the site does not discharge any storm water outside the site
- 4.2.3: Upload photographs, with description, of the measures implemented

Project Specific

As per NBC requirement, project team will have to maintain imperviousness factor of site below than 70%. Project team will have to reduce hard paved area.

Type of area	Imperviousness factor (percent)
Commercial and industrial areas	70-90
Residential areas (high density)	60-75
Residential areas (low density)	35-60
Parks and underdeveloped areas	10-20

As per attached calculation, the net imperviousness factor is 75.

Hence project does not complies credit requirement

NOT APPLICABLE - 1 POINT

CRITERION 4				
Total site area (sq.m.)	13196.4			
Runoff Coefficients for various surfaces				
Surface type	Run-off Co-efficient	Surface Area (sq.m)	Effective Impervious Area	
Roof				
Roofs conventional	0.95	4,265.41	4052.1395	
Roof garden < 100 mm thick	0.5	0	0	0
Roof garden 100 - 200 mm thick	0.3	0	0	0
Roof garden 200 - 500 mm thick	0.2	0	0	0
Roof garden > 500 mm thick	0.1	0	0	0
Impervious Paving on site				
Concrete/ Asphalt/ Kota Paving	0.95	5,521.40	5245.33	
Gravel (Open Grid Pavers)	0.5	192.5	96.25	
Brick Paving	0.85	0	0	0
Vegetation				
Slope 0-1%	0.1	0	0	0
Slope 1% to 3%	0.2	2676	535.164	
Slope 3% to 10%	0.25	0	0	0
Slope > 10%	0.3	0	0	0
Turf slopes				
0% to 1%	0.25	0	0	0
1% to 3%	0.35	0	0	0
3% to 10%	0.4	0	0	0
>10%	0.45	0	0	0
Total Impervious Effective Area (sq.m.)		12655.13	9928.8835	
Net Impervious Factor (%)				75

Criterion 5: Air and water pollution control

Objective:

The intent of this criterion is to minimize air and water pollution during construction on site.

Appraisal (maximum points – 1)

- 5.1.1: Adopt at least 3 measures (from the list given with first being mandatory) on site to curb air pollution during construction – (Mandatory)
 - Provision of 3 meter high barricading around the construction area - Mandatory
 - Wheel washing facility at the vehicular entrance of the site
 - Covering of fine aggregate and excavated earth on site with plastic/geo-textile sheets
 - Water sprinkling on fine aggregate (sand) and excavated earth
 - All diesel gensets on site to have proper chimneys with their outlet facing away from the site

- 5.1.2: Develop and implement a spill prevention plan (to control effects of spill from hazardous materials like bitumen, diesel etc.) on site – (1 point)

Compliance:

- 5.2.1: Submit relevant sections of tender document showing that air pollution prevention measures are required to be implemented by the contractor during construction on site.
- 5.2.2: Submit narrative describing the spill prevention plan, with description of spill control measures, adopted on site
- 5.2.3: Upload photographs, with description, of the measures implemented

Project Specific

Project team will be adopting listed below measures on site to curb air pollution during construction.

1. Provision of 3 meter high barricading around the construction area - Mandatory
2. Covering of fine aggregate and excavated earth on site with plastic/geo-textile sheets
3. Water sprinkling on fine aggregate (sand) and excavated earth

Project team will also have to provide separate room for hazardous material storage to prevent spillage.

Sample Photographs



Barricading Site Boundary



Water Sprinkling & Chimneys of DG



Storage of Hazardous Waste

MANDATORY
ANTICIPATED - 1 POINT



Criterion 6: Preserve and protect landscape during construction

Objective:

The intent of this criterion is to ensure preservation of mature trees and fertile top soil on site, thereby minimizing the impact of construction activities on existing landscape.

Non-applicability :

- If there are no mature trees on site, then project is exempt from 6.1.1 & 6.1.2
- If the top soil is not fertile & can't be made fertile through organic means, then project is exempt from 6.1.3

Appraisals (Maximum points 4):

- 6.1.1: Ensure that no existing mature tree is cut on site OR transplant mature trees within the site and ensure they survive OR Plant 3 trees for every 1 tree cut of the same native/naturalized species OR any combination of these for all mature trees on site – (Mandatory)
- 6.1.2: Increase total number of trees on site by 25% above the pre-construction phase OR Plant 4 trees for every 1 tree cut of the same native/naturalized species – (2 points)
- 6.1.3: Preserve top soil during construction, maintain its fertility (during construction phase) and use for landscape post-construction – (2 points)

Compliance:

- 6.2.1: Submit site plan (drawing) of existing landscape plan highlighting (in different colour coding/layer) the following:
 - Existing trees which have been protected and preserved, along with table listing their species
 - Existing trees which have been transplanted
 - Existing trees which have been removed
 - Area from where top soil has been removed
 - Location on site (or off-site) where top soil will be preserved
- 6.2.2: Submit CAD drawing of proposed landscape plan highlighting (in different colour coding/layer) the following:
 - Replantation of new trees in the ratio of 1:3 for each tree which has been cut, with the details about the species that have been planted

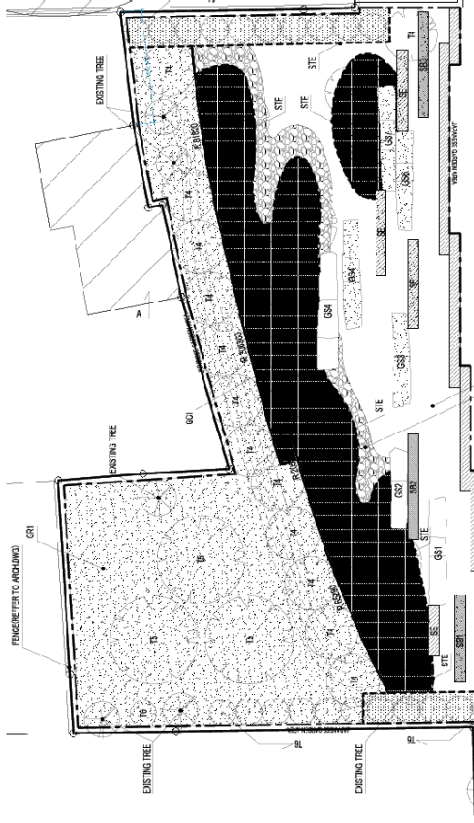
- Replantation of tree done in excess of 25% than the minimum requirement, with the details of the species that existed
- Landscape area where top soil has been reapplied
- 6.2.3: Submit soil fertility test reports of site's top soil from an ICAR (Indian Council of Agricultural Research)-accredited laboratory
- 6.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team has proposed 63 number of new trees which will be planted on site and 7 trees will be retain on site.

As per proposed number of trees we can only cut 21 number of trees. Project team has to provide the list of trees which will be cut and also the approval copy from authority.

Snap Shot of Landscape Plan



KEY	COMMON NAME	BOTANICAL NAME	HIGHT	QTY
T1	BOTTLEBRUSH	CALLISTEMON LANCEOLATUS	4.0 m	2
T2	TEMPLE TREE	PLUMERIA	3.0 m	2
T3	GUAVA	PSIDIUM GLAJAVIA	6.0 m	1
T4	CHAMPANA	MICHELIA CHAMPANA	6.0 m	17
T5	JACARANDA	JACARANDA MINUSFOLIA	8.0 m	3
T6	ASHOKA	POLYALTHIA LONGIFOLIA	3.0 m	38

Proposed trees in tender docs

ANTICIPATED - 2 POINT



Criterion 7: Construction Management Practices

Objective:

The intent of this criterion is to ensure adoption of good construction management practices on site.

Appraisal (Maximum points 4)

- 7.1.1: Adopt staging during construction on site – (1 point)
- 7.1.2: Adopt strategies to prevent/reduce movement of soil (not top soil) outside the site through adoption of various strategies (like soil erosion channels, sedimentation control etc.) – (1 point)
- 7.1.3: Adopt strategies (at least 3 from the list below) to manage water during construction – (1 point)
 - Using gunny bags for curing and using ponding for curing
 - Monitoring to avoid leaks and water wastage
 - Use of additives to reduce water requirements during curing
 - Use of treated waste water/captured storm water
- 7.1.4: A construction waste management plan for segregation of construction waste, its safe storage and on-site/off-site recycling is developed and implemented in the project – (1 point)

Compliance:

- 7.2.1: Submit narrative detailing the following practices on site:
 - staging practices adopted during construction
 - strategies implemented to reduce soil erosion from site
 - strategies adopted to reduce potable water during construction
- 7.2.2: Submit a site plan (drawing) highlighting the following:
 - Site boundary, proposed building footprint and staging boundary on site
 - Location of measures to block soil erosion from site
 - Construction waste storage locations (primary and secondary)
- 7.2.3: Submit narrative highlighting the quantum of waste generated during construction, storage facilities for inert and hazardous wastes and measures employed for its safe disposal/recycling
- 7.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team will have to adopt listed below strategies to manage water during construction.

- Using gunny bags for curing and using ponding for curing
 - Monitoring to avoid leaks and water wastage
 - Use of additives to reduce water requirements during curing
- Also project team make temporary sedimentation pit at lowest contour point to reduce movement of soil. Project team will have to provide waste collection area on site for construction waste such as steel scrap, cement bags, debris and plastic. Hence project team complies for 4 points.

Sample Photographs



Use of Gunny bags for curing during construction



Temporary Sedimentation Pit



Steel Scrap Yard



Empty Cement Bags Yard

ANTICIPATED - 4 POINT

Criterion 8: Energy efficiency

Objective:

The intent of this criterion is to ensure the energy efficiency of the project.

Appraisal (Maximum points 13)

- 8.1.1: Ensure that the project meets the mandatory requirements of ECBC* & all fans must be BEE star rated - **(Mandatory)**
- 8.1.2: Peak heat gain through building envelope (for each AC building individually) should meet the GRIHA Building Envelope Peak Heat Gain Factor thresholds – **(2 points)**

GRIHA Thresholds for Building Envelope Peak Heat Gain Factor (W/sqm)

Climate	Threshold
Composite/Hot & Dry	40
Warm and Humid	35
Moderate	30

- 8.1.3: Demonstrate that 100% of outdoor lighting fixtures (lamps + lamp housing) meet the luminous efficacy requirements of GRIHA – **(1 point)**
All lamps + lamp housing must demonstrate luminous efficacy of at least 75 lumens/watt.
- 8.1.4: Demonstrate (through simulations) that project EPI is below GRIHA benchmark# - **(Mandatory)**
- 8.1.5: Additional reduction in EPI will be awarded points as mentioned below:

Reduction from EPI Benchmark	Points
10%	2
20%	3
30%	5
40%	7
50%	10

Compliance:

- 8.2.1: Submit documentation (narrative, specification sheets, purchase orders – reflecting full quantities) demonstrating compliance with all mandatory requirements of ECBC
- 8.2.2: Submit specification sheets and purchase orders to demonstrate that all fans being installed in the project at BEE star rated
- 8.2.3: Submit analysis demonstrating that the project complies with the GRIHA Building Envelope Peak Heat Gain Factor thresholds
- 8.2.4: Provide documentation (specification sheets & purchase orders) to demonstrate that all outdoor lamps meet the luminous efficacy levels of 75 lumens/watts
- 8.2.5: Submit narrative and drawings highlighting the various Energy Conservation Measures incorporated in the project
- 8.2.6: Provide simulation reports (along with I/O file) to demonstrate annual energy consumption and reduction vis-a-vis the GRIHA Benchmarks
- 8.2.7: Upload photographs, with description, of the measures implemented

Project Specific

8.1.1 & 8.1.3 Project team has confirmed that listed below ECBC mandatory requirement will be comply. Project team will follow ECBC 2017 to comply only ECBC requirement.

- All ceiling fans will be atleast 3 star rated
- Outdoor lighting system efficiency
 - 100% of outdoor lighting fixtures (lamps + lamp housing) meet the luminous efficacy requirements of GRIHA i.e. at least 80 lumens/watt.
 - Facade lighting and facade non-emergency signage of Shopping Complexes shall have separate time switches.

Table 6-7 Exterior Building Lighting Power for ECBC Buildings

Exterior lighting application	Power limits
Building entrance (with canopy)	10 W/m ² of canopied area
Building entrance (w/o canopy)	90 W/ linear m of door width
Building exit	60 W/lin m of door width
Building façade	5.0 W/m ² of vertical façade area
Emergency signs, ATM kiosks, Security areas façade	1.0 W/m ²
Driveways and parking (open/ external)	1.6 W/m ²
Pedestrian walkways	2.0 W/m ²
Stairways	10.0 W/m ²
Landscaping	0.5 W/m ²
Outdoor sales area	9.0 W/m ²

c. Indoor lighting system:-

- Over-design of artificial lighting system shall be avoided and the lighting levels in indoor spaces shall be maintained 30% less than LPD value as mentioned in ECBC norms:

Category	LPD (W/m ²)	Lamp category	LPD (W/m ²)
Hospitality			
Hotel Dining	9.10	Hotel Lobby	10.9
For Bar Lounge/ Dining	14.1	Motel Dining	9.10
For food preparation	12.1	Motel Guest Rooms	7.70
Hotel Guest Rooms	9.10		
Shopping Complex			
Mall Concourse	12.8	For Family Dining	10.9
Sales Area	18.3	For food preparation	12.1
Motion Picture Theatre	9.60	Bar Lounge/ Dining	14.1
Educational			
Classroom/Lecture	13.7	Card File and Cataloguing	9.10
For Classrooms	13.8	Stacks (JIP)	18.3
Laboratory	15.1	Reading Area (Library)	10.0
Assembly			
Dressing Room	9.10	Seating Area - Performing Arts Theatre	22.6
Exhibit Space - Convention Centre	44.0	Lobby - Performing Arts Theatre	21.5
Seating Area - Gymnasium	4.60	Seating Area - Convention Centre	6.40
Fitness Area - Gymnasium	13.70	Seating Religious Building	16.4
Museum - General Exhibition	16.40	Playing Area - Gymnasium	18.8
Museum - Restoration	18.3		

Table 6-4 Interior Lighting Power for ECBC Buildings - Space Evaluation Method

Category	LPD (W/m ²)	Lamp category	LPD (W/m ²)
Common Space Types			
Restroom	7.70	Trainway	5.50
Storage	6.30	Corridor/Transition	7.10
Conferences/ Meeting	14.5	Lobby	9.10
Parking Bays (covered/ basement)	2.20	Parking Driveway (covered/ basement)	3.00
Electrical/Mechanical	7.10	Workshop	17.1
Business			
Enclosed	10.0	Open Plan	10.0
Banking Activity Area	12.6	Service/Repair	6.80
Healthcare			
Emergency	22.8	Recovery	8.60
Exam/Treatment	13.7	Storage	5.50
Nurses' Station	9.40	Laundry/Washing	7.50
Operating Room	71.8	Lounge/Recreation	8.00
Patient Room	7.70	Medical Supply	13.7
Pharmacy	10.7	Nursery	5.70
Physical Therapy	9.70	Corridor/Transition	9.10
Radiology/Imaging	9.10		

- Lux Levels: Artificial lighting design to fall within limits (lower and higher range limits) as recommended space/task specific lighting levels as per NBC** and to meet a minimum uniformity ratio of 0.4

d. Lighting Control

Interior Lighting:

- Interior lighting in buildings > 500 m² (5000ft²) shall be equipped with an automatic control device. Inside the building, office spaces < 30 m² (300 ft²) shall be equipped with occupancy sensors.
- For other spaces, this automatic control shall function on a schedule- A schedule is provided for areas not more than 2500 m² and not more than one floor. Occupancy sensors that shall turn off the lights within 30 min. of occupant leaving the space.
- Luminaries located in day lighted area > 25 m²(250ft²) shall be equipped with a control device that is capable of reducing the light output of the luminaries in the day lighted areas by at least 50%. Controls only the luminaries which are located entirely in day lighted areas.

