



NATIONAL BIM e-SUBMISSION (NBeS) Model Import Guidebook – For PSP/SP



MODELING GUIDELINES FOR THE COMPLIANCE OF BUILDING
USING NBeS E-CHECKING SYSTEM
DURING BUILDING PLAN SUBMISSION STAGE

VERSION 3.0

FOR PURPOSE GROUP



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This Guidebook is written with step by step modeling instruction during the BIM modeling process. The PSP/SP or their BIM modelers & coordinators are expected to read & understand this Guidebook before preparing any BIM model or models ready to be exported out to e-checker for compliance testing. This Guidebook may from time to time be superseded with a revised and improved version. Therefore, PSP/SP shall occasionally check with CIDBEC for the latest version and to review all changes before preparing any BIM model for testing.

EXPECTATION

The expectation of BIM modelers to understand and add parameters into the BIM model as outlined in the Guidebook requires their understanding of the Malaysian Bylaws, managing Revit parameters/properties and the PBT submission requirements. PSP/SP's and their BIM modelers are expected to be properly trained by CIDBeC's training program or any CIDBeC's authorized training facilities.

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This guideline is only focused for Building Plan Submission by Principal Submitting Person (PSP) - Architect, their BIM modelers and Coordinators.

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1.0 INTRODUCTION

The conception and development of National BIM e-Submission (NBeS) falls under “Productivity” which is one of the “Four Strategic Thrusts” of Construction Industry Transformation Program (CITP) to transform Malaysia’s Construction Industry. With the rise in I.T. technologies in all forms of industries, the use of Building Information Modeling (BIM) in the AEC (Architecture, Engineering & Construction) Industry has become an essential tool to deliver high productivity, collaboration, time & cost saving and accurate building design to construction.

CIDB Malaysia since 2012 has led the way to assist industry construction players to adopt BIM as a delivery platform to improve the construction delivery platform. CIDB has also collaborated closely with design practitioners & education ministry such as PAM, IEM, RISM, REDHA, MOHE etc to make aware of the nation’s CITP vision to successfully deliver this programme by the year 2020.

The current Building Plan Submission to Local PBT is through the “One Stop Centre (OSC)” of each Local Council via OSC 3.1, which involves the local authority and external technical department consultant by PSP/SP prior to submission of the building plan. PSP/SP shall produce the support letter from all the consulted agencies during building plan submission.

The following PBTs have been identified and agreed to participate in the NBeS pilot project in the effort to be part of NBeS building plan submission program. They are :-

- Perbadanan Putrajaya (PPj)
- Majlis Bandaraya Petaling Jaya (MBPJ)
- Majlis Perbandaran Kangar (MPK)
- Majlis Bandaraya Melaka Bersejarah (MBMB)
- Majlis Perbandaran Kulim, Kedah (MPKK)

This version of the NBeS PSP/SP BIM modeling guide is written and intended for buildings that fall under Designated Purpose Group I - Small Residential, III - Other Residential, IV - Office, V - Shop & VI - Factory.

NBeS process involves initially with PSP preparing a 3-dimensional LOD 300 model of the project from the NBeS Revit template obtained from the Local PBT. The PSP should first register with the Local PBT to inform of their intention to submit for NBeS’s Building Plan Approval whereby the 3-dimensional ifc model are subjected to digital information processing. The NBeS system can view the 3-D model and the 3-D elements will show both compliance and non compliance data when checked against the UBBL’s & local council’s rulesets. A report can be generated to display the results of the checking.

1.1 About NBeS

National “Building Information Modeling” (BIM) e-Submission (NBeS) modeling guideline compliance builds on procedures and methodologies from a consensus of experienced BIM architectural practitioners. This guideline is developed by a team of consultants appointed by CIDB e-Construct Sdn Bhd who have more than 10 years knowledge & understanding of BIM process, experienced LAM Registered PSP/SP Architects.

This framework focuses primarily on the adaptation of those standards for practical and optimum utilisation of Revit Architecture for internal purpose only. Terminology and reference to functionality is based around the Autodesk Revit platform.

The objectives are:

- Utilization project-based template of BIM model submission for new development under the following Designation of Purpose Group I, III, IV, V & VI
- To ensure the digital BIM model is modeled with the required data/parameters used for NBeS checking against relevant bylaws, standards & PBT technical requirements.
- To standardized naming conventions of parameters used for checking and best modeling practices that will ensure delivery of high quality and uniform BIM modeling output across to NBeS e-Checker System.

1.2 Goals

NBeS is developed to establish a uniform and efficient building plan submission via a BIM model e-checker system which is setup for participating local authorities across the nation. The establishment of “NBeS Revit template” is customized to suit the local building plan submission process, taking into consideration other approved KM parameters such as car park requirements, density, plot-ratio, maximum height of building, KM approval information etc.

NBeS will be the first in Malaysia to take the building plan approvals process to the next level by digitizing the building by- laws, fire regulations and other related local PBT technical compliance into the BIM platform. It is earmarked as an important innovation in Malaysia’s building industry by leveraging on the forward evolution of BIM technology. It is acknowledged to be the tool to enhance competency & productivity levels of our local BIM Modellers, Coordinators and Managers to compete globally.

Henceforth, the effort made by the Malaysian Government through NBeS development will further support the “ease of doing business”; which is one of the criteria introduced by the World Bank. One of the categories was ‘dealing with construction permits’. (PAM,2019) Currently, Malaysia is ranked at third place for the year 2019, in dealing with construction permits, which included all procedures for a business in the construction industry.