Exterior Lighting Switch:

- Lighting for all exterior applications shall be controlled by a photo sensor or astronomical time switch

Exit Signs:

- Exit signs shall not exceed 5W per face

e. Transformers

- The power transformer selected shall satisfy the minimum acceptable efficiency at 50% and 100% load . Permissible total loss values shall not exceed
 - 5% of the maximum total loss values mentioned in IS 1180 for oil type transformers in voltage class above 11 kV but not more than 22 kV
 - 7.5% of the maximum total loss values mentioned in above IS 1180 for oil type transformers in voltage class above 22 kV and up to and including 33 kV
- Transformer losses shall be measured by using calibrated digital meters of class 0.5 or better. For transformers of capacity ≥ 500kVA shall be equipped with additional current transformers(CTs) and potential transformers(PTs) for loss monitoring
- All electricity supplies exceeding 100A, 3 phases shall maintain their power factor between 0.95 lag and unity at point of connection

f. Energy efficient motors

- All poly phase motors of (capacity >0.375 kW and operating hours >1500 hours/year) and (capacity >50kW and operating hours >500 hours/day) shall follow minimum efficiency level as per IS 12615 for energy efficient motors and shall have motors of IE 2 (high efficiency) class or a higher class
- Motor horsepower rating shall not exceed 20% of the calculated maximum load being served.
- Motor nameplate shall list nominal full load efficiencies and full load power factor.

g. Diesel Generator (DG) Sets

BEE star rated DG sets shall be used in all compliant buildings.

(a) minimum 3 stars rating in ECBC Buildings

h. Uninterruptible Power Supply (UPS)

In all buildings, UPS shall meet or exceed the energy efficiency requirements listed in Table 7-4. Any Standards and Labeling program by BEE shall take precedence over requirements listed in this section.

Table 7-4 Energy Efficiency Requirements for UPS for ECBC, ECBC+, SuperECBC building

UPS Size	Energy Efficiency Requirements at 100% Load
kVA < 20	90.2%
20 ≤ kVA ≤ 100	91.9%
kVA > 100	93.8%

i. Unitary air-conditioners, split air conditioners shall meet table 5.3

Table 5-3 Minimum Requirements for Unitary, Split, Packaged Air Conditioners in ECBC Building

Cooling Capacity (kW)	Water Cooled	Air Cooled
≤ 10.5	NA	BEE 3 Star
> 10.5	3.3 EER	2.8 EE

j. Variable Refrigerant Flow (VRF) systems shall meet or exceed the efficiency requirements specified in Table 5-6 as per the ANSI/AHRI Standard 1230 while the Indian Standard on VRF is being developed. BEE Standards and Labeling requirements for VRF shall take precedence over the current minimum requirement.

Table 5-5 Minimum Efficiency Requirements for VRF Air conditioners for ECBC Building*

Type	Size category (kW)	For Heating or cooling or both EER	IEER
VRF Air Conditioners, Air cooled	< 40	3.28	4.36
	≥ 40 and < 70	3.26	4.34
	≥ 70	3.02	4.07

* The revised EER and IEER values as per Indian Standard for VRF corresponding to values in this table will supersede as and when the revised standards are published.

k. Piping & Duct Work:

Piping for heating system shall have minimum R-4 insulation for design operating temperature ≥ 60C, and minimum R-2 insulation for design operating temperature < 40C and < 60 C.

Piping for cooling system with design operating temperature < 15C, and refrigerant suction piping for split system shall have minimum R-2 insulation. The insulation exposed shall be protected by aluminium sheet metal, painted canvas, or plastic cover

Insulation of ductwork shall be in accordance with ECBC Table 5.11

Table 5-11 Ductwork Insulation (R value in m² .K/W) Requirements

Duct Location	Supply ducts	Return ducts
Exterior	R-1.4	R-0.6
Unconditioned Space	R-0.5	None
Buried	R-0.5	None

l. System Balancing:

HVAC System Balancing with report serving zones for air-conditioned area exceeding 500 m²

Air System Balancing to minimize throttling losses and adjust fan speed to meet design flow conditions (for fan system with capacity > 0.75 kW (1 hp)).

Hydronic System Balancing to minimize throttling losses and adjust pump speed or trim pump impeller to meet the design flow conditions

l. AHU: All AHU motors should have minimum efficiency as mentioned below:-

Table 5-12 Mechanical and Motor Efficiency Requirements for Fans in ECBC Buildings

System type	Fan Type	Mechanical Efficiency	Motor Efficiency (As per IS 12615)
Air-handling unit	Supply, return and exhaust	60%	IE 2

m. Pumps:

Chilled and condenser water pumps shall meet or exceed the minimum energy efficiency requirements specified in Table 5-15 through Table 5-17. Requirements for pumps in district chiller systems and hot water pumps for space heating are limited to the installed efficiency requirement of individual pump equipment only. To show compliance, calculate the total installed pump capacity in kilo watt and achieve the prescribed limits per kilo watt of refrigeration installed in the building.

Table 5-15 Pump Efficiency Requirements for ECBC Building

Equipment	ECBC
Chilled Water Pump (Primary and Secondary)	18.2 W/ kW, with VFD on secondary pump
Condenser Water Pump	17.7 W/ kW,
Pump Efficiency (minimum)	70%



Snap Shot of Tender Documents

1. Project team has included the ECBC requirement of transformers in tenders

Maximum Allowable Power Transformer Losses			
Maximum allowable losses for oil filled hermetically sealed distribution transformers with highest voltage for equipment 36 KV, at 50% and 100% of the load (as per ECBC).			
TRANSFORMER CAPACITY KVA	MAXIMUM ALLOWABLE LOSSES (KW) AT 50% KVA OR LOAD (%)	MAXIMUM ALLOWABLE LOSSES (KW) AT FULL LOAD / RATED KVA (%)	
1000	3.00	9.00	

Transformer losses mentioned in tender specs

2. Project team has included the ECBC requirement of pump efficiency in tenders

PW	01	Major lift pump	50 x 40	φ	x	200	L/min	x	60 m/sq	(Stainless steel)
	02		Type	Centrifugal						
			Accessories	Rubber vibration isolation base						
			Efficiency	more than 70%						
PW	01	Domestic water pump unit	50	φ	x	200	L/min	x	60 m/sq	x 2 (Stainless steel)
			Type	booster pump unit						
			Accessories	Rubber vibration isolation base						
			Control panel with inverter							
			Pressure gauge							
			Pressure tank							
			Alternate operating system for two pumps							
			Efficiency	more than 70%						
F1	01	Domestic water filter unit	100	L/min	Stainless casing					
			80 filter							
PW	01	Irrigation water pump unit	50	φ	x	200	L/min	x	40 m/sq	x 2 (Stainless steel)
			Type	booster pump unit						
			Accessories	Rubber vibration isolation base						
			Control panel with inverter							
			Pressure gauge							
			Pressure tank							
			Alternate operating system for two pumps							

Pumps efficiency mentioned in tender specs

3. Project team has included the ECBC requirement of air cooled chiller efficiency in tenders

Specification	
Type	Air cooled screw chiller
Cooling capacity	104 TR 365 kW
Heating capacity	- TR - kW
Chilled water	1,134 L/min 12-7 degree
COP	3 3.7 (ENEC 2017 Table 5-2)
Refrigerant	R134a
Accessories	Control panel
	Spring vibration isolation base

Chiller COP mentioned in tender specs

Snap Shot of Tender Documents

4. Project team has included the ECBC requirement of AHU motor efficiency in tenders

Air handling unit	Type	FAHU	Outdoor water proof
	AHU	Indoor floor mounted	
	Insulation	Sandwich panel with SUS bolts	
	Fan	Centrifugal fan or Plug fan	
	Vibration	Spring vibration isolation base	
	Motor	4 pole, High efficiency (IE2)	
	Filter	Pre MERV 7	
		Main MERV 13	
	Chilled water	7-12 degree	
	Accessories	Marine pump	
		Maintenance hatch, 100% Spare filter	

AHU motor efficiency mentioned in tender specs

5. Project team has included the ECBC requirement of VRV and Split units efficiency in tenders

Air cooled DX unit	1. Air condition: Outdoor DB 23 degree, Indoor DB 24 degree.
	2. Indoor unit is concealed type or Wall mounted type
	3. Specification of cabling, refrigerant pipe, and heat insulation is manufacture standard.
	4. Power supply to unit is Electrical work.
	5. Control wiring between unit and controller is included.
	6. Out door unit noise level is less than 65dB(A)
	7. Indoor unit air flow is strong north and ESP is external static pressure.
	8. Filter is more than MERV 8.
	9. Vibration: Spring vibration isolation for outdoor unit and Spring banger for indoor unit.
	10. Accessories: Remote control switch, Drain up system, 100% spare filter, air chamber for concealed indoor unit and standard accessories.
	11. Operation condition should be kept during power cut and recovery.
	12. AUL/DOL should be installed for inverter n outdoor unit.
	13. High water level alarm function should be installed in indoor drain pan with float switch.
	14. Drain leak sensor should be installed in indoor unit..
	15. Drain pan and filter has antibacterial specification.
	16. Connector point to BMS for operation, alarm and condition.
	17. Concrete base is building work for VRV outdoor unit. Split system outdoor unit include concrete base.
	18. COP: VRV > BEER 3.28, Split type > BEER 3 star

Air Cooled DX unit Efficiency mentioned in tender specs

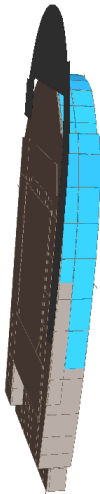


8.1.2 & 8.1.4

Energy Conservation Features:

Following are the Energy Conservation measures which were proposed for the preliminary analysis:

- 1. AAC blocks with insulation for external wall
- 2. PUF insulation on roof
- 3. Better thermal properties of Glass SHGC - 0.27
- 4. Better orientation to reduce thermal heat gain
- 5. Low Window Wall ratio to reduce heat gain
- 6. Optimize design of interior Lighting layout with 0.9 LPD (W/sqft)
- 7. AHU with VSD and two way valve
- 8. Primary & Secondary pumping with VFD
- 9. Air cooled screw chiller with COP 3.1 at ARI condition
- 10. VRV system for office and supporting zone having 4 COP.



3D-Views

CRITERION 8			
Climate			Composite
Total Envelope Area (sq meter)			2,481.2
Sensible Heat Gain			
Wall Conduction (Watt)			16228
Roof Conduction (Watt)			11902
Window Glass+Frame Conduction (Watt)			32610
Window Glass Solar			9534
Total Sensible Heat Gain From Envelope (watt)			70274
Watt /sqm			28.32228032

	SENSIBLE (KBTU/H) (KW)	LATENT (KBTU/H) (KW)
WALL CONDUCTION	55.386	16.228
ROOF CONDUCTION	40.623	11.902
WINDOW GLASS+FRM COND	111.297	32.610
WINDOW GLASS SOLAR	32.541	9.534
DOOR CONDUCTION	0.000	0.000
INTERNAL SURFACE COND	0.000	0.000
UNDERGROUND SURF COND	6.686	1.959
OCCUPANTS TO SPACE	374.451	109.714
LIGHT TO SPACE	86.789	25.429
EQUIPMENT TO SPACE	386.910	113.365
PROCESS TO SPACE	0.000	0.000
INFILTRATION	0.000	0.000
TOTAL	1094.682	320.742
TOTAL / AREA	0.018	0.056



Annual Energy Consumption

The following tabulated values determine the annual energy consumption of the building.

kWh X 1000	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	12.94	15.68	19.45	27.46	33.82	38.37	32.89	32.69	31.1	26.65	19.47	15.76	306.27
Vent. Fans	3.3	3.35	3.69	4.4	4.83	5.31	4.56	4.52	4.37	4.29	3.84	3.36	49.84
Pumps & Aux.	0.57	0.49	0.56	0.83	1.19	1.27	1.3	1.3	1.27	0.99	0.54	0.5	10.81
Area Lights	7.35	7.35	7.35	7.35	7.35	7.35	7.35	7.35	7.35	7.35	7.35	7.35	88.22
Total	24.16	26.87	31.05	40.04	47.19	52.3	46.1	45.86	44.09	39.28	31.2	26.97	455.14

Note -: We have assume Building is operating for 13 hours & 5 days a Week. Also project team has removed equipment consumption to determine EPI of building as GRIHA guidelines

Description	Units	Values
Benchmark EPI = (90 * (13/8))	kWh/Sqm/year	146
Total Area	Sq meter	4,000
Total Annual kWh Consumption	kWh/year	455,140
Project Benchmark EPI	kWh/Sqm/year	113.8
% Reduction	%	22.2%
Total Points	points	3

ANTICIPATED - 06 POINT
NOT APPLICABLE - 07 POINT

Criterion 9: Renewable energy utilization

Objective:

To optimize use of energy systems in buildings that maintain a specified indoor climate conducive to the functional requirements of the building.

Appraisal (maximum points – 7 points)

- 9.1.1: On-site/Off-site renewable energy system installation to offset a part of the annual energy consumption of internal artificial lighting and HVAC systems as mentioned in the table below:

Daytime Commercial/ Institutional Buildings	Residential Buildings	24 X 7 occupied buildings	Points
2.5% (Only Site)	-	0.5% (Only Site)	Mandatory
5%	5%	1%	1
10%	10%	3%	2
15%	15%	5%	4
20%	20%	7%	5
25%	25%	10%	7

OR

- 9.1.2: Off-site renewable energy system to offset 100% building energy demand (this appraisal is available for only non-residential buildings) – **Mandatory +7 points**

Compliance:

- 9.2.1: Submit calculations/simulations for renewable energy system sizing & on-site annual energy generation potential
- 9.2.2: Submit specification sheets and purchase orders (reflecting full quantities) of the renewable energy system, highlighting the panel performance (as tested under standard test conditions)
- 9.2.3: Submit drawings in CAD format to show location of renewable energy systems
- 9.2.4: Submit documents supporting off-site generation of energy through renewable energy systems. These may be either: Renewable Energy Certificates (RECs) for at least 2 years along with a declaration that the RECs are not being used for any other obligatory requirements and will be purchased every year OR Power Purchase Agreement from the utility for purchase of green power. In the agreement, the address of the particular site must be mentioned
- 9.2.5: Upload photographs, with description, of the measures implemented



Project Specific

Project team has proposed 100 KW Solar PV system which will comply GRIHA requirement.

The Project for Construction of the International Cooperation and Convention Center in Varanasi	
c.	AC short circuit protection
d.	Leakage current protection
e.	DC switch
f.	DC fuse
g.	Overvoltage protection
F.	Disconnects: Rated for system voltage and conductor.
G.	System Overcurrent Protection: Circuit breakers.
H.	Electrical characteristics
1.	Solar Power Module (Wp) 325 Wp
2.	Rated Open-Circuit Voltage: < 69.6 Vdc>
3.	Maximum Power at STC (Pmax): < 100 kilo watts>
1.4	FRAMING
A.	Finish: Anodized aluminum.

Solar PV Technical Specs

Hence project team complies mandatory requirement.

MANDATORY
ANTICIPATED - 05 POINT
NOT APPLICABLE - 02 POINT

Criterion 10: Low ODP materials

- Objective:
The intent of this criterion is to ensure use of materials in building insulation, HVAC & refrigeration equipment and fire fighting systems with low ozone depleting potential.
- Appraisal (maximum points – No points)
- 10.1.1 All the insulation used in building should be CFCs and HCFCs free –(Mandatory)
 - 10.1.2 All the refrigerant in the HVAC and refrigeration equipment should be CFCs free – (Mandatory)
 - 10.1.3 The fire suppression systems and fire extinguishers installed in the building are free of halon – (Mandatory)

- Compliance:
- 10.2.1: Submit specification sheets & purchase orders (reflecting full quantities) highlighting that the insulation, HVAC system, refrigeration equipment and fire fighting systems comply with Appraisal 10.1.1
- Project Specific
- Project team has proposed clean agent fire extinguisher system in technical specification. In all chillers HFC based refrigerant will be used and in VRV and Split units CFC free refrigerant will be used.
- All insulation proposed in project are CFC and HCFC free

MANDATORY

Snap Shot of Provision in Technical Docs

1.3

CLEAN AGENT SYSTEMS

A.

Performance Requirements:

1.

Discharge HFC 22/70a within 10 seconds and maintain 7.1 percent concentration. Minimum 620-psig (4278-kPa) calculated working pressure and 360-psig (2484-kPa) initial charging pressure.

2.

Discharge FK-5-1-12 within 10 seconds and maintain 6.6 percent concentration. Minimum 620-psig (4278-kPa) calculated working pressure and 360-psig (2484-kPa) initial charging pressure.

3.

Discharge IG-541 within 60 seconds and maintain 38 percent concentration. Minimum 2175-psig (15-MPa) calculated working pressure upstream from orifice union, minimum 1000-psig (6895-kPa) calculated working pressure downstream from orifice union, and 2175-psig (15-MPa) initial charging pressure.

Clean Agent First Extinguisher Technical Specs

Equipment name	Specification			
Air cooled chiller	Type	Air cooled screw chiller		
	Cooling capacity	104 TR	386 kW	Outdoor temperature 43 degree
	Heating capacity	- TR	- kW	
	Chilled water	1,134 L/min	12-7 degree	Pressure drop 27.2 kPa
	COP	3	3.7 (E680 2017 Table 5-2)	
	Refrigerant	R134a		
	Accessories	Control panel		
		Spring vibration isolation base		

Air Cooled Chiller Technical Specs



Criterion 11: Achieving indoor comfort requirements (visual/thermal/acoustic)

Objective:

The intent of this criterion is to ensure that the building spaces are designed to deliver visual, thermal and acoustical comfort to building occupants.

Appraisal (maximum points – 6 points)

- 11.1.1: Demonstrate compliance with either of the alternatives mentioned – (Partly Mandatory)

Alternative 1	Alternative 2
The WWR and SRR to not exceed 60% & 5% respectively &; All the fenestrations meet the SHGC requirement of ECBC-2007/Weighted Façade average SHGC (for each orientation) meets SHGC requirements of ECBC-2007 OR; Alternatively use Tables 9 & 10 of SP 41 to design the shading device for the windows. OR; Conduct solar path analysis for windows of AC as well as non-AC spaces, to ensure that the window is completely shaded for the duration between 10:00 am on 1st April to 15:00 on 30th September OR; Any combination of the above strategies on 100% of the fenestrations – Mandatory	Demonstrate that the mean DA requirements (300* lux or more) are met over the total living area for at least 25% of total annual analysis hours (area-weighted) – Mandatory Demonstrate that the mean DA requirements (3000 lux or more) are never exceeded over the total living area for across the total annual analysis hours – Mandatory
Minimum of 25% of the living area should meet adequate level of daylight (daylight factors) as prescribed in SP 41 – Mandatory	Demonstrate that the mean DA requirements (300* lux or more) are met over the total living area for at least 50%/75% of total annual analysis hours (area-weighted) – 2/4 points annual analysis hours – 800 to 1800 each day
If the adequate daylight factors are achieved in more than 50%/75% of total living area - 2 /4 points	

- 11.1.2: Artificial lighting design to fall within limits (lower and higher range limits) as recommended space/task specific lighting levels as per NBC** and to meet a minimum uniformity ratio of 0.4 – Mandatory

- 11.1.3: Demonstrate that project can achieve the thermal comfort requirements# of NBC 2005 OR ASHRAE 55 OR requirement of Indian Adaptive Comfort Model as mentioned in Appendix 1 – (Mandatory)
- 11.1.4: The indoor noise levels should be within the acceptable limits as specified in NBC 2005 and key noise source on site (like DG sets, chiller plants etc.) should have sufficient acoustic insulation as per NBC 2005 norms - (2 points)

Compliance:

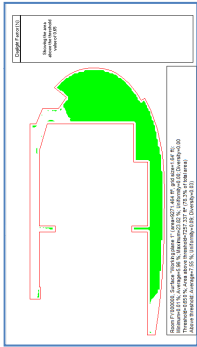
- 11.2.1: Submit drawings (floor plans, relevant elevations and sections and doors-windows schedule) for the project, detailing various shading devices
- 11.2.2: Submit narrative providing overview of compliance with all appraisals of the criteria
- 11.2.3: Appraisal 11.1.1 – Alternative 1: Submit calculations detailing the WWR and SRR of the project
- 11.2.4: Appraisal 11.1.1 – Alternative 1: Submit calculations demonstrating that all fenestrations comply with either SHGC requirements and/or shading requirements
- 11.2.5: Appraisal 11.1.1 – Alternative 1: Submit simulation reports demonstrating that at least 25% (or more) of total living area of project meets daylight factor requirements of SP 41
- 11.2.7: Submit artificial lighting simulation reports demonstrating that the artificial lighting levels meet the NBC 2005 recommended levels and uniformity of 0.4
- 11.2.8: Submit interior artificial lighting layout drawings
- 11.2.9: Submit simulation reports to demonstrate that thermal comfort conditions as specified in Appraisal 11.1.3 are met in the project
- 11.2.10: Submit drawings and narratives highlighting various measures adopted to meet indoor noise levels of NBC 2005 and to limit noise from noise sources mentioned in Appraisal 11.1.4
- 11.2.11: Submit specification sheets, purchase orders (reflecting full quantities) and BOQ of relevant products used in building to meet Appraisals 11.1.1 – 11.1.4 including but not limited to the following:
 - Glass specifications
 - Interior lamps and luminaries
 - Thermal insulation
 - Acoustic insulation
- 11.2.12: Upload photographs, with description, of the measures implemented

Project Specific

1. Project team will opt Alternative 1 to comply credit requirement. WWR of the project is less than 40% and project team will be using glass having SHGC <=0.25 which comply ECBC requirement.

Recommended Daylight Factors for Different areas		
S.No	Location	Daylight Factor
1	Office & Conference Room	1.9
2	Foyer	.625

Kindly note that auditorium, stage and dressing room area are excluded from calculation as per GRIHA guidelines.



S.No	Level	Description	Regularly Occupied Area (sq ft)	% of Area Getting DF	Regularly Occupied Area Getting Daylight Factor (sq ft)
1	Ground Floor	Foyer	9271	78.30%	7257
2	Ground Floor	Admin Office	694	0%	0
3	Ground Floor	Meeting Room 1	745	0%	0
4	Ground Floor	Meeting Room 2	671	0%	0
5	Ground Floor	VIP Room	441	0%	0
6	First Floor	Foyer	2761	0%	0
% of Regularly Occupied Area Getting Daylight Factor 1.9			14583		7257
					64.20%

- Project team has performed a thermal comfort analysis of all occupied conditioned zone. As per results all zone achieve thermal comfort as mentioned in ASHRAE 55
- Over-design of artificial lighting system shall be avoided and the lighting levels in indoor spaces shall be maintained 30% less than LPD value as mentioned in ECBC Table 7.2
- Lux Levels: Artificial lighting design to fall within limits (lower and higher range limits) as recommended space/task specific lighting levels as per NBC and to meet a minimum uniformity ratio of 0.4
- All DG sets and chiller plant will be properly acoustically insulated to reduce noise and complying NBC norms.

ANTICIPATED - 4 POINT
NOT APPLICABLE - 2 POINT



Snap Shot of Tender Documents

APPENDIX 'A' - MATERIALS FINISH SCHEDULE

1.1 FAÇADE GLASS

- The following table shows the guideline of different configurations of glass types. Glass thickness is indicative only, and is to serve as minimum requirements based on average wind load to the façade. Glazing in areas of higher wind pressure may be required to be thicker.
- Final sizes shall satisfy all relevant codes and regulation, as well as the performance criteria of this Specification, including deflection, thermal breakage, live loading, acoustics, and thermal performance.
- The final confirmation of thickness and color shall be determined at Site by the Consultant.

Glass Code	Glass Type Legend	Glass		Shading Coefficient	Performance requirements			Visible Light Transmission
		Outer Life	Inner Life		E-Value W/m ² K	Interior Glass Reflectivity	Exterior Glass Reflectivity	
H&LE	GA	6 mm HS + 1.52 PVB inter layer + 6 mm HS with 3 layers of soft coat Low-E on face #4	12mm	≤ 0.29	<2.0	≤15%	≤17%	Min 40%
	GB	10 mm HS with 3 layers of soft coat Low-E on face #2	12mm	≤ 0.29	<2.0	≤ 15%	≤ 17%	Min 40%
	GC	6 mm HS with 3 layers of soft coat Low-E on face #2	12mm	≤ 0.29	<2.0	≤ 15%	≤ 17%	Min 40%

Glass properties in tender docs

Saturday

Criterion 12: Maintaining good IAQ

Objective:

Maintenance of good indoor air quality is imperative for ensuring healthy living conditions for the building occupants. The intent of this criterion is to ensure design and monitoring of ventilation systems such that indoor air quality meets the minimum requirements, as recommended in the standards.

Non-applicability: Appraisal 12.1.1 is not applicable for non-AC spaces/residential spaces with operable windows

Appraisal (maximum points – 4)

- 12.1.1: Meet the minimum requirements of
 - CPCB National Ambient Air Quality Standard (NAAQS) for quality of fresh air; and
 - ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a NBC-2005 for quantity of fresh air – (2 points)
- The clause shall cover treatment of outdoor air for predominantly PM 10 and PM 2.5
- 12.1.2: Monitoring the CO2, temperature and RH at the occupied spaces or at AHUs for the air conditioned spaces – (2 points)

Compliance:

- 12.2.1: Submit documentation detailing the specifications of the filtration system to demonstrate that fresh air quality meet the minimum requirements of CPCB NAAQS
- 12.2.2: Submit space by space sheet Heat Load Sheet highlighting provision of sufficient fresh air in the HVAC system design as per the ASHRAE 62.1 or NBC 2005 norms
- 12.2.3: Submit drawings (floor plans and/or HVAC system plans) highlighting the location of various CO2, temperature and RH sensors
- 12.2.4: Submit specification sheets and purchase orders (reflecting full quantities) for the filters and sensors installed in the project
- 12.2.5: Upload photographs, with description, of the measures implemented

Project Specific

Project team has provide fresh air as per NBC . Also all DOAS and ERV will have MERV 8 filters . Project team has proposed CO2, temperature and RH at each conditioned zone. Hence project complies for 4 points.

Snap Shot of Tender Documents

4. Fin Material: Aluminum or Copper>

5. Coating: Phenolic epoxy coating after assembly.

G. Outdoor-air intake hood.

H. Filters: Metal mesh or Disposable media or Extended surface, disposable media type with MERV rating of 7 for pre filter and 13 for main filter.

I. Electrical:

1. Factory-installed and wired electrical devices mounted in Type 3R or Type 4 or Type 4X enclosure for single-point field power connection to unit.

2. Field power interface to wire lugs or heavy-duty, non-fused disconnect switch.

3. Branch power circuits with heavy-duty, non-fusible switches or circuit breakers.

J. Controls:

1. Field installed or Furnished and factory installed by unit manufacturer.

2. Remote or Unit-Mounted Status Panel.

3. Controls for fans, dampers, cooling, and heating through unit or remote-mounted carbon dioxide, humidity, pressure and temperature sensors.

4. Integral Smoke Alarm: Smoke detector installed in supply and return air.

237433
Page 1 of 2

DEDICATED OUTDOOR-AIR UNITS

Provision of DOAS with MERV 13 filters

15	ROOM METER	30 SETS
For GRIHA ☒ Temperature ☒ Relative Humidity ☒ CO2		

Provision of Temp, RH and CO2 sensor in rooms



Criterion 13: Use of low-VOC paints and other compounds in building interiors

Objective:

The intent of this criterion is to promote use of low-VOC and lead-free interior paints as well as low-VOC adhesives and sealants in order to maintain good indoor air quality for the project occupants.

Appraisal (maximum points – 2 point)

- 13.1.1: Ensure that all interior paints are low-VOC *(as mentioned in the GRIHA manual) and lead-free – (1 point)
- 13.1.2: Ensure that all adhesives and sealants used shall be low-VOC *& that interior composite wood-products do not use urea-formaldehyde as a bonding resin – (1 point)

Compliance:

- 13.2.1: Submit specification sheets for the following:
 - low-VOC and lead-free paints being used in building interiors
 - low-VOC adhesives, sealants used in building interiors
 - composite wood products demonstrating that they do not use urea-formaldehyde as a bonding resin
- 13.2.2: Submit purchase orders (reflecting full quantities) for the above materials
- 13.2.3: Upload photographs, with description, of the measures implemented

Project Specific

Project team has included the LOW VOC requirement in painting work, Carpet work as per GRIHA.

LOW VOC Adhesive and sealant requirement also need to be added in facade work, HVAC ducting work and vinyl flooring work

ANTICIPATED - 2 POINT

Snap Shot of Tender Documents

PART 2 - PRODUCTS	
2.1 PAINT, GENERAL	
A. MPI Standards: Products shall comply with MPI standards and shall be listed in its "MPI Approved Products Lists," or comply with applicable standards of the AHJ.	
B. Material Compatibility:	
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.	
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.	
C. Colors: As selected by the Consultant from RAL color range.	
D. VOC Content: Paints and coatings shall comply with VOC limits as stated in the GRIHA PAINTING	099100 Page 4 of 10

The Project for Construction of the International Cooperation and Convention Center in Varanasi	
2.3 INSTALLATION ACCESSORIES	
A. Trowable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.	
B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation. Comply with the limit of VOC (Volatile Organic Compound) content defined in the GRIHA Rating Manual.	
C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams	



Criterion 14: Use of low-flow fixtures and systems

Objective:

The intent of this criterion is to ensure reduction in the building water consumption through the use of low-flow fixtures.

Non-applicability: All faucets, which are installed in spaces with water head heights less than 5 m /17 feet, in a gravity fed systems (without pressure reduction) are exempt from calculations in this criterion

Appraisal (maximum points – 4 point)

- 14.1.1: Reduce water demand through selection of low-flow fixtures by 30% below the GRIHA base case – (Mandatory)
- 14.1.2: Reduce water demand through selection of low-flow fixtures by 50% below the GRIHA base case – (2 points)
- 14.1.3: Reduce water demand through selection of low-flow fixtures by 70% below the GRIHA base case – (4 points)

Compliance:

- 14.2.1: Provide calculations demonstrating compliance with Appraisals 14.1.1 – 14.1.3
- 14.2.2: Submit specification sheets from manufacturers for each fixture indicating the flow rates (at design pressure of 45 psi for faucets)
- 14.2.3: Submit purchase orders (reflecting full quantities) for the low-flow fixtures used in the project
- 14.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team has mentioned the low flow rates of all fixtures in plumbing technical specs.