1.3 Benefits

A NBeS template is developed to standardize and to optimize for PSP/SP to embark into digital building submission approval to the local PBT across the nation. The approval result shall be automated and time optimized to reduce manual checking by the PBT’s staff and officers henceforth, a more transparent process, increased productivity and confidence to the investors, developers, house owners and the communities.

1.4 Scope and Limitation

NBeS is currently developed to enable BIM model submission for new development designation of purpose groups which includes: • I -

Small Residential

- III - Other Residentials
- IV - Office
- V - Shop
- VI - Factory

1.5 How to use the Guidebook

The order of chapters has been carefully thought out with the intention of following a logical architectural modeling workflow process. The NBeS Revit Template can be used to “jumpstart” the adoption of NBeS by eliminating the need to load each shared parameter individually and manually sort the properties into the correct grouping. It is mandatory for the PSP/SP, their BIM modelers, coordinators and managers to attend CIDB’s or other NBeS’s licensed training centres to learn and understand the 3-d modeling & parameter input process. After the training, this guidebook shall serve as a reference to recall what has been taught during the training sessions. You may be overwhelmed in the beginning but rest assured with help from CIDB and the training centres, you will be able to overcome and understand the NBeS process with ease.

1.6 Guidebook Updates (Period of Revision/Dates)

Registered PSP/SP users with CIDB, NBeS Training Centres or PBTs shall be informed of any revisions to this guidebook. We encouraged the PSP/SP to comment and to feedback any errors or to suggest any technical modeling improvements to the IT developers via a comment section in the NBeS website. These feedbacks shall be compiled, reviewed and may be adopted into the revised NBeS Guidebook. Credit shall be given to feedback contributors for their efforts in making NBeS a successful building plan e-checking and approval software.

1.7 References

Below are a list of by-law, references and guide books which we have referred to in the preparation of this Guidebook. They are:- ●

Street, Drainage & Building Act 1974

- Uniform Building by-Law 1984
- MS1183:2015 Fire safety in the Design, management and use of building – Code of Practice :2014 Universal design and accessibility in the built environment – Code of Practice
- AEC (UK) BIM Standard for Autodesk Revit; A workable implementation of the AEC (UK) BIM Standard for the Architectural, Engineering and Construction Industry in the UK. (Version 1.0 and Version 2.0)
- Singapore BIM Guide: BIM Essential Guide for Architectural Consultants
- Singapore BIM Guide : BIM Essential Guide for BIM Adoption in an Organization
- The Aubin Academy; Revit Architecture 2016
- Revit IFC Manual; Detailed Instruction for Handling IFC Files
- Guide to Fire Protection in Malaysia
 - Sistem Pengumpulan & Penggunaan Semula Air Hujan - Jabatan Perancangan Bandar & Desa Semenanjung Malaysia

1.8 NBeS Revit Template

A Revit architectural project startup template named “NBeS Revit 2022 Template V2.0” is set up for the NBeS modeling. This template can be downloaded from CIDBeC’s website or the Local Council website. Template update versions shall be notified to any registered PSP/SP with CIDBeC, Local PBTs or NBeS Training Centres when there is a latest version available for download. PSP/SP may use this template as part of their Office BIM workflow provided that they have registered with the owner of NBeS which is CIDBEC, Malaysia. The PSP/SP is advised to always start a BIM 3-d model with the latest available template. PSP/SP who have already developed their standard office template shall be required to import their standard families into the NBeS Revit template and not the other way around to ensure that the set parameters are not changed and may affect the e-checker from functioning properly.

1.9 NBeS BEP

NBeS required accurate modeling, checking & verification protocols to be established early into the project in order to minimize keyed-in errors. The NBeS system has no AI features built-in except for elements that have vectorial parameters which the system can verify and confirm. Therefore, the PSP/SP’s BIM office is recommended to attend NBeS training/workshop organized by CIDBEC to help them to understand this Guidebook and to devise an office BEP and change management to verify all required data before any model submissions are made. In the template, NBeS Schedules are prepared to assist the modelers to enter parameters which shall be used in NBeS to check against preset rulesets. PSP/SP shall print and check the parameters before signing off to be used as part of the submission document to Local PBT. The responsibility for ensuring the BEP is followed falls on the shoulder of the firm and the submission person.

1.10 Key Personnel

PSP's key person or persons in the NBeS submission must be identified along with their roles, contributions, and right access, modification and use. This process becomes dramatically more complicated as the circle of key persons expand beyond the design professionals. Responsibilities must be established. Most often, this will focus on a single entity responsible for the model with each contributor responsible for its content, along with a process and schedule for input and validation. The following are the proposed task responsibilities of each key person dealing with NBeS template, including but not limited to : .

Table 1 NBeS Task Responsibility

Key Person	Scope of Work
PSP/ Signing Architect	● Provide final approval for upload to the system ● Digitally sign the drawings and forms required for submission
BIM Manager/ Project Architect	● Leads, establishes, and assures development and compliance in NBeS. ● Overall responsibility for the proper use, implementation, and deliverables of BIM models conformance with the NBeS. ● Assures proper deliverables are met and provided in requirements as specified in NBeS Guidelines. ● Present compliance schedules to PSP for approval after verifying and confirming BIM coordinators' task. ● Review model before uploading NBeS Model to portal to test, and final upload for Building Plan submission ● Monitor approval status and report submission issues to the Local Council. ● Report to PSP on status on the submission
BIM Coordinator/ Graduate Architect	● Prepare, monitor NBeS BEP requirements and ensure BEP is followed by BIM modelers. ● Train BIM modelers on the NBeS requirements and BIM workflow. ● Manage families & all relevant parameters to be updated and used in models. ● Develop project information and data. ● Coordinate and check BIM processes, file naming structure, file sharing management, parameter input, output submission schedules. ● Check ruleset compliances and present them to BIM Manager ● Check submission drawings.
BIM Modeler/ Assistant Architect	● Prepare, revise, and update models during the schematic and design development phase. ● Prepare NBeS schedule and set NBeS element parameters. ● Prepare submission drawings. ● (Note: The submission drawings may not be required in the future once the drawings are embedded into the submission model)

1.11 NBes Technology

BIM models consist of data which are used in NBes e-Submission to extrapolate and compared with preset UBBL program rulesets. An NBes template is currently developed inside the Autodesk Revit platform and will be progressively updated and improved from time to time. Latest template shall be uploaded to the CIDB e-Construct website from time to time. PSP/SP shall always check the NBes portal for a newly released template and guidebooks. The system is flexible to allow any modification of rulesets to align with the Local Council deviation requirements and any future changes in the bylaws. It will generate results efficiently without any human interference in the processing hence increase in productivity in processing building plan approvals especially for more complex large projects.

1.12 Master Definition list

The following terms define the concepts of BIM and data structures used in this Standard.

Table 2 Master definition List

Abbreviation	Definition	Abbreviation	Definition
BIM	Building Information Modeling	SPPSAH	Sistem Pengumpulan & Penggunaan Semula Air Hujan
NBeS	National Building Information Modeling (BIM) e-Submission	SPAHA	Sistem Pengumpulan & Penggunaan Semula Air hujan
FSR	Fire Safety Requirement	BEP	BIM Execution Plan
IFC	Industry Foundation Class	MS	Malaysian Standard
MVD	Model View Definition	UBBL	Uniform Building by-Law
PBT	Pihak Berkuasa Tempatan ie Local Council	PSP/SP	Principal Submission Person/Submitting Person
PSP	Principal Submitting Person	OSC	One Stop Centre
BP	Kelulusan Pelan Bangunan ie Building Plan Approval	JBPM	Jabatan Bomba & Penyelamat Malaysia
KM	Kebenaran Merancang		
CPS	Car Parking Space		
MPS	Motor Parking Space		

OKU	Orang Kurang Upaya		

2.0 NBeS OVERVIEW

NBeS Building Plan submission/approval process has not changed from the current OSC 3.1 where it still involves the following departments:-

1. Jabatan Bangunan
2. Jabatan Bomba & Penyelamat Malaysia
3. Jabatan Kejuruteraan, Perparitan dan Saliran
4. Department of Civil Aviation (for some high rise building in close proximity to an airport)

Only one (1) exported Revit BIM model saved in ifc format is required to be uploaded to the NBeS e-checker system after registration of the project. A pdf copy of the submission drawings may be required to be uploaded pending on the Local Council you are dealing with.

It was suggested by CIDBEC that NBeS be used by the PSP/SP to upload their Building Plan Model for compliance testing before a final model to be officially submitted to the Local PBT for approval. The administrator of Jabatan Bangunan shall forward the relevant models to the officer in-charge of the project. The PSP/SP registration to use the system will be advised by OSC.

The results of the NBeS e-checker will be automatically informed to both PSP/SP and officers in the Local Council. The results may be viewed by both parties. Within a stipulated time, an official approval or comments shall be issued from Local Authority. Any comments which require the model to be amended or written in to comply can be prepared for further NBeS model checking and compliance. Once approved, the PSP/SP shall prepare the hard copies required within the period given for endorsement of the Building Plans for safe keeping.

2.1 Revit Approach

Revit Element Organisation is divided into three (3) categories; i) Model Element, ii) View Element and iii) Annotation Element. NBes parameters were created using all these elements based on its required information in relation to building guidelines and regulations. The parameters created in different forms i.e text, area, volume etc, according to its element category.