S.No.	Fixture	Flow rates
1.	Water Closet (dual flush)	6/3 Liters per flush
2.	Conventional Urinals	1 Liters per flush
3.	Lavatory faucet	1.4 Liters per minute
4.	Kitchen faucet	4 Liters per minute

ANTICIPATED - 2 POINT
NOT APPLICABLE - 2 POINT

Snap Shot of Tender Documents

EQUIPMENT NAME	NUMBER	SPECIFICATION
WATER CLOSET	G1	WALL HUNG TYPE COCEALED TANK (6/3 L PER FLUSH) FLUSH PANEL (6/3 L PER FLUSH) SEAT & COVER ROVE HOOK PAPER HOLDER HAND SHOWER SPRAY OTHER OPTIONS#1
WATER CLOSET FOR HANDICAPPED	G2	WALL HUNG TYPE COCEALED TANK (6/3 L PER FLUSH) FLUSH PANEL (6/3 L PER FLUSH) SEAT & COVER ROVE HOOK PAPER HOLDER HAND SHOWER SPRAY OTHER OPTIONS#1
URINAL	U1	WALL HUNG TYPE (1L PER MINUTE) BATTERY TYPE OTHER OPTIONS#1
WATER BASIN	L1	UNDER COUNTER AUTOMATIC FAUCET (1.4L PER MINUTE) OTHER OPTIONS#1
WATER BASIN FOR STAFF	L2	INDEPENDENT BASIN AUTOMATIC FAUCET (1.4L PER MINUTE) OTHER OPTIONS#1
WATER BASIN FOR HANDICAPPED	L3	INDEPENDENT BASIN FAUCET (1.4L PER MINUTE) OTHER OPTIONS#1
WATER BASIN FOR VIP	L4	INDEPENDENT BASIN AUTOMATIC FAUCET (1.4L PER MINUTE) OTHER OPTIONS#1
SERVICE SINK	SK	SERVICE SINK SINK TAP OTHER OPTIONS#1
SHOWER	SN	SHOWER SET SLIDING RAIL SOUP BRACKET TOWEL BAR OTHER OPTIONS#1 7L PER MINUTE
KITCHEN FAUCET	F1	4L PER MINUTE
SINK TAP	F2	1.4L PER MINUTE
SINK TAP	F3	WITH KEY 1.4L PER MINUTE
WATER TAP	F4	OUTDOOR WITH BOX 1.4L PER MINUTE

Flow rates mentioned in tender docs

Criterion 16: Water Quality

Objective:

Ensuring quality of water available for use during building operation is important from two perspectives – overall hygiene for building occupants as well as longevity of plumbing systems. It is also important to ensure that the water being discharged from the site meets the relevant disposal norms. The intent of this criterion is to ensure that the water being used in the project meets the relevant national standards.

Appraisal (maximum points – 2 point)

- 16.1.1: Water used for various purposes like drinking, irrigation etc. shall conform to the BIS standards - **(Mandatory)**
- 16.1.2: The STP installed on site meets the CPCB norms – **(2 points)**

Compliance:

- 16.2.1: Submit potable water quality, treated waste water and captured rainwater quality test reports from various sources before and after treatment (if required) - from an NABL accredited laboratory on the quality of potable water
- 16.2.2: Submit narrative (including capacity of water treatment) of the type of treatment plant installed on site along with plumbing drawings of the system
- 16.2.3: Submit the specification details indicating the capacity and components of the water treatment plant along with drawings (product details from the manufacturer)
- 16.2.4: Submit document indicating the quantum of treated water generated along with the use/disposal steps
- 16.2.5: Submit narrative on disposal and reuse of other by-products such as sludge
- 16.2.6: Upload photographs, with description, of the measures implemented

Project Specific

Project team has proposed domestic water filtration equipment for project. Drinking water will be treated and will comply BIS standards. Project team will be using potable water for landscaping and irrigation since no STP has been proposed on site. Hence project does not comply for 2 points.

MANDATORY

NOT APPLICABLE - 2 POINT

Snap Shot of Tender Documents

The Project for Construction of the International Cooperation and Convention Center in Varanasi

SECTION 223200 - DOMESTIC WATER FILTRATION EQUIPMENT

1.1 QUALITY ASSURANCE

- A Welding: ASME Boiler and Pressure Vessel Code- Section IX
- B Electrical Components, Devices, and Accessories: NFPA 70.
- C Components in Contact with Potable Water: NSF 61.
- D Circulating Pumps: UL 778, HI 1.1-1.2, and HI 1.3.

1.2 PRODUCTS

A Bag-Type Filters: Single bag.

1. Filtration Efficiency: 98 percent for particles 10 micrometers and larger.
2. Pressure Drop: Not to exceed 2 psig (14 kPa) when clean when dirty.
3. Housing: Stainless steel.
4. Bag Media: Cotton or Polyester or PP.

B Cartridge Filters:

1. Freestanding Cartridge Filters:

- a. Filtration Efficiency: 98 percent for particles 10 micrometer(s) and larger.
- b. Pressure Drop: Not to exceed 2 psig (14 kPa) when clean when dirty.
- c. Housing: Stainless steel
- d. Media: Activated charcoal or ground charcoal.
- e. Media: Pleated polyester or pleated PP.
- f. Media: Wound polyester or wound PP.

2. Off-Floor Cartridge Filters:

- a. Mounting: In line or Wall.
- b. Filtration Efficiency: 98 percent for particles 10 micrometer(s) and larger.
- c. Pressure Drop: Not to exceed 2 psig (14 kPa) when clean when dirty.
- d. Housing: Stainless steel.
- e. Media: Activated charcoal or ground charcoal.
- f. Media: Pleated polyester or pleated PP.
- g. Media: Wound polyester or wound PP.

C Carbon Filters:

1 Backwash Initiation Device: Differential pressure gauges or Electric time clock or Water meter.

2. Filtration Efficiency: 98 percent for particles 20 micrometers and larger.
3. Pressure Drop: Not to exceed 2 psig (14 kPa) when clean when dirty.
4. Media Tank:

- a. Construction: ASME code.
- b. Housing Material: Stainless steel.
- c. Media: Activated charcoal or Ground charcoal.

DOMESTIC WATER FILTRATION EQUIPMENT

223200
Page 1 of 2



Criterion 17: On Site Water Reuse

Objective:

The intent of this criterion is to promote recycle and reuse of waste water as well as reuse of captured rainwater on site to meet the water demand, thereby reducing the water required from the local municipal supply/groundwater aquifers.

Appraisal (maximum points – 5 point)

- 17.1.1: Demonstrate that the project meets the on-site water reuse requirements (through on-site recycle and reuse of waste water and use of on-site harvested rainwater) in its annual water requirements for domestic use, buildings, landscape and utilities as mentioned below:

On Site Water Reuse	Points
20%	1
40%	2
60%	4
80%	5

Compliance:

- 17.2.1: Submit calculations (Water Balance) demonstrating the total quantity of water treated and harvested and the amount being used for different applications including use within the building and irrigation and that which is recharged into underground aquifers
- 17.2.2: Submit drawings detailing the dual plumbing systems and/or treated waste water storage tanks and/or rainwater capture and storage tanks on site
- 17.2.3: Submit site level plumbing drawings indicating delivery lines for treated waste water and captured rainwater to their respective points of use
- 17.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team will be using potable water for landscaping and irrigation since no STP has been proposed on site. Hence project does not comply for 5 points.

NOT APPLICABLE - 5 POINT

Criterion 18: Rainwater Recharge

Objective:

The intent of this criterion is to promote the recharge of groundwater aquifers.

Non-applicability: if the CGWB norms suggest that the ground water table is high and ground water recharging should not be done, then the project is exempt from this criterion

Appraisal (maximum points – 2 point)

- 18.1.1: Recharge of surplus rainwater into aquifer (through appropriate filtration measures) – (2 points)

Compliance:

- 18.2.1: Submit details of rainwater harvesting for ground water recharge and its filtration system to show that adequate preventive measures are being taken to avoid damage to the aquifer by the recharged rainwater
- 18.2.2: Upload photographs, with description, of the measures implemented

Project Specific

Project team has confirmed that water table is very high i.e. less than 5 meters hence project is exempted from rain water harvesting. Project team will have to provide a letter from CGWB.

NOT APPLICABLE - 2 POINT



Criterion 19: Utilization of BIS recommended waste materials in building structure

Objective:

The intent of this criterion is to promote use BIS recommended wastes (such as fly ash, blast furnace slag etc.), having properties similar to conventional construction materials for building construction. These being low embodied energy materials as well as waste products, reduce the need for virgin materials in the building structure and help divert waste from landfills..

Appraisal (maximum points – 6 point)

- 19.1.1 Minimum 15% replacement of Ordinary Portland cement with fly ash* by weight of cement used in structural concrete – **(1 point)**
 - If replacement is more than 25% - **(2 points)**
- 19.1.2 Minimum 40% composition of building blocks/bricks by fly ash* by volume, for 100% load bearing and non-load bearing masonry walls – **(2 points)**
- 19.1.3 Certify minimum 15% replacement of Ordinary Portland cement with fly ash* in plaster/masonry mortar – (1 point)
 - If replacement is more than 25% - **(2 points)**

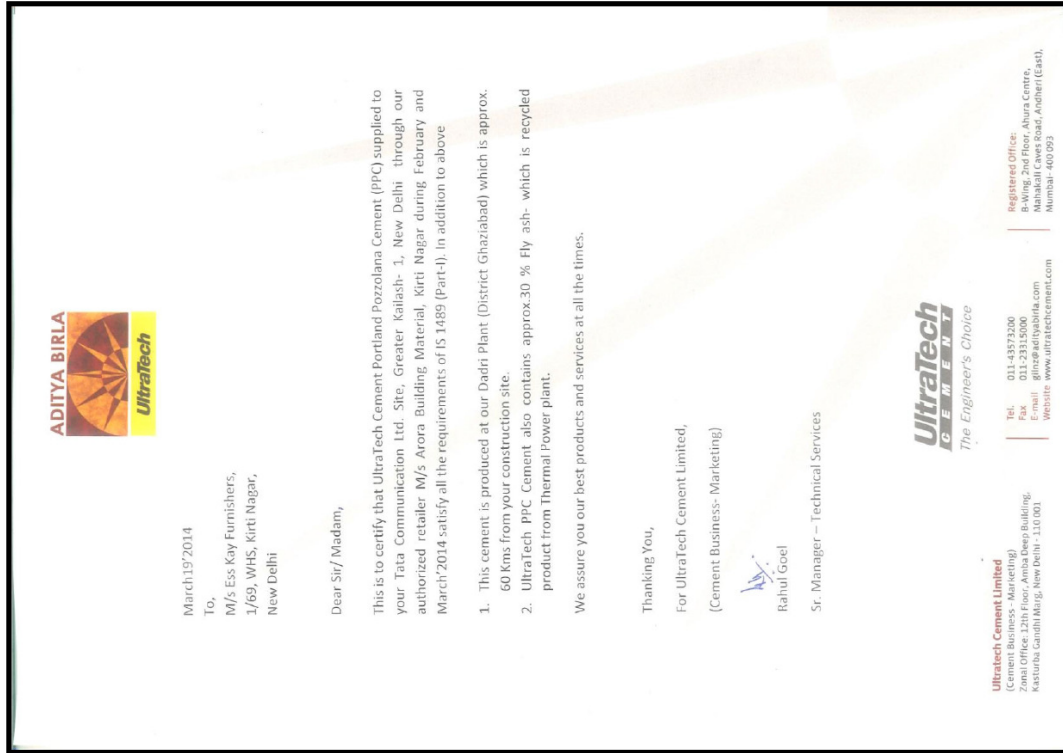
Compliance:

- 19.2.1: Submit documentation (calculations, manufactures cut-sheets & purchase orders – reflecting full quantities) demonstrating 15% (or higher) replacement of OPC in structural concrete by fly ash*
- 19.2.2: Submit documentation (calculations, manufactures cut-sheets & purchase orders – reflecting full quantities) demonstrating that fly ash* constitutes at least 40% of load bearing and non-load bearing walls (by volume of materials)
- 19.2.3: Submit documentation (calculations, manufactures cut-sheets & purchase orders – reflecting full quantities) demonstrating 15% (or higher) replacement of OPC in plaster and/or masonry mortar by fly ash*
- 19.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team has proposed PPC cement, RMC having fly ash content upto 25% and also AAC blocks and fly ash brick will be used having fly ash content atleast 40%. Hence project team complies for 6 point.

ANTICIPATED - 6 POINT



Sample certificate

Criterion 20: Reduction in embodied energy of building structure

Objective:

The intent of this criterion is to promote reduction in the embodied energy of the building structure through the use of low-embodied energy materials.

Appraisal (maximum points-4)

- 20.1.1: Demonstrate reduction in combined embodied energy of load-bearing structure and masonry walls by at least 10% below the base case – (1 point)
- 20.1.2: Demonstrate reduction in combined embodied energy of load-bearing structure and masonry walls by at least 20% below the base case – (2 points)
- 20.1.3: Demonstrate reduction in combined embodied energy of load-bearing structure and masonry walls by at least 30% below the base case – (4 points)

Base Case: RCC structure with burnt clay brick masonry. The live load, equipment load and spans between the design and the base case should be same. The total length of masonry walls between design and base case should be same.

Compliance:

- 20.2.1: Submit calculations (through software output files recommended) demonstrating reduction in embodied energy as per Appraisal 20.1.1 – 20.1.3
- 20.2.2: Submit manufacturer cut-sheets of the low-energy materials used in building structure and masonry walls
- 20.2.3: Submit CAD drawings highlighting the use of low embodied energy materials in the relevant floor plans, with clear dimensioning
- 20.2.4: Submit purchase orders (reflecting full quantity) and relevant sections of the BOQ highlighting the low-energy materials used
- 20.2.5: Upload photographs, with description, of the measures implemented

Project Specific

Project team is not proposing any efficient technologies in structure to reduce the qty of steel and cement.

To comply the credit requirement project team will have to use technologies or materials which

are less energy intensive such as:-

1. Pre Stressed Slab Elements
2. Micro concrete Roofing
3. Pre-cast stone block

Hence project team does not complies for 4 points.

Structure	Embodied energy
Steel	HIGH
Portland Cement	
Concrete - 50% GGBS	
Timber Studs and Headers	
Blockwork	LOW

NOT APPLICABLE - 4 POINT



Criterion 21: Use of low-environmental impact materials in building interiors

Objective:

The intent of this criterion is to promote installation of low environmental impact materials in the building interiors.

Appraisal (maximum points-4)

- 21.1.1: Project demonstrates that at least 25% of all materials (calculated by surface area) used for building interiors* meets the GRIHA criterion low-impact material requirements – (1 point)
- 21.1.2: Project demonstrates that at least 50% of all materials (calculated by surface area) used for building interiors* meets the GRIHA criterion low-impact material requirements – (2 points)
- 21.1.3: Project demonstrates that at least 75% of all materials (calculated by surface area) used for building interiors* meets the GRIHA criterion low-impact material requirements – (4 points)

Following materials will be accepted as low-environmental impact:

- Stones from India
- Composite wood based products
- FSC Chain of Custody certified products
- Manufactured products with at least 5% recycled content
- Products with EPD (cradle to gate) analyzed and published as per ISO 14025 / ISO 21930
- Products with water footprint (cradle to gate) analyzed and published as per ISO 14046

**false ceilings/internal partitions/paneling/in-built furniture/flooring/internal door & window panels & frames*

Compliance:

- 21.2.1: Provide manufacturer cut-sheets highlighting specifications of low environmental impact finishes/products used in the building interiors
- 21.2.2: Provide CAD drawings demarcating (by highlighting with clear dimensions) the use of aforesaid finishes/products in the interior layouts/plans.
- 21.2.3: Submit purchase orders (reflecting full quantities) and relevant sections of the BOQ for the low environmental impact materials used
- 21.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team will be using recycled content material in the project such as glass, steel, cement, fly ash blocks and also composite wood base products will be used such as MDF board, ply board etc. This strategy will help to achieve maximum points.

ANTICIPATED

~ 4 POINT



Criterion 22: Avoided post-construction landfill

Objective:

The intent of this criterion is to provide infrastructure to future occupants of the project so that they can sustainably manage on-site solid waste during operation phase.

Appraisal (maximum points-4)

- 22.1.1: Provide infrastructure (multi-colored dustbins/different garbage chutes) to building occupants to ensure segregation of waste at source
- 22.1.2: Provide dedicated, segregated and hygienic storage spaces in the project site to store different wastes before treatment /recycling
- 22.1.3: Provide contractual tie-ups with waste recyclers for safe recycling for recyclable wastes like metal, paper, plastic, glass etc.
 - Together – (4 points)

Compliance:

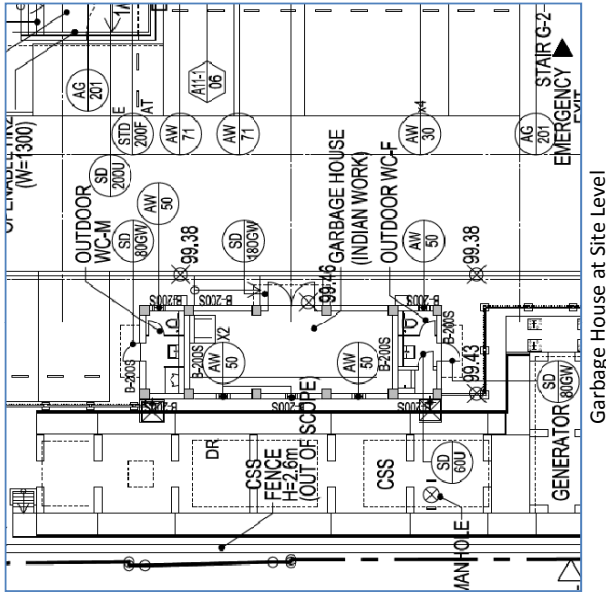
- 22.2.1: Submit the Solid Waste Management plan for the project – detailing the sizing of segregated waste storage facilities, strategy for primary and secondary collection and storage.
- 22.2.2: Submit site plan indicating location of various primary (multi-coloured dustbins) and secondary storage facilities
- 22.2.3: Submit document highlighting tie-up with recyclers for ensuring safe recycling of recyclable wastes
- 22.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team has proposed a centralized waste segregation area with dedicated waste storage area for hazardous waste.

ANTICIPATED - 4 POINT

Snap Shot of Provision in Drawings



Criterion 23: Treat Organic Waste On Site

Objective:

The intent of this criterion is to promote recycling and reuse of organic waste on site.

Non-applicability: If the total waste generation on site is less than 100 kg/day, then the project is exempt from this criterion.

Appraisal (maximum points-2)

- 23.1.1 Implement strategies to treat all organic (kitchen and landscape) waste on-site and to convert it into a resource (manure, biogas etc.) - (2 points)

Compliance:

- 23.2.1: Submit narrative detailing the design and sizing of the on-site waste treatment strategy and highlight method of reuse on site
- 23.2.2: Upload photographs, with description, of the measures implemented

5 ASSESSMENT OF PER CAPITA WASTE QUANTITY

5.1 For purposes of this Section, the following municipal refuse generation rates are recommended:

- | | |
|---------------------------|---------------------------|
| a) Residential refuse : | 0.3 to 0.6 kg/capita/day |
| b) Commercial refuse : | 0.1 to 0.2 kg/capita/day |
| c) Street sweepings : | 0.05 to 0.2 kg/capita/day |
| d) Institutional refuse : | 0.05 to 0.2 kg/capita/day |

Project Specific

Project team has confirmed that there is no dedicated cooking kitchen area in project. Hence the generation of organic waste will be less than 100 KG.
Project is exempted from credit requirement.



NOT APPLICABLE - 2 POINT

Criterion 24: Labour safety and sanitation

Objective:

The intent of this criterion is to ensure safe, healthy and hygienic working & living conditions for construction workers working in the project.

Non-applicability: If no families are allowed to work and live at construction sites, then appraisal 24.1.3 is not applicable

Appraisal (maximum points-1)

- 24.1.1: Ensure compliance with the NBC (2005) safety norms for providing the necessary safety equipment and measures for construction workers – (Mandatory)
- 24.1.2: Ensure provisions for drinking water, hygienic working & living conditions and sanitation facilities shall be provided for the workers – (Mandatory)
- 24.1.3: Provide a crèche facility for children of construction workers – (1 point)

Compliance:

- 24.2.1: Submit relevant sections of tender document showing that the conditions mentioned in Appraisal 24.1.1 and 24.1.2 are required to be implemented by the contractor during construction on site.
- 24.2.2: Submit test reports demonstrating that the drinking water provided to workers meets the relevant BIS drinking water norms
- 24.2.3: Submit narrative on provision of crèche facility for children of construction workers
- 24.2.4: Upload photographs, with description, of the measures implemented

Project Specific

Project team will be have to provide all the health and safety equipment to all labors as per NBC safety norms. Also facilities like drinking water, hygienic working & living conditions and sanitation facilities shall be provided for the workers.
crèche facility will be provided for children of construction workers

MANDATORY
ANTICIPATED - 1 POINT

	
Sanitation Facility	Drinking Water Facility
	
Personal Protective Equipment Store 1	Personal Protective Equipment Store 2
	
First Aid Facility for Labor	Ambulance Facility for Labor
	
Labor housing facility	First Aid Box

Sample Photographs

Criterion 25: Design for Universal Accessibility

Objective:

The intent of this criterion is to promote adoption of measures in the project to make it universally accessible.

Appraisal (maximum points-2)

- 25.1.1: Compliance with National Building Code norms on Requirements for Planning of Public Buildings Meant for Use of Physically Challenged - (2 points)

Compliance:

- 25.2.1: Submit drawings demonstrating that the project incorporates design measures for Universal Accessibility as recommended in NBC 2005
- 25.2.2: Upload photographs, with description, of the measures implemented

Project Specific

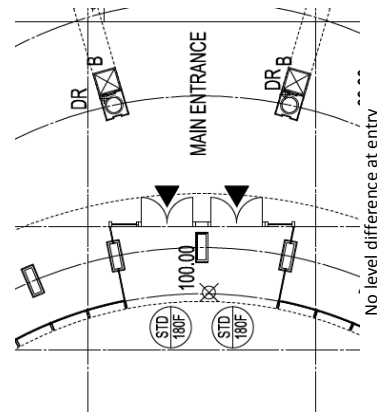
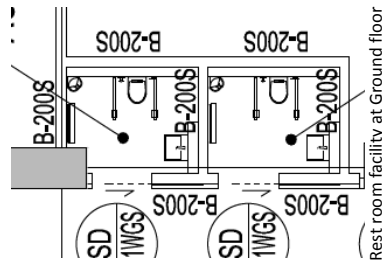
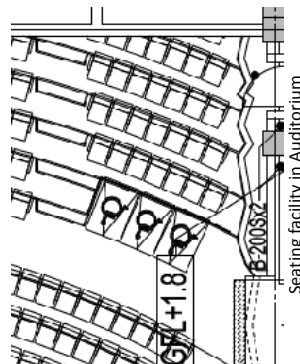
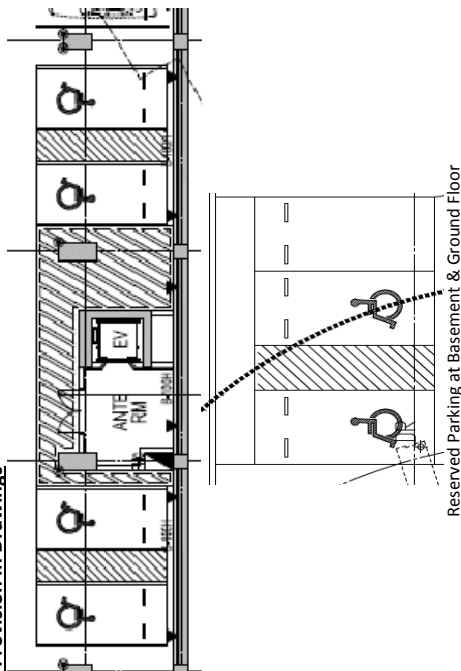
Project team has proposed listed below disabled facilities in design as per NBC norms:-

1. Reserved parking for disabled person
2. Ramp with hand rail at main entrance
3. Disabled toilets as per NBC norms
4. Seating Facility in Auditorium
5. Braille assistance has been mentioned in technical specs of elevators

Please note that Audio Assistance has not been highlighted in specs of elevators. Kindly include these features.

ANTICIPATED - 2 POINT

Snap Shot of Provision in Drawings



Criterion 26: Dedicated facilities for service staff

Objective:

The intent of this criterion is to promote provision of resting spaces and toilets dedicated for project's service staff.

Appraisal (maximum points-2)

- 26.1.1: Provide dedicated resting rooms for the service staff on site – (1 point)
- 26.1.2: Provide toilets for the service staff on site – (1 point)

Guidance for Estimation

Assume total service staff population to be about 5% of total fixed building occupancy. If staff works in shifts, count the position only once.

Fixtures	Male	Female
WC	1 per 25	1 per 15
Washbasins	1 per 25	1 per 25
Urinals	Nil up to 6 1 for 7 – 20 2 for 21 – 45 3 for 46 – 70 4 for 71 – 100 Add 3% over 101 – 200 Add 2.5% over 200	

Compliance:

- 26.2.1: Submit drawings demarcating the location of various toilets and/or resting rooms for service staff
- 26.2.2: Upload photographs, with description, of the measures implemented

Project Specific

As per current design, the total number of staff is 20. Project team has proposed listed below dedicated toilets for fixed staff. Also dedicated staff room has been proposed.

Male:-

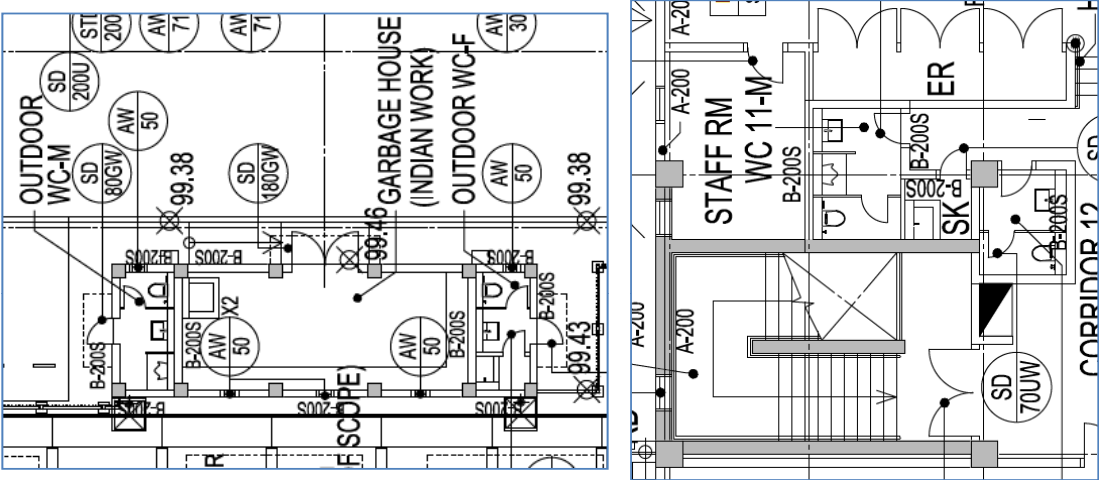
Water Closet 1, Wash Basin 1, urinals - 1

Female :-

Water Closet 1, Wash Basin 1

ANTICIPATED - 2 POINT

Snap Shot of Provision in Drawings



Dedicated toilets and rest room proposed at Site Level & first Floor



Criterion 27: Increase in environmental awareness

Objective:

The intent of this criterion is to create awareness on sustainability amongst the building users & visitors.

Appraisal (maximum points-1)

- 27.1.1: Adopt measures to create environmental awareness – (1 point)

Compliance:

- 27.2.1: Submit narrative with supporting photographs highlighting strategies implemented, in the project, to create environmental awareness

Project Specific

Project team will make a dedicated green wall at main lobby area highlighting Green Features of the building in form of posters. This will help to create environment awareness among building occupants and visitors.

Hence project complies for 1 point

ANTICIPATED - 1 POINT



Criterion 28: Smart Metering and Monitoring

Objective:

The intent of this criterion is to promote smart metering and monitoring of energy and water consumption on site to analyze the performance of the building.

Appraisal (maximum points-8)

- 28.1.1: Comply with following Basic metering requirements of GRIHA – Mandatory

Basic Metering Requirements	
Energy	Water
Ensure regular monitoring of project's energy consumption by installing digital meters* at the following point sources at the project level for: • Utility grid • On-site renewable energy system • Diesel Genset, Gas Genset etc. • Each building level	Ensure regular monitoring of project's water consumption by installing digital meters* at the following point sources at the project level for: • Municipal Supply • Bore well • Treated water outlet from STP • Captured rainwater • Each building level

- 28.1.2: Comply with Extended metering requirements as mentioned in the table – (2 points)

Extended Metering Requirements	
Energy	Water
Sub-meter* the following points to monitor energy consumption: • Commercial/Institutional: ➢ HVAC central plant- AHU, Cooling tower, Chillers (BTU meters) and/or distributed units (split/window ACs) ➢ Lighting (Indoor and outdoor) ➢ UPS ➢ Basement parking lighting • Residential: ➢ For Basement Parking Lighting, Community/Recreation center, Water pumping, Outdoor Lighting ➢ Lifts and common areas	Sub-meter* at the following points to monitor water consumption: • Irrigation • Cooling Tower • STP/WTP/ETP • Each apartment/commercial tenant

Project Specific

Project team will provide basic and extended metering on listed below load and all meters will be monitored on BMS.

Basic Metering Requirements

Energy	Water
• Utility grid • On-site renewable energy system • Diesel Genset, Gas Genset etc. • Each building level	• Municipal Supply • Bore well • Each building level

Extended Metering Requirements

Energy	Water
• Commercial/Institutional: ➢ HVAC central plant- AHU, Cooling tower, Chillers (BTU meters) and/or distributed units (split/window ACs) ➢ Lighting (Indoor and outdoor) ➢ UPS	• Irrigation • WTP

Also project team will share the monitoring data with GRIHA with two way communication.

ANTICIPATED - 8 POINT

Snap Shot of Tender Docs

<Other> Fire Alarm	---	Fire Alarm Panel	RS
BIF Water Consumption	RCP-BF-1	Meter	RS
Main Irrigation Water Consumption	RCP-BF-1	Meter	RS
Main Drinking Water Consumption	RCP-BF-1	Meter	RS
Outside Income	RCP-GF-1	Meter	RS
GF Water Consumption	RCP-GF-1	Meter	RS
1F Water Consumption	RCP-1F-1	Meter	RS
<Electrical Equipment>			
<Substation>			
Cubicle	RCP-GF-1	Cubicle	RS
LT Panel	RCP-GF-1	LT Panel	RS
<Generator>			
Generator	RCP-GF-1	Generator	RS
<Emergency Lighting>			
CBS	RCP-BF-1	CBS	RS

NAME	CONTROL PANEL	INPUT/OUTPUT	SCHEMATIC TYPE	OPERATION	FUNCTIONALITY
<<SMD>>					
BSM-1	RCP-BF-1	BSM-1	RS		2
BSM-2	RCP-BF-1	BSM-2	RS		2
GSM-1	RCP-GF-1	GSM-1	RS		2
ISM-1	RCP-1F-1	ISM-1	RS		2
<<MCC>>					
BMCC-1	RCP-BF-1	BMCC-1	RS		1
BMCC-2	RCP-BF-1	BMCC-2	RS		1
BMCC-3	RCP-BF-1	BMCC-3	RS		1
GMCC-1	RCP-GF-1	GMCC-1	RS		1
IMCC-1	RCP-1F-1	IMCC-1	RS		1
IMCC-2	RCP-1F-1	IMCC-2	RS		2
IMCC-3	RCP-1F-2	IMCC-3	RS		1
<<Power DB>>					
BPDB-1	RCP-BF-1	BPDB-1	RS		1
BPDB-2	RCP-BF-1	BPDB-2	RS		1
GPDB-1	RCP-GF-1	GPDB-1	RS		1
GPDB-2	RCP-GF-1	GPDB-2	RS		1
EPDB-1	RCP-1F-1	EPDB-1	RS		1
EPDB-2	RCP-1F-1	EPDB-2	RS		1
IPDB-1	RCP-1F-1	IPDB-1	RS		1
IPDB-2	RCP-1F-2	IPDB-2	RS		1
<<Lighting DB>>					
BSDB-1	RCP-BF-1	BSDB-1	RS		1
BSDB-2	RCP-BF-1	BSDB-2	RS		1
GLDB-1	RCP-GF-1	GLDB-1	RS		1
GLDB-2	RCP-GF-1	GLDB-2	RS		1
ELDB-1	RCP-1F-1	ELDB-1	RS		1
ELDB-2	RCP-1F-1	ELDB-2	RS		1
ILDB-1	RCP-1F-1	ILDB-1	RS		1
ILDB-2	RCP-1F-2	ILDB-2	RS		1
<<AV equipment DB>>					
AVDB-1	RCP-1F-2	AVDB-1	RS		1
AVDB-2	RCP-1F-2	AVDB-2	RS		1
AVDB-3	RCP-GF-1	AVDB-3	RS		1
AVDB-4	RCP-GF-1	AVDB-4	RS		1
Stage Lighting Panel	RCP-GF-1	Stage Lighting Panel	RS		1
Stage Lighting Panel	RCP-GF-1	Stage Lighting Panel	RS		1

Water & Energy meter considered in BMS specs



Criterion 29: Operation & Maintenance Protocols

Objective:

The intent of this criterion is to ensure implementation of an Operation and Maintenance protocol.