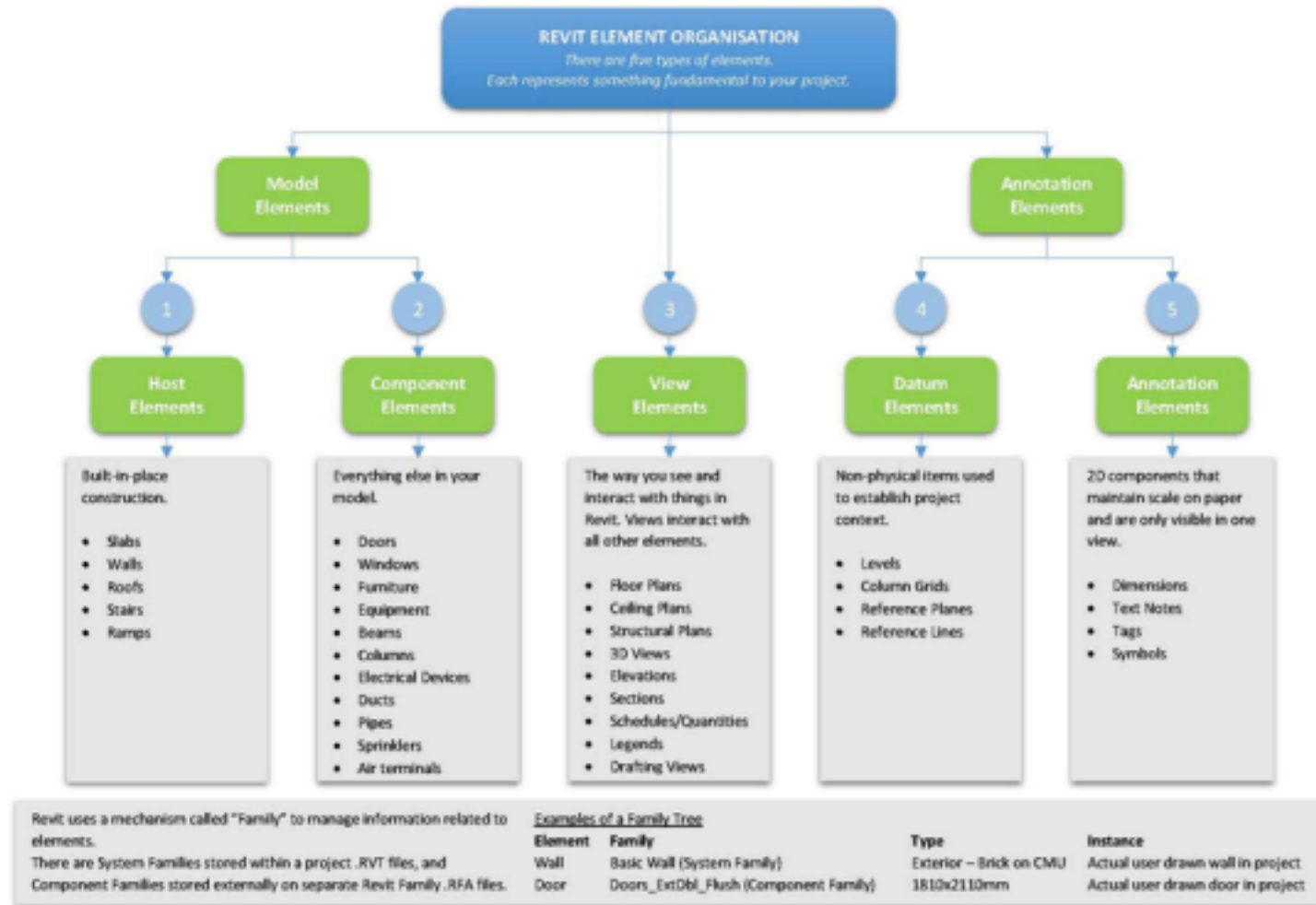


Figure 1

The following are some examples of parameters created across the Revit Elements Organisation Category, according to the above diagram:

Table 3 Element category

Revit Elements Organisation Category	Item
Model Element	- Walls - Floors - Columns & Beams - Roofs - Doors & Windows - Ramps - Stairs - Railings - Specialty Equipment (Fire Hydrant, Hose reel etc.) - Line-based family and many more
View Element	- Area (Fire Provision) - Schedules
Annotation Element	- Project, Site, Building, PSP/SP & Client Information - Self declaration for Green Building and Fire Protection Information - Rooms/Spaces, standard space naming conventions

2.2 What is IFC?

IFC is defined as Industry Foundation Classes, an object-based format. IFC enables exchange of information between different BIM authorized software platforms. It is a global standard used to describe, share and exchange construction and facilities management information. IFC format is supported by about 150 software applications worldwide and the flexibility in interoperability is crucial as construction workflow becomes increasingly collaborative. To achieve BIM's full potential the industry requires a robust mechanism to exchange the ever increasing levels of digital data, regardless of what software package or BIM platform is used.

NBeS is being developed based on the IFC2x3 Coordination View Version 2.0 release and models are exported in that format for model checking. According to Revit IFC Manual; Detailed Instruction for Handling IFC files, 2016 , IFC2X3 is currently the most supported and stable format, certified in

Revit and recommended for production. Furthermore, the version is optimised for coordinated exchange of BIM models between the main disciplines in the industry. It is also known as CV 2.0, which was widely used and supported Model View Definition (MVD). The version further supports the rudimentary parametric derivation of building elements when importing to planning tools. The MDV produced through the IFC2X3 is primarily used for exchanging models between architectural, engineering and MEP.

Table 4 Model tool Export to ifc type

Revit Input Parameter or Architecture Tool to model	Exported ifc Class	Building Element
ifc authoring file Information	ifcProject	-
Project Information	ifcBuilding	-
Project Information	ifcSite	-
Wall Tool	ifcWall	Partition Wall, Retaining Wall
Door Tool	ifcDoor	Door
Window Tool	ifcWindow	Window
Column Tool	ifcColumn	Column
Roof Tool	ifcRoof	Roof

Floor Tool	ifcSlab	Floor, Structural Foundation ie footing, pile-cap
Curtain System Tool	ifcCurtainWall	Curtain wall
Ceiling Tool	ifcCovering	Ceiling
Railing Tool	ifcRailing	Railing
Ramp Tool	ifcRamp	Ramp
Stair Tool	ifcStair	Stair
Room Tool	ifcSpace	Space
Site Tool	ifcSite	Site
Site Tool	ifcBuildingElementProxy	Vehicle Parking Space, Road, Topography
Component Tool - Specialty Equipment Family	ifcFireSuppressionTerminal	Hydrant, Sprinkler, Dry Riser, Wet Riser, Hose Reel, Fire Extinguisher

Revit Input Parameter or Architecture Tool to model	Exported ifc Class	Building Element
Component Tool - Specialty Equipment Family	ifcFlowTerminal	Emergency Light, Exit Light Box,
Component Tool - Fire Alarm Family	ifcDistributionControlElement	Smoke Detector, Heat Detector, Fire Alarm

* Note: Model in-place shall be placed in an appropriate family category and ifc class shall be assigned accordingly to the above list. 23

3.0 BUILDING LAWS AND REGULATIONS ADOPTION AS NBeS RULESET PARAMETERS

Besides NBeS rulesets being incorporated into the NBeS e-checker system, a NBeS Revit template is prepared with standard parameters and rulesets and modeled elements can be listed out in the element Schedules. These schedules are used by PSP/SP to set the correct parameters and element data display to verify the certain minimum UBBL compliance value found in the BIM model. Some parameter data required are self declared by measuring the distance width, length or height. These required data input will be further explained in this guidebook.

The NBeS ruleset parameters may vary and differ from the UBBL from one Local PBT to another. PSP/SP are required to consult the PBTs or to obtain the Building Department's Technical Compliance Checklist to ensure the BIM model complies to their parameter requirements. An example of such variations are wall fencing height, room height etc. Some extra compliance such as minimum room size for Surau.

3.1 NBeS's Designation of Purpose Group Breakdown

Because of the various sub-types of purpose group which require further classification, NBeS proposed below a detailed breakdown to label these variety building sub-types.

Table 5 Expanded Designation of Purposed Group

UBBL 2021 FIFTH SCHEDULE & TENTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type				
I	Small Residential - Private dwelling up to 2 storeys	I-(i)(a) (a) Terrace/Link House	I-(i)(a)CL	I-(i)(a)IL	I-(i)(a)EL	
			House units with typical front 20', 20' side and rear building setback boundaries to local authority requirement (Corner Unit)	House units with typical front 20' and rear building setback boundaries to local authority requirement (Intermediate Unit)	House units with typical front 20', 0' or 10' side and rear building setback boundaries to local authority requirement (End-lot Unit)	
		I-(i)(b) (b) Semi- Detached House	I-(i)(b)CL	I-(i)(b)EL		
			House units with typical front 20', 20'/10' sides & 10' rear building setback boundaries (Corner Semi-d)	House units with typical front 20', 10' sides & 10' rear building setback boundaries (End Semi-d)		
		I-(i)(c) (c) Detached House or Bungalow	I-(i)(c)CL	I-(i)(c)IL	I-(i)(c)ZL	
			House units with typical front 20', 20' & 10' sides & 10' rear building setback boundaries (Corner Bungalows)	House units with typical front 20', 10' sides & 10' rear building setback boundaries (Intermediate Bungalows)	House units with Zero building setback for the side boundaries, 20' front & 10' rear building setback boundaries	

		I-(i)(d) (d) Terrace Town house (2 unit per lot)	I-(i)(d)CL	I-(i)(d)IL	I-(i)(d)EL	
			House units with typical front 20', 20' side and rear building setback boundaries to local authority requirement (Corner Unit)	House units with typical front 20' and rear building setback boundaries to local authority requirement (Intermediate Unit)	House units with typical front 20', 0' or 10' side and rear building setback boundaries to local authority requirement (End-lot Unit)	

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UBBL 2021 FIFTH SCHEDULE & TENTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type				
I	Small Residential - Private dwelling up to 2 storeys	I-(i)(e) (e) Cluster House (Linked Semi-detached House) 4 Houses linked together	I-(i)(e)CL	I-(i)(e)EL		
			House units with typical front 20',10' & 20' side building setback & no rear building setback boundaries (Corner Cluster unit)	House units with typical front 20',10' sides building setback & no rear building setback boundaries (Intermediate Cluster Unit)		

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UBBL 2021 FIFTH SCHEDULE & TENTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type				
I	Small	I-(ii)(a)	I-(ii)(a)CL	I-(ii)(a)IL	I-(ii)(a)EL	

	Residential - Private dwelling of more than 2 storeys	(a) Terrace/Link House	House units with typical front 20', 20' side and rear building setback boundaries to local authority requirement (Corner Unit)	House units with typical front 20' and rear building setback boundaries to local authority requirement (Intermediate Unit)	House units with typical front 20', 0' or 10' side and rear building setback boundaries to local authority requirement (End-lot Unit)	
		I-(ii)(b) (b) Semi- Detached House	I-(ii)(b)CL	I-(ii)(b)EL		
			House units with typical front 20', 20'/10' sides & 10' rear building setback boundaries (Corner Semi-d)	House units with typical front 20', 10' sides & 10' rear building setback boundaries (End Semi-d)		
		I-(ii)(c) (c) Detached House or Bungalow	I-(ii)(c)CL	I-(ii)(c)IL	I-(ii)(c)ZL	
			House units with typical front 20', 20' & 10' sides & 10' rear building setback boundaries (Corner Bungalows)	House units with typical front 20', 10' sides & 10' rear building setback boundaries (Intermediate Bungalows)	House units with Zero building setback for the side boundaries, 20' front & 10' rear building setback boundaries	
		I-(ii)(d) (d) Terrace Town house (2 unit per lot)	I-(ii)(d)CL	I-(ii)(d)IL	I-(ii)(d)EL	
			House units with typical front 20', 20' side and rear building setback boundaries to local authority requirement (Corner Unit)	House units with typical front 20' and rear building setback boundaries to local authority requirement (Intermediate Unit)	House units with typical front 20', 0' or 10' side and rear building setback boundaries to local authority requirement (End-lot Unit)	