Appraisal

- 29.1.1: Provision for a core facility/service group responsible for the O&M of the building's systems after installation as per GRIHA requirements. Inclusion of a specific clause in the contract document of the systems supplier for providing training to the core facility/ service group responsible for the O&M of the building systems after installation, on the operating instructions/dos and don'ts/ maintenance requirements for the specific system, as per GRIHA requirements. Development of a fully documented O&M manual/ CD/ Multimedia /information brochure enlisting the best practices for O&M of the building's systems as per GRIHA requirements – **(Mandatory)**
 - O&M protocol should be submitted for
 - HVAC plant- AHU, Cooling tower, Chillers and pumps , VRF
 - Electrical- Transformer, DG, HT & LT panels
 - Energy Systems: Solar PV, wind mill, bio gasifier etc.
 - STP and/or WTP

Compliance:

- 29.2.1: Submit proof of provision for a core facility/service group responsible for the operation and maintenance of the building's systems after installation. This should be supported with the contract (mutually signed between the respective parties) document or supportive documents, verified and signed by the responsible parties).
 - O&M protocol should contain the following:
 - Provision of inspection as per respective system schedules
 - Corrective measures to be implemented according to the periodic inspection report.
 - Records tracking the periodic inspection and maintenance
 - Provision for training staff members

Project Specific

All Vendor will have to submit O&M Manual of all active system and will give training to facility team about the system and its operation. Hence project will comply mandatory requirement.

MANDATORY

Criterion 30: Performance Assessment for Final Rating

Objective:

The intent of this criterion is to validate the performance of the energy, water and comfort conditions in the building as predicted during the design and development stage.

Appraisal

- 30.1.1 The energy systems, water systems and solid waste management systems of the building are performing as predicted and match the information provided at the time of award of provisional GRIHA rating
- 30.1.2: The visual, thermal and acoustic comfort conditions of the building meet the requirements of GRIHA Criterion 11
- 30.1.3 Any improvement in the following 4 parameters can be attempted by the project, post-GRIHA Provisional Rating, in order to improve its overall GRIHA points tally:
 - Hard/soft/shaded paving on site – Criterion 3
 - Renewable energy installation – Criterion 9
 - Noise levels – Criterion 11
 - Innovation – Criterion 31

Please note: Reattempt/fresh attempt of a criterion will not be allowed in this; only improved performance will be evaluated.

Compliance:

- 30.2.1: Submit audit report and bills by an independent BEE certified auditor highlighting the following:
 - Annual energy and water consumption
 - Compliance with visual, thermal and acoustic comfort conditions in building interiors
 - Functioning solid waste management strategies
- 30.2.2: Submit narrative/drawings/photographs highlighting improved performance in criteria mentioned in 30.1.3

Project Specific

Project team has will validate the performance of the energy, water and comfort conditions of the building by BEE Energy Auditor after 1 year of operation.

MANDATORY

Snap Shot of Tender Docs

Criterion 31: Innovation

- Objective:
- The intent of this criterion is to promote adoption and implementation of innovative strategies in improving the sustainability of the project.
- Appraisal (maximum points-4)
- 31.1.1: 1 point per Innovation strategy up to a maximum of 4.
 - Examples of innovation:
 - A GRIHA certified professional (Trainer or Evaluator) is involved in the project from beginning to end
 - First Mover: Implementation of a technology for the first time in the country.
 - E-waste recycling
 - STP technologies which do not use chemicals
 - Net-Zero Energy/Water

Compliance:

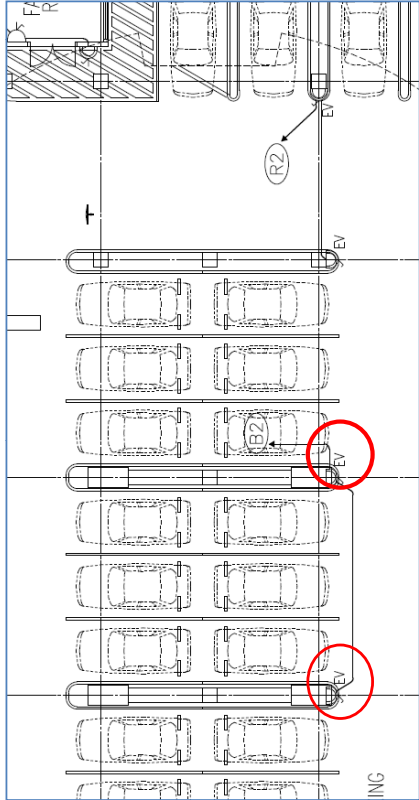
- 31.2.1: Submit supporting documentation for each Innovation strategy

Project Specific

A GRIHA Certified professional will be involved in the project. Also 1 innovation point will be target.

- Electrical Charging sockets in basement
- A GRIHA certified professional will be involved in the project.

ANTICIPATED	- 2 POINT
NOT APPLICABLE	- 2 POINT



Charging Sockets Considered for Electrical Vehicles



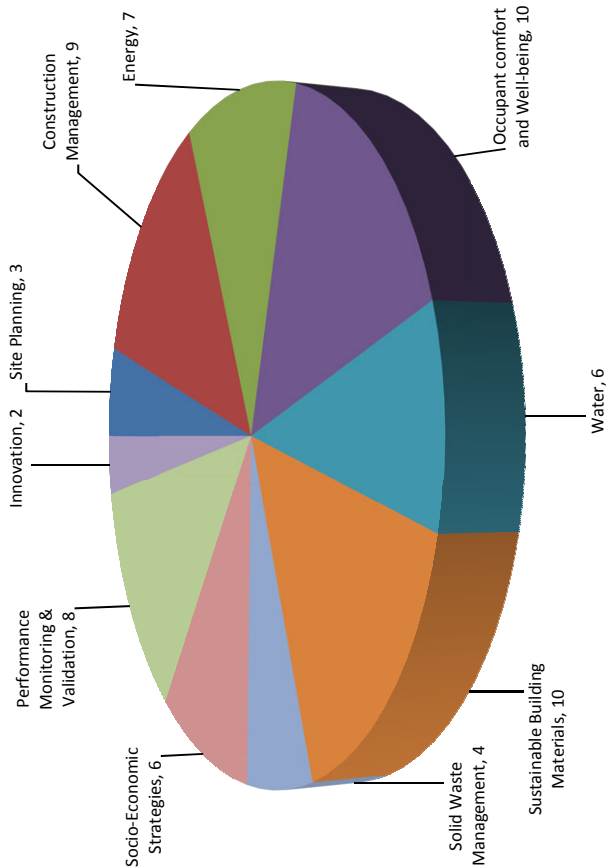
Conclusion:

Based on the above study, we can summarize the summary as below:

Section Wise Break up	Points Attempted
Site Planning	3
Construction Management	9
Energy	7
Occupant comfort and Well-being	10
Water	6
Sustainable Building Materials	10
Solid Waste Management	4
Socio-Economic Strategies	6
Performance Monitoring & Validation	8
Innovation	2

TOTAL MAXIMUM	96
TOTAL PERCENTILE	67.7%
LIKLEY RATING	3 STAR

The study reveals that the project can aspire to achieve “THREE STAR Rating” in GRIHA Rating System, but some serious efforts would be required. The aim would be to achieve at least 4-5 points higher than the threshold points required for the feasible / achievable and desired rating.



Page 49

2018/6/19

<https://tools.grihaindia.org/precert/projectssummary>

GRIHA Pre-Certification
Documentation Tool V 2015



HOME **PROJECT SUMMARY** **DOCUMENTATION**

Project: The Project for
Construction of the International
Cooperation and Convention
Center in Varanasi (18PC0020)

Status: Pending at Client level

Logged: Chetan Bhoj (Client)

PROJECT SUMMARY

Project Code	18PC0020
Project Name	The Project for Construction of the International Cooperation and Convention Center in Varanasi
Registration Type	GRIHA pre-certification
Built up area (sqm)	5117.50
Site area (sqm)	13196.40
Ground coverage (sqm)	4265.41
No. of stories	
Total cost (Rs.)	118000.00

GRIHA Council

添付資料8-14：進捗報告書 (Project Monitoring Report)

Project Monitoring Report
on
The Project for Construction of The International Cooperation and
Convention Center in Varanasi / (Phase II)
Grant Agreement No. 1760420 / 1860100
 July, 2018

Organizational Information

Signer of the G/A (Recipient)	<u>Ministry of Finance</u> Person in Charge <u>Mr. S. Selvalumar</u> <u>Joint Secretary Department of economic Affairs,</u> <u>Ministry of Finance</u> Contacts <u>Address: New Delhi, 110001, India</u> <u>Phone/FAX: 23093881/23092024</u> <u>Email: jsabc-dea@nic.in</u>
Executing Agency	<u>Project Management Unit (PMU) for the Project</u> Person in Charge <u>Mr. R. P. Singh</u> <u>Project Director</u> <u>Project Management Unit for the Project</u> Contacts <u>Address: Behind central office, BHU,</u> <u>Varanasi 221005 India</u> <u>Phone/FAX:0542-236-9418/0542-236-8184</u> <u>Email: pmbhuvns@gmail.com</u>
Line Ministry	<u>Ministry of Housing and Urban Affairs</u> Person in Charge <u>Mr. Sumit Gakhar</u> <u>Under Secretary</u> Contacts <u>Address: Behind central office, BHU,</u> <u>Varanasi 221005 India</u> <u>Phone/FAX: 011-23062040</u> <u>Email: gakhar.sumit@gmail.com</u>

General Information:

Project Title	[Phase I] The Project for Construction of The International Cooperation and Convention Center in Varanasi
	[Phase II] The Project for Construction of The International Cooperation and Convention Center in Varanasi (Phase II)
E/N	[Phase I] Signed date: 14 th September, 2017 Duration: 31 st December, 2023
	[Phase II] Signed date: 18th May, 2018 Duration: 31st December, 2023
G/A	[Phase I] Signed date: 15 th September, 2017 Duration: 31 st December, 2022

	[Phase II] Signed date: 18th May, 2018 Duration: 31st December, 2022
Source of Finance	[Phase I] Government of Japan: Not exceeding JPY <u>2,240 million</u> Government of India: INR <u>285.4 million</u>
	[Phase II] Government of Japan: Not exceeding JPY <u>802 million</u> Government of India: INR <u>131.1 million</u>

1: Project Description

1-1 Project Objective

The objective of the Project is to construct a Varanasi Convention Centre (VCC) that will provide opportunities for social and cultural interactions and the exchange of knowledge, thereby contributing to the socio-economic and tourism development of Varanasi.

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

In December 2015, during a summit meeting between Japan and India, the prime ministers of India and Japan issued a joint statement in the form of the “Japan and India Vision 2025 Special Strategic and Global Partnership”, in which they expressed their satisfaction in the strengthened ties between the cities of Kyoto and Varanasi, two ancient and historic cities integral to their respective cultural heritages. Prime Minister Modi also expressed his expectation that the two sides will explore the development of a convention center in Varanasi.

Following the above announcement, the Detailed Project Reports (DPR) for the Varanasi Convention Centre (VCC) were prepared by the India side and submitted to the Japan side. In response, JICA conducted the Data Collection Survey on Varanasi Convention Centre from November 2016 to May 2017. At the India-Japan Joint Statement in November 2016, while the survey was still being conducted, Prime Minister Modi expressed appreciation for Japan’s efforts to support the construction of a convention center in Varanasi and recognized its symbolic importance as a sign of strengthening bilateral ties.

Based on the results of the survey, both governments agreed in principle to the function and size of the requested facility. Furthermore, JICA decided to conduct the Preparatory Survey (hereinafter referred to as “the Survey”) and dispatch the Survey team to verify the feasibility of the requested project (hereinafter referred to as “the Project”) and to develop the project plan, schematic design and detailed design of the building and equipment, and prepare the draft bidding documents and cost estimation.

The result of the schematic design was presented at the India-Japan Joint meeting in September 2017, in which it was stated that “the two Prime Ministers welcomed the exchange of notes for the construction of a state-of-art Convention Centre in Varanasi as a symbol of friendship between Japan and India and expressed their hope for its early completion”. This project has a symbolic importance as proof of Japan-India bilateral close relations. Overall goal of this project is to contribute to the socio-economic and tourism development of Varanasi.

1-3 Indicators for measurement of “Effectiveness”

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr 2021)
Operation Number of visitors at the facility	-	50,211 visitors/year
Operation Number of international events at the facility	-	6 events/year
Qualitative indicators to measure the attainment of project objectives		
• Create opportunities for social and cultural interactions of the people by a variety of event at the facility. • Bring economic spill-over effects in local industries through tourism development. • Promote events for strengthening international relations. • Strengthen the bilateral relationship between India and Japan.		

2: Details of the Project**2-1 Location**

Components	Original (proposed in the outline design)	Actual
1.	The project site is the southern part of the premises of Varanasi Municipal Corporation, where the existing Auditorium is located, and is shown in Attachment 1. It covers an area of 10,560 m ² . The project site covers the southern section of the premises starting from the south wall of the existing Municipality Cooperation Office Building, and excludes the areas occupied by the existing C.R.P.F. house, petrol station, elevated water tank, and SWM maintenance.	