UBBL 2021 FIFTH SCHEDULE & TENTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type				
I	Small Residential - Private dwelling of more than 2 storeys	I-(ii)(e) (e) Cluster House (Linked Semi-detached House) 4 Houses linked together	I-(ii)(e)CL	I-(ii)(e)EL		
			House units with typical front 20',10' & 20' side building setback & no rear building setback boundaries (Corner Cluster unit)	House units with typical front 20',10' sides building setback & no rear building setback boundaries (Intermediate Cluster Unit)		

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UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type (Refer to Tenth Schedule, UBBL 2021)				
II	Institutional	II-A				

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UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descriptive Title	Purpose of Which Building Type (Refer to Tenth Schedule, UBBL 2021)				
III	Other Residentials	III-1(a)	III1-(a)(i)(aa)	III-1(a)(i)(ab)	III-1(a)(ii)(ab)	III-1(a)(ii)(ab)

		Hotel - Open Corridor w/ open staircase, extended lobby or tower staircase	(2-3 storeys) 50 rooms or less per block	(2-3 storeys) exceeding 50 rooms per block	(4 storeys & above) 100 rooms or less per block	(4 storeys & above) exceeding 100 rooms per block
		III-1(b) Hotel - other designs	III-1(b)(i)(aa)	III-1(b)(i)(ab)	III-1(b)(i)(ac)	
			(2-3 storeys) less than 20 rooms per block	(2-3 storeys) 20 - 100 rooms per block	(2-3 storeys) Exceeding 100 rooms per block	
		III-1(b) Hotel - other designs	III-1(b)(ii)(aa)	III-1(b)(ii)(ab)		
			(4 storeys & above) less than 50 rooms per block	(4 storeys & above) 50 rooms and over per block		
		III-1(c) Hotel - above shop occupancy or hotel above office occupancy	III-1(c)			
		III-2 Hostel or Dormitory	III-2(i)			
			2 storeys and below			
			III-2(ii)(aa)	III-2(ii)(ab)	III-2(ii)(ac)	
			Open corridor design 3 - 5 storeys	6 - 10 storeys and total GFA not exceeding 5,000 m2	Above 10 storeys and total GFA exceeding 5,000 m2	
			III-2(iii)(aa)	III-2(iii)(ab)		

			Other designs 3 - 5 storeys and total GFA not exceeding 3,000m2	Other designs Above 5 storeys or total GFA exceeding 3,000m2		
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UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descriptive Title	Purpose of Which Building Type (Refer to Tenth Schedule, UBBL 2021)				
III	Other Residentials	III-3(a) Apartment or Flats	III-3(a)			
			5 storey & below			
		III-3(b) Apartment or Flats - Open corridor design	III-3(b)(i)	III-3(b)(ii)		
			6 to 40 storeys <u>or</u> less than 120m in height	above 40 storeys <u>or</u> exceeding 120m in height		
		III-3(c) Apartment or Flats - Internal staircase or a core design	III-3(c)(i)	III-3(c)(ii)	III-3(c)(iii)	
			6 - 10 storeys <u>or</u> less than 30m in height	11 - 40 storeys <u>or</u> less than 120m in height	above 40 storeys <u>and</u> exceeding 120m in height	
		III-4 Service apartment	III-4(i)	III-4(ii)		
			10 storeys and below per block or less than 30m in height	Above 10 storeys <u>or</u> exceeding 30m in height		

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)					
Group No	Descriptive Title	Purpose of Which Building Type			
IV	Office	IV-1	IV-2	IV-3	IV-4
		4 storeys and below <u>or</u> GFA less than 1,000 m2	5 storeys & above <u>or</u> GFA exceeding 1,000 m2.	Exceeding 18 m in height <u>and</u> GFA less than 10,000 m2	30 m and above in height <u>or</u> GFA exceeding 10,000 m2

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descriptive Title	Purpose of Which Building Type				
V	Shop	V-1 Floor area not exceeding 250m2 per floor built as separate compartment	V-1(a)	V-1(b)		
			Less than 4.5 storeys <u>or</u> 18 m in height	Less than 4.5 storeys <u>or</u> 18 m in height w/ combination grd shop and residential or office upper floor		
		V-2 Single Storey	V-2(a)	V-2(b)	V2-(c)	
			GFA less than 1,000 m2	GFA 1,000-2,000 m2	GFA exceeding 2,000 m2	
		V-3 2 storeys and above	V-3(a)	V-3(b)	V-3(c)	V-3(d)
			GFA less than 750 m2	GFA 750-1,000 m2	GFA exceeding 1,000-3,000 m2	GFA exceeding 3,000 m2
		V-4	V-4(a)	V-4(b)		

		Hawker centre, food court, wet or dry market,	Detached bldg less than 2,000 m2 w/ open structure & natural ventilated design	Exceeding 2,000 m2		
		V-5 Combination shop occupancy & hotel or office occupancy				

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descriptive Title	Purpose of Which Building Type				
VI	Factory	VI-1(i) Single storey detached unit	VI-1(i)(a)	VI-1(i)(b)	VI-1(i)(c)	VI-1(i)(d)
			GFA less than 750 m2	GFA 750-1,000 m2	GFA 1,000-2,000 m2	GFA exceeding 2,000 m2
		VI-1(ii) Single storey semi-detached unit	VI-1(ii)(a)	VI-1(ii)(b)	VI-1(ii)(c)	VI-1(ii)(d)
			GFA less than 750 m2	GFA 750-1,000 m2	GFA 1,000-2,000 m2	GFA exceeding 2,000 m2
		VI-1(iii) Single storey terrace unit	VI-1(iii)(a)	VI-1(iii)(b)	VI-1(iii)(c)	VI-1(iii)(d)
			GFA less than 750 m2	GFA 750-1,000 m2	GFA exceeding 1,000-2,000 m2	GFA exceeding 2,000 m2
		VI-2 Open structure design	VI-2(a)	VI-2(b)	VI-2(c)	
			Steel fabrication work & metal fabrication engineering work or sim low fire risk	Saw Mill	Steel Mill	

			establishment			
		VI-3(i) Two storeys and above detached unit. Each floor is built as a separate compartment.	VI-3(i)(a)	VI-3(i)(b)	VI-3(i)(c)	
			Less than 500 square metres per floor	500 to 1,000 square metres per floor	Exceeding 1,000 square metres per floor	
		VI-3(ii) Two storeys and above semi-detached unit. Each floor is built as a separate compartment.	VI-3(ii)(a)	VI-3(ii)(b)	VI-3(ii)(c)	
			Less than 500 square metres per floor	500 to 1,000 square metres per floor	Exceeding 1,000 square metres per floor	
		VI-3(iii) Two storeys and above terrace unit. Each floor is built as a separate compartment.	VI-3(iii)(a)	VI-3(iii)(b)	VI-3(iii)(c)	
			Less than 500 square metres per floor	500 to 1,000 square metres per floor	Exceeding 1,000 square metres per floor	

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descriptive Title	Purpose of Which Building Type				
VI	Factory	VI-4	VI-4(a)	VI-4(b)	VI-4(c)	

		Flatted factory block (two storeys and above)	Less than 500 square metres per floor	500 to 1,000 square metres per floor	Exceeding 1,000 square metres per floor or of exceeding 7,000 cubic metres per compartment	
		VI-5 Vehicle assembly or a similar plant	VI-5(a)	VI-5(b)	VI-5(c)	VI-5(d)
			Less than 1,000 square metres total floor area	1,000 to 2,000 square metres total floor area	2,001 to 5,000 square metres total floor area	Exceeding 5,000 square metres total floor area
		VI-6 Special structure	VI-6(a)	VI-6(b)	VI-6(c)	
			Factory complex such as palm oil mill complexes, palm oil refineries, sugar mills, or cement work	Wet process	Hazardous process	

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)						
Group No	Descripti ve Title	Purpose of Which Building Type				
VII	Places of Assembly	VII-1 Place of assembly below the level of exit discharge of	VII-1			
			exceeding 1,000 sq.m (total floor area)			
		VII-2	VII-2(a)	VII-2(b)	VII-2(c)	

		Convention centre, community centre, private club, exhibition centre, museum or art gallery (total floor area)	Not exceeding 1,000 sq.m.	1,001 to 2,000 sq.m.	Exceeding 2,000 q.m.	
		VII-3 Theatre, cinema, concert hall or auditorium (total floor area)	VII-3(a)	VII-3(b)	VII-3(c)	
			Not exceeding 1,000 sq.m.	1,001 to 2,000 sq.m.	Exceeding 2,000 q.m.	
		VII-4 Amusement centre (total floor area)	VII-4(a)	VII-4(b)	VII-4(c)	
			Not exceeding 1,000 sq.m.	1,001 to 2,000 sq.m.	Exceeding 2,000 q.m.	
		VII-5 Bus terminal, ferry terminal, train station or airport (total floor area)	VII-5(a)	VII-5(b)	VII-5(c)	
			Not exceeding 1,000 sq.m.	1,001 to 2,000 sq.m.	Exceeding 2,000 q.m.	
		VII-6 Place of worship	VII-6			
			Place of assembly used purely for a religious purpose.			

UBBL 2021 FIFTH SCHEDULE - EXPANDED DESIGNATION OF PURPOSE GROUP (BY-LAW 134, 138)

Group No	Descriptive Title	Purpose of Which Building Type				
VIII	Storage & General	VIII-1 Car park	VIII-1(a)(i)	VIII-1(a)(ii)	VIII-1(b)(i)	VIII-1(b)(ii)
			Open structure car park above the ground (a) Single storey or less than 750 sq.m.	Open structure car park above the ground (b) Two storeys and above or of exceeding 750 sq.m. per floor	Enclosed car park or underground car park (a) Less than 2,000 sq.m. (total floor area)	Enclosed car park or underground car park (b) Exceeding 2,000 sq.m. (total floor area)
			VIII-1(c)			
			Automated multilevel car park			
		VIII-2 Warehouse of non-combustible product or storage of non-combustible product such as clay or bleaching earth	VIII-2(a)(i)	VIII-2(a)(ii)	VIII-2(b)	
			Single storey Less than 2,000 sq.m.	Single storey Exceeding 2,000 sq.m.	Two storeys and above	
		VIII-3 Warehouse of combustible product or storage of combustible product	VIII-3(a)(i)	VIII-3(a)(ii)	VIII-3(a)(iii)	VIII-3(a)(iv)
			(a) Single storey (total floor area) (i) Open sided of exceeding 1,000 sq.m.	(a) Single storey (total floor area) (ii) Less than 250 sq.m.	(a) Single storey (total floor area) (iii) 250 to 500 sq.m.	(a) Single storey (total floor area) (iv) 501 to 1,000 sq.m. and less than 7,000 cub.m.
			VIII-3(a)(v)	VIII-3(a)(vi)		