2-2 Scope of the work

Components	Original* (proposed in the outline design)	Actual*
(1) Building Works	a) Facility components: The total building coverage of VCC is 4,265 m ² , with a total floor area of 9,772 m ² , which includes the basement. b) Zoning Plan: The 1200-seat Main Hall, surrounded by the foyer, is located at the center of the facility. c) Specifications of Each Room • Hall: 843 m², 1,200seats (Fixed flip up seat, stepped floor) • Stage: 438 m² • Gallery/ Meeting Room : 165 m² • Greenrooms: 221 m² • VIP Room: 46 m² • Toilets for the Audience • Basement Parking: 3,930 m², 102 lots d) Structural works e) Aluminum Louver of the Tower f) Ornament on the Eaves g) Signage Work	
(2) Electrical Works	a) Low voltage power supply system within the Project site including installation of distribution panels, cables, conduit pipes and outlets, and PV panels. b) Emergency power supply system providing a diesel engine generator c) Lighting system within the Project site including installation of lighting fixtures, cables, conduit pipes and switches d) Local area network (LAN) within the Project site including installation of switches, cables and LAN outlets e) Telecommunications system applying VoIP within the Project site f) Lightning protection system g) AV System for the Meeting Rooms h) Solar Panels and Generators	

(3) Mechanical Works	a) Water supply system b) Sewage system c) Wastewater treatment facility d) Water tanks e) Fire extinguishing facility	
(4) Stage System Works	a) Stage mechanical system facilities b) Stage Sound system c) Stage Acoustic system d) Stage Lighting system e) Stage AV system	
(5) External work related to the building	a) Road and Path b) Fence c) Parking lots within the site	
(6) Other works	a) Furniture Work b) Generator House	

Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	
	The tentative implementation schedule for the project is expected as attached hereto Attachment 4	The same as in the outline design	

Reasons for any changes of the schedule, and their effects on the project (if any)

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2-4 Obligations by the Recipient**2-4-1 Progress of Specific Obligations**

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost**2-5-1 Cost borne by the Grant (Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
Total				

Note: 1) Date of estimation: August, 2017

2) Exchange rate: 1.00 US Dollar =112.83 JPY, 1.00 INR = 1.89 JPY

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 INR)	
	Original (proposed in the outline design)	Actual (in case of any modification)	Original ^{1),2)} (proposed in the outline design)	Actual
1.	Site Clearance Preparation Works 1) Demolition of the existing building 2) Removal of unnecessary existing structures and trees		2,400	
2.	Installation of Utility Work (Water, Electricity, Sewage and Internet, etc.)		1,450	
3.	Necessary Approvals for Construction		100	
4.	External Works 1) Landscaping and Planting Works 2) Fencing, Guard House, Generator House and Garbage House 3) General Furniture		25,000	
5.	Fee for Authorization to Pay		20	
6.	Taxes		387,533	
Total			416,503	

Note: 1) Date of estimation: August 2017
 2) Exchange rate: 1 US Dollar = 112.83 JPY, 1.00 INR = 1.89 JPY
 3) Cost for both Phase I and Phase II

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery, etc.
- Organization Chart including the unit in charge of the implementation and number of employees.

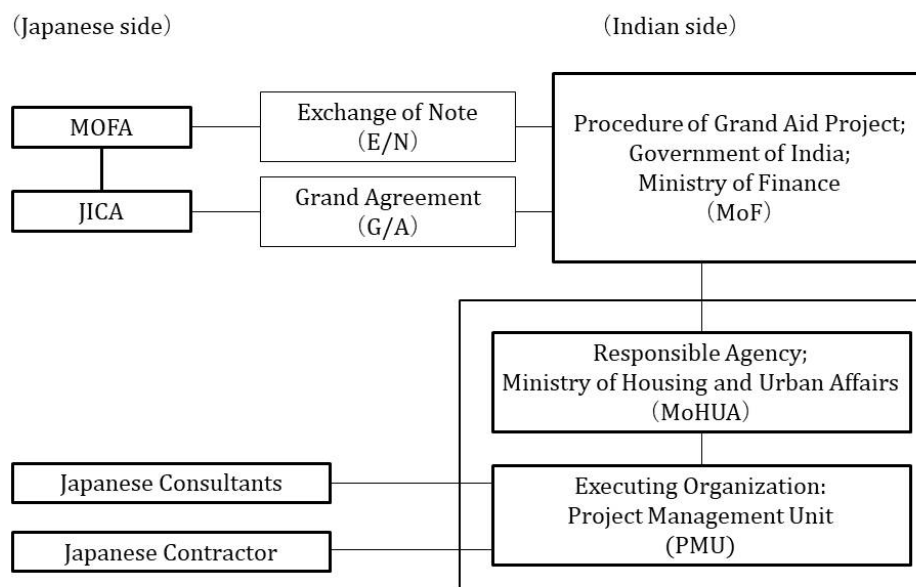
Original (at the time of outline design)

Name: Project Management Unit (PMU)

Role:

Financial situation: Budget for MoHUA

Institutional and organizational arrangement (organogram):



human resources (number and ability of staff):

Project Director (PD): Mr. R. P. Singh (CPWD)

Executive Engineer (EE): Mr. A. K. Singh (CPWD)

Operations Manager (OM): Mr. Ramesh Singh (VMC)

Assistant Engineer (AE): Mr. Abhishek Verma (CPWD)

Actual (PMR)**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 6 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 6 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spare parts, etc.)

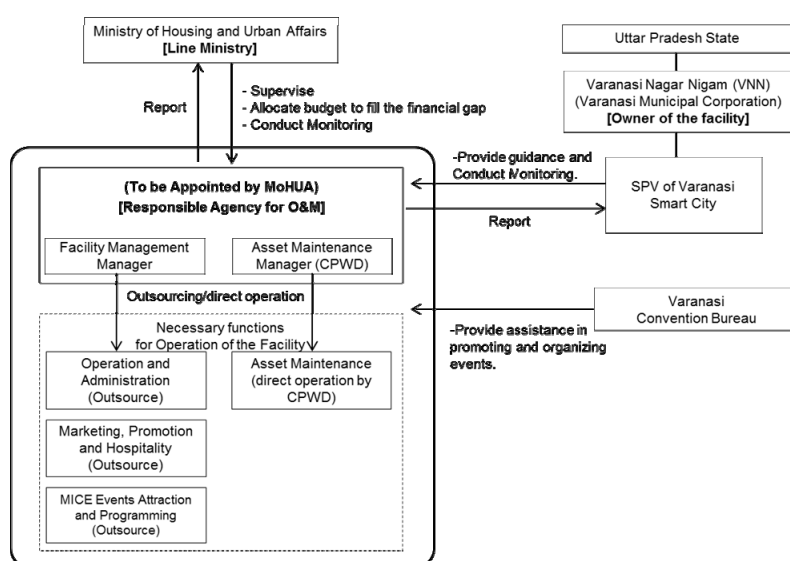
Original (at the time of outline design)

MoHUA proposed from the previous survey that SPV is in charge of the operations management for VCC. However, the existing development list of SPV has not yet formalized for the organization setting-up and development policy concerning the operations of VCC.

Meanwhile, CPWD appointed as the executing agency from MoHUA is suitable for management of construction projects as described above, and has plentiful architects and engineers. However with respect to the operations of theatre facilities with international standard, CPDW has no specialists to assign. For this reason, the Advisory Committee (AC) was established at this design stage, not only for providing the direction of the Project and determining important policies, but also supporting PMU for providing advice in important prerequisites during the design stage toward future operations management.

For operation stage, MoHUA issued the letter that CPWD will be responsible for operating management for VCC and VCC will be financed by their annual budget. Following the letter, CPWD prepared the standard operation procedure (SOP) including operations / maintenance organization and financial plan was submitted from PMU in November 2017.

The organization of operations and maintenance based on this SOP is as shown in the following figure. CPWD will be in charge of the asset maintenance management of VCC, but some parts of the operation tasks, such as marketing and event management, MICE events attraction and programming and operation and administratio, are proposed to be outsourced. Establishment of organization body of VCC, including non-profit entity, requires further study.



Actual (PMR)

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original (*at the time of outline design*)

Occupancy Rate 30% : INR 40,080,000

Occupancy Rate 50% : INR 41,492,000

Occupancy Rate 70% : INR 42,914,000

Actual (*PMR*)

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (*at the time of outline design*)

Potential Risks	Assessment
1. High underground water level	Probability: <u>High</u> /Moderate/Low
	Impact: <u>High</u> /Moderate/Low
	Analysis of Probability and Impact:
	From investigation of the neighboring area, it was confirmed that level of underground water in this area is not so high. However, the result of the soil investigation survey shows high underground water level. There is a doubt of water leakage from the water supply pipe network.
	Mitigation Measures:
	By the recipient side, all the existing water pipes in the site were removed before commencement of the work.
	Action required during the implementation stage:
	The actual situation will be confirmed in the excavation work.
	Contingency Plan (if applicable):
2. Cost for the Phase II Work	Probability: <u>High</u> /Moderate/Low
	Impact: <u>High</u> /Moderate/Low
	Analysis of Probability and Impact:
	It depends on the procurement procedure. In the event of direct contract, it is expected that the contractor may propose high cost for the Phase II work, and it may be hard to negotiate.
	Mitigation Measures:
	Careful evaluation / confirmation of the proposed cost
	Action required during the implementation stage:
	Contingency Plan (if applicable):

3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
Contingency Plan (if applicable):	
Actual Situation and Countermeasures	
(PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

--

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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5-3 Monitoring Plan of the Indicators for Post-Evaluation

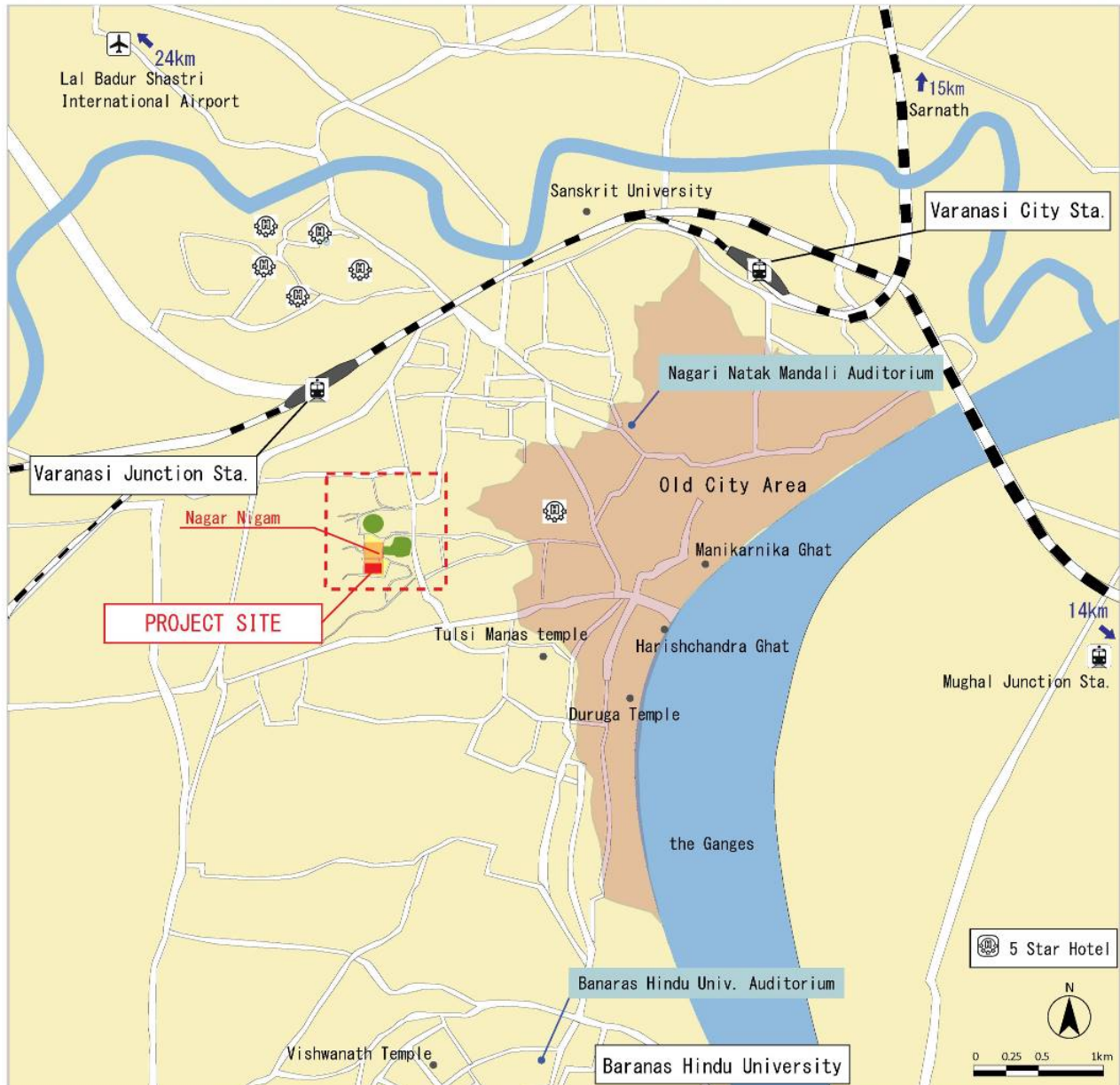
Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
 - Appendix - Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
4. Implementation Schedule
5. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
6. Environmental Management Plan
7. Monitoring sheet on price of specified materials (Quarterly)
8. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
9. Pictures (by JPEG style by CD-R) (PMR (final)only)
10. Equipment List (PMR (final)only)
11. Drawing (PMR (final)only)
12. Report on RD (After project)

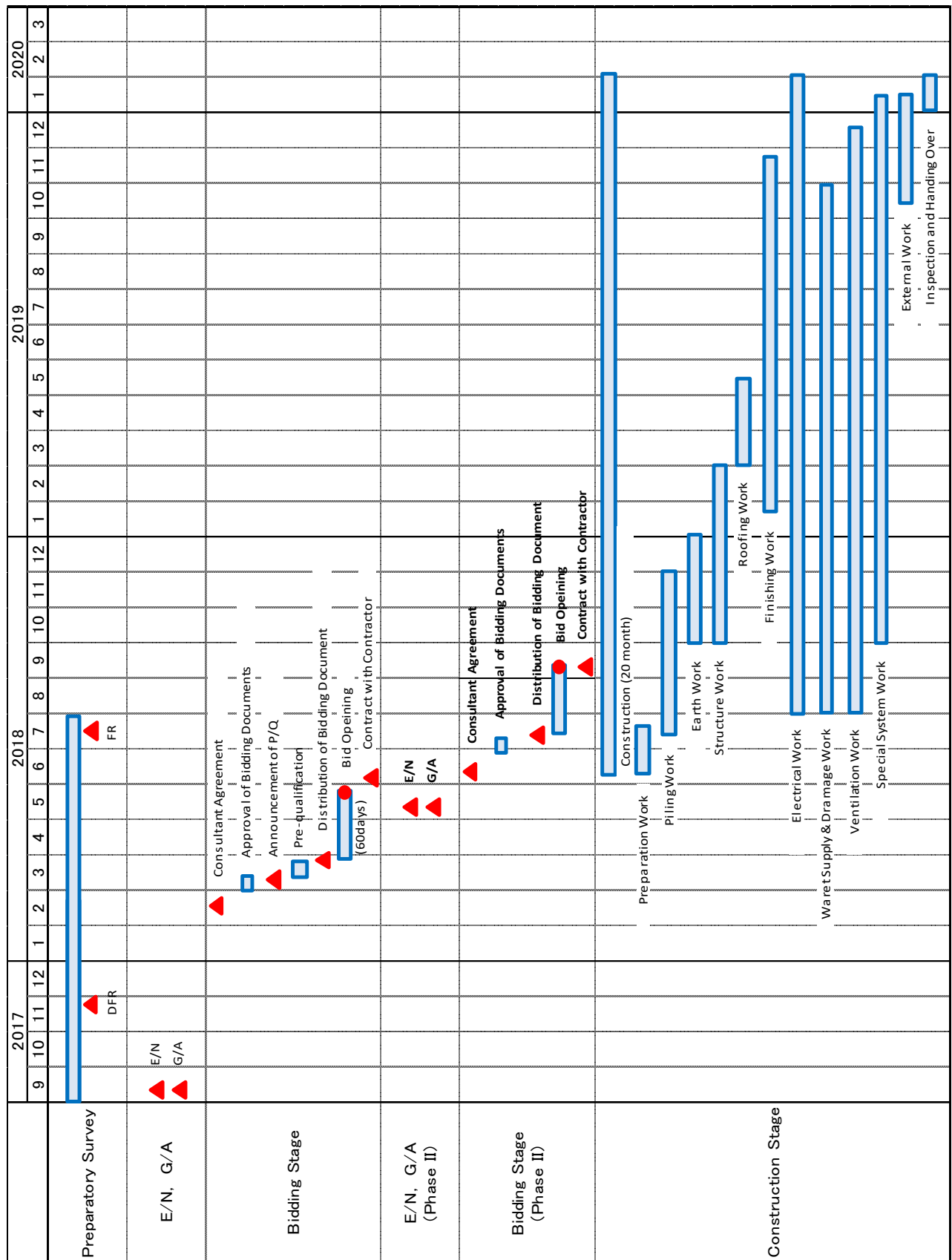
Attachment 1 Project Location Map



Attachment 2 Specific obligations of the Recipient which will not be funded with the Grant

Cost to be borne by Indian Side			
	Item	Quantity	Cost (1,000 INR)
1.	Site Clearance Preparation Works 1) Demolition of the existing building 2) Removal of unnecessary existing structures and trees	1 set	2,400
2.	Installation of Utility Work (Water, Electricity, Sewage and Internet, etc.)	1 set	1,450
3.	Necessary Approvals for Construction	1 set	100
4.	External Works 1) Landscaping and Planting Works 2) Fencing, Guard House, Generator House and Garbage House 3) General Furniture	1 set	25,000
5.	Fee for Authorization to Pay	1 set	20
6.	Taxes	1 set	387,533
Total			416,503

Attachment 4 Implementation Schedule (Phase I + II)



Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials		Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C-D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials		1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

-
-
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

添付資料8-15：免税情報シート

【シート11】企業の所得に課される税金（法人税、等）

注) インドの税率は、国会の予算執行会議で毎年改訂される。以下に記載されている税率は、2017年のインドの財政法に基づくものである。

税目	免除	免税方式	根拠法、 条項	税率 (%)	計算方法	免除申請に関する情報	備考
日系企業に係る 法人税 (商業、製造業、 サービス業に係 る所得税)	○	事前免税 方式	所得税法 (1961)	50% + 教育目的税 2% + 中等・高等教育目的税 1%+ 加算税 (収入： INR 100million 以下：収 入の 2%、 INR100million 超：収入 の 5%)	詳細は添付資料 1 参照	申請先：財務省所得税局長 手順 1) 実施機関は、財務省所得税局長に対し、免税 申請書を提出しなければならない。 2) 第 10 条(42)に基づく免除となる。 3) IT 部門による評価。確認後、財務省から免 除通知が発行される。 4) 通知はインドの官報に掲載される。 5) この通知により指定された所得区分は課税 対象から除外される。	—
第三国企業に係 る法人税	○	事前免税 方式	所得税法 (1961)	50% + 教育目的税 2% + 中等・高等教育目的税 1%+ 加算税 (収入： INR 100million 以下：収 入の 2%、 INR100million 超：収入 の 5%)	詳細は添付資料 1 参照	申請先：財務省所得税局長 手順 1) 実施機関は、財務省所得税局長に対し、免税 申請書を提出しなければならない。 2) 第 10 条(42)に基づく免除となる。 3) IT 部門による評価。確認後、財務省から免 除通知が発行される。 4) 通知はインドの官報に掲載される。 5) この通知により指定された所得区分は課税 対象から除外される。	—
現地企業に係る 法人税	—	—	所得税法 (1961)	25-30%	詳細は添付資料 1 参照	—	—

CALCULATION OF TAXBLE INCOME				
Surcharge				
Particular	If net income does not exceeds Rs. 1 Crore	In net income is in range of Rs. 1 Core- Rs.10 Crore	If net income exceeds Rs. 10 Crore	
Domestic Company	Nil	7%	12%	
Foreign Company	Nil	2%	5%	

CALCULATION OF TAXBLE INCOME		
Calculation of Taxable Income under Corporate Income Tax:		
Particulars	Amount	
Profit as per Books of Accounts	xxx	
Add		
• Depreciation debited to Profit & Loss Account	Xxx	
• Expense which have been debited to Profit & Loss Account but are not allowable as deduction under Income Tax Act	Xxx	
Less-		
• Depreciation allowable as deduction u/s 32 of Income Tax Act, 1961	Xxx	
• Expenditure which are not claimed in Profit & Loss account but are allowable as deduction under Income Tax	Xxx	
Add: Any other Income / Expense under any head of Income Tax	xxx	
Gross Total Income		
Less: Deduction allowable under chapter VI of Income Tax	xxx	
Taxable Income		
Taxable Liability	xxx	

Income tax rate of Companies		Tax (%)
Particulars		
In case of a Domestic Company		
- Where its total turnover or gross receipt during the previous year 2015-16 does not exceeds Rs. 50 Crore		25
- Any other Domestic Company		30
In case of a Foreign Companies		
- Royalty received from Government or an Indian concern in pursuance of an arrangements made by it with the Indian concern after March 31, 1961 but before April 1, 1976, or fees for rendering technical services		50
- Other Income		40

【シート 2】 個人の収入に係る税 (個人所得税)

注) インドの税率は、国会の予算執行会議で毎年改訂される。以下に記載されている税率は、2017 年のインドの財政法に基づくものである。

税目	免除	免税方式	根拠法、 条項	税率 (%)	計算方法	免除申請に関する情報	備考
日系企業に雇用されたコンサルタント (インド居住者以外) に係る法人税	○	事前免税方式	所得税法 (1961):10(8A) & 10(8B) & 10(88)	添付資料 2 に 定義	添付資料 3 参照	申請先:財務省所得税局 手順: 1) 各個人はまずインドの所得税ポータルで "IT Return" を提出する。 2) 所得税法 (1961):10(8A), 10(8B) & 10(88) に該当する免税の申告	
日系企業の日本人従業員に係る所得税	○	事前免税方式	所得税法 (1961): 10 (6) (vi)	添付資料 2 に 定義	添付資料 3 参照	申請先:財務省所得税局 手順: 1) 各個人はまずインドの所得税ポータルで "IT Return" を提出する。 2) 所得税法 (1961):10(8A), 10(8B) & 10(88) に該当する免税の申告	全従業員は PAN に申し込む必要がある。さもなければ最大税率の所得税を支払わなければならない。
現地建設会社従業員に係る所得税及び所得税法:(1961) 10(8A), 10(8B), 10(88) & 10(6)(vi)による免税対象とならない邦人従業員	—	—	所得税法 (1961)	添付資料 2 に 定義	添付資料 3 参照	所得税法 (1961): 10(8A), 10(8B), 10(88) & 10(6)(vi) の適用利用不可。	主にインドに 90 日以上滞在している邦人従業員を含む。従って上記 Point1 に依る免除の対象にはならない。
邦人に係る源泉徴収	○	事前免税方式	所得税法 (1961) 195 項: 源泉徴収 (TDS)	添付資料 2 に 定義	添付資料 3 参照	申請先: 財務省所得税局 手順: 1) 日系企業は税金の割当番号(納税者番号)を取得。 2) 日系企業は該当する従業員の給与から源泉徴収分を控除する。 3) TDS Returns を四半期ごとに提出する。	

第三国出身者に 係る源泉徴収	○	事前免税 方式	所得税法 (1961) 項：源泉徴収 (TDS)	添付資料 2 に 定義 定義	添付資料 3 参照	申請先：財務省所得税局 手順： 1) 日系企業は税金の割当番号(納税者番号)を取得。 2) 担当者が該当する従業員の給与から源泉徴収を 控除する。 3) TDS Returns は四半期ごとに提出する。	
現地建設会社作 業員に係る源泉 徴収	—	—	所得税法 (1961) 項：源泉徴収 (TDS)	添付資料 2 に 定義 定義	添付資料 3 参照	申請先：財務省所得税局 手順： 1) 日系企業は税金の割当番号(納税者番号)を取得。 2) 担当者が該当する従業員の給与から源泉徴収を 控除する。 3) TDS Returns は四半期ごとに提出する。	

Income Tax Slab Rates for FY 2017-18 (AY 2018-19)**PART I: Income Tax Slab for Individual Tax Payers & HUF (Less Than 60 Years Old)**

Income Slab	Tax Rate
Income up to Rs 2,50,000*	No tax
Income from Rs 2,50,000 – Rs 5,00,000	5%
Income from Rs 5,00,000 – 10,00,000	20%
Income more than Rs 10,00,000	30%
Surcharge: 10% of income tax, where total income exceeds Rs.50 lakh up to Rs.1 crore.	
Surcharge: 15% of income tax, where the total income exceeds Rs.1 crore.	
Cess: 3% on total of income tax + surcharge.	

Income Tax Slab Rates for FY 2017-18 (AY 2018-19)**PART II: Income Tax Slab for Senior Citizens (60 Years Old Or More but Less than 80 Years Old)**

Income Slab	Tax Rate
Income up to Rs 3,00,000*	No tax
Income from Rs 3,00,000 – Rs 5,00,000	5%
Income from Rs 5,00,000 – 10,00,000	20%
Income more than Rs 10,00,000	30%
Surcharge: 10% of income tax, where total income exceeds Rs.50 lakh up to Rs.1 crore.	
Surcharge: 15% of income tax, where the total income exceeds Rs.1 crore.	
Cess: 3% on total of income tax + surcharge.	

Income Tax Slab Rates for FY 2017-18 (AY 2018-19)

PART III: Income Tax Slab for Senior Citizens (80 Years Old Or More)

Income Slab	Tax Rate
Income up to Rs 2,50,000*	No tax
Income up to Rs 5,00,000*	No tax
Income from Rs 5,00,000 – 10,00,000	20%
Income more than Rs 10,00,000	30%
Surcharge: 15% of income tax, where total income exceeds Rs.1 crore.	
Cess: 3% on total of income tax + surcharge.	

Income from salary can be computed as follows:

Particulars	Amount
Basic Salary	-
<u>Add</u>	-
1. Fees, Commission and Bonus	-
2. Allowances	-
3. Perquisites	-
4. Retirement Benefits	-
5. Fees, Commission and Bonus	-
Gross Salary	-
Less: Deductions from Salary	-
1. Entertainment Allowance u/s 16	-
2. Professional Tax u/s 16	-
3. House Rent Allowance u/s 10(13A)	-
4. Any Other Allowance u/s 10	-
Net Salary	-
<u>Less</u>	-
Deduction Chapter VI of Income Tax Act	
Taxable Salary	-
Tax Due	-

【シート 3】間接税 (GST、等)

注) 2017 年 1 月より GST 法が施行され、物品税、サービス税、VAT(付加価値税)は GST に包括されることとなり、大部分の関節税や関税が不要となった。

税目	免除	免税方式	根拠法、条項	税率 (%)	計算方法	免除申請に関する情報	備考
物品サービス税 (Goods and Service Tax (GST))	—	事後還付方式	The Goods & Services Tax Act, 2017	1) 物品に対する GST 率 http://www.cbec.gov.in/resources/htdocs-cbec/gst/goods-rate-s-booklet-03July2017.pdf http://www.cbec.gov.in/resources/htdocs-cbec/gst/services-booklet-03July2017.pdf 2) サービスに対する GST 率 http://www.cbec.gov.in/resources/htdocs-cbec/press-release-10-11-2017.pdf	GST 法による。	1. 納税には税務登録証明書の発行が必要。 申請先：インド財務省物品税・関税中央委員会 手順： a) 非居住課税対象者は、業務の開始の少なくとも 5 日前までに、直接または局長から通知された Facilitation Centre を通じて、署名済み申請書 (GST REG-09 フォーム) と有効なパスポートとともに電子申請する。 b) 非居住者の課税対象者として登録を申請した者は、27 項の税金の事前納付を行うための共通ポータルの一時的参照番号を与えられ、その後、規則 1 の副規則(5) に基づく承認が与えられる。 c) 副規則(1)に基づき登録を申請する者は、GST 法 27 項(2017)に規定されているように、登録が求められる期間、当該人物の推定納税額に相当する税金を事前納付しなければならない。 d) 登録の確認及び授権に関する規則 2 及び規則 3 の条項は、この規則に基づいて提出された出願に適用する。 説明 - 非居住課税対象者の登録申請書には、有効な PAN を持ちインドに居住する、代筆可能な権限をもった者 (代理人) が署名するものとする。 所要日数：15 日間	—

				3) 税率の改定 http://www.cbec.gov.in/resources/press-release/CBEC_Press_Release_dt_16.1.2017after_on_GST%20Rate_Changes.pdf		2.免税手続き 申請先：中央監視機関 手順： a) 本件において JICA と「イ」国政府との間で締結された G/A では、MOHUA または UP 州の都市開発局がすべての間接税を負担するとされている。 b) したがって、本件で発生した GST は、MOHUA と州の UDD が負担する。 c) 免税は認められないが、日系企業は、下記の手順に従って、年度末に支払われる GST の払い戻しを求めることができる。 d) 還付申請書は G/A 当事者である JICA 経由で入手可能。 e) 供給業者/納入業者/建設会社/下請け会社（国内外とも）に支払われる GST は、中央の MOHUA または納税申告書に基づく州の UDD によって払い戻される。上記のすべての供給業者/納入業者が challans & the Returns のコピーを実施機関に提出することが前提となっている。 f) 実施機関は、払い戻しのために書類を政府-中央の MOHUA と州の UDD に提出する。 g) 払い戻し時期は、年間売上高が INR 1.5Crore 未満の場合は、GST の払い戻しは 4 半期に 1 度。年間売上高が INR1.5Crore 以上の場合は、GST の払い戻しは毎月行われる。	
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(注) 2017年1月よりGST法が施行され、物品税、サービス税、VAT(付加価値税)はGSTに包括されることとなり、大部分の関節税や関税が不要となった。

税目	免除	免税方式	根拠法、 条項	税率 (%)	計算方法	免除申請に関する情報	備考
輸出入業者コード(IEC)	—	—	インド関税法 1962	—	—	申請先：商工省商務局・外国貿易部（DGFT） 手順： 1) プロジェクトのための機材/材料の輸出入を希望する企業/人物は、DGFTへ申請し IEC コードを取得する。 2) 申請には、以下の書類を申請書と一緒に提出する： PAN、申請者の銀行口座残高証明書、支払済小切手、DGFT 名義で Rs.2000 の法定手数料、役員/パートナーのパスポートサイズの写真、組織の登録のコピー 3) DGFT は、IEC コードを発行する。 期間：1 ヶ月	—
海外輸入品	○	事前免税方式	インド関税法 1962	関税率 http://cbec.gov. in/Cbec Reva mp_new/htdocs -cbec/customs/ cstl617-02021 7/cstl617-0202 17-idc	—	申請先：MOHUA または MOU&D 手順： 1) 本件において JICA と「イ」国政府との間で締結された G/A では、MOHUA または UP 州の都市開発局がすべての間接税を負担するとされている。 2) 本件で関税局に支払われる関税は MOHUA と UDD が負担する。 3) 免除は認められていないが、日系企業は、下記の手順に従って、年度末に支払われる関税の払い戻しを求めることができる。 4) 還付申請書は JICA から送付される。 5) 本件の輸出入に伴う関税は MOHUA と州の UDD が負担する。	—

[illegible]

【シート5】その他、優先的に免税を確保すべき税目

注) インドの税率は、国会の予算執行会議で毎年改訂される。以下に記載されている税率は、2017年のインドの財政法に基づくものである。

税目	免除	免税方式	根拠法、 条項	税率 (%)	計算方法	免除申請に関する情報	備考
その他の税金および課税額	○	免税	現地の法律	—	バラナシ市 企業条例に 従う	請求先：州の UDD 手順： 1) 本件において JICA と「イ」国政府との間で締結された G/A では、MOHUA または UP 州の都市開発局がすべての間接税を負担するとされている。 2) したがって、本プロジェクトで支払われる地方税/市税は州の UDD によって免除される。	