			(a) Single storey (total floor area) (v) 1,001 sq.m. to 10,000 sq.m. and 7,001 cub.m. to 70,000 cub.m.	(a) Single storey (total floor area) (vi) Exceeding 10,000 sq.m. or of exceeding 70,000 cub.m.		
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		VIII-3 Warehouse of combustible product or storage of combustible product	VIII-3(b)(i)	VIII-3(b)(ii)		
			(b) Two storeys and over (total floor area) (i) Less than 1,000 sq.m. or less than 7,000 cub.m.	(b) Two storeys and over (total floor area) (ii) Exceeding than 1,000 sq.m. or exceeding than 7,000 cub.m.		

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3.2 Uniform Building Bylaw 1984 & Selangor Uniform Building Bylaw 1986

NBeS focuses on the building bylaw requirements from the following sections of the UBBL:-

- Part III - Space, Light & Ventilation
- Part V - Structural Requirement
- Part VI - Constructional Requirements
- Part VII - Fire Requirements
- Part VIII - Fire Detection, Fire Alarm & Fire Extinguishment
- Part IX - Miscellaneous
- Fifth Schedule: Designation of Purpose Group
- Sixth Schedule: Calculation of Permitted Limits of Unprotected Areas
- Seventh Schedule: Maximum Travel Distance and Calculation of Occupant Load and Capacity of Exits
- Eighth Schedule: Classification of Restriction of Spread of Flame over Surfaces of Walls & Ceilings
- Ninth Schedule: Limit of Compartments and Minimum Periods of Fire Resistance for Elements of Structure
- Tenth Schedule: Table of Requirements for Fire Detection, Fire Alarm and Fire Extinguishment Systems.

3.3 Malaysian Standard (MS) 1184:2014 Universal design and accessibility in the built environment - Code of practice (Second revision)

This MS code of practice focuses on detailed designs and parameters related to Handicapped & disabled persons from parking requirements, horizontal & vertical circulation and accessibility including ramp designs, toilet design & layout, handrail design requirements, furnishing & signages and fire safety, protection & evacuation. NBeS shall incorporate some aspects of the design requirements for compliance.

3.4 Local PBT Design Technical Requirements

PSP/SP shall obtain from the Local PBT's Design Technical Manual/Checklist before embarking in the modeling process. This is to understand and comply with the required element parameters and data besides what is required by the other reference bylaws and MS standards.

3.5 NBeS Ruleset Element Parameters Summary List

Table 6 Ruleset Parameters

No	Elements	Required NBeS Ruleset Parameters	Section/Reference
1	Partition Wall	- Wall Function - Wall Type - Wall Fire Rating - Fence Type	UBBL cl. 70, 71, 86, 98, 139, 141, 149, 158, refer to Section 4.5 Wall Types UBBL cl. 98

2	Separating Wall/ Party Wall	- Wall Function - Wall Type - Wall Thickness - Fire Rating	UBBL cl. 86, 141 refer to Section 4.5 Wall Type
3	Separating Wall Above Roof/ Party Wall Above Roof	- Wall Function - Wall Type - Wall Height - Wall Thickness - Fire Rating	UBBL cl. 86, 141 refer to Section 4.5.2 Wall Type - FireSeparating Wall Above Roof
4	Door	- Door Function - Door Rating - Door Openable Area - Door Opening Area	UBBL cl.39, 163, 165, 167,169, 171, 173, refer to Section 4.7 Doors & Windows
5	Window	- Window Opening Area - Window Openable Area	UBBL cl.39,191, 196, 197B, 198 refer to Section 4.7 Doors & Windows
6	Stair & steps	Space Type - No of stair provided - No of Risers - Riser height - Tread Depth - Flight Width - Landing depth - Handrail Provision Requirement - Min. 1 sq.m. Ventilation Opening Area for Enclosed staircase - No of podium escape staircases provided (min 2) - No of tower escape staircase provided (min 2)	UBB cl. 126, 167, 168, 194, 195 Distance between storey exit doors morethan 5m refer to Section 4.9 Staircases

No	Elements	Required NBeS Ruleset Parameters	Section/Reference
6	Stair & steps	- Distance markers between storey exit doors (only apply for 2 storey exitssscenario)	UBB cl. 126, 167, 168, 194, 195 Distance between storey exit doors morethan 5m refer to Section 4.9 Staircases
7	Railing	- Railing Type - Railing Height - Handrail Provision Requirement (based on width)	Ubbl cl. 107, 116, 126 refer to Section 4.8 Handrail/Guardrail
8	Ramp	- Ramp Type - Ramp Width - Ramp Gradient - Ramp Length	UBBL cl.38, 192 refer to Section 4.2.8 Ramp

9	Room Minimum Floor Area, Height & Minimum Natural Ventilation Requirement	- Unit Lot or Unit No - Room numbering - Space Use Type - Lighting Type - Ventilation Type - Room Height - Room Width - Min. 10% Floor Area Opening Area Required for Habitable Rooms - - Min. 5% Floor Area Uninterrupted Air Passage for Habitable Rooms - - Min. Required Ventilation Opening Area for Bathroom & Toilets - Air Well Building Height - Air Well Minimal Width	UBBL cl.39,41 42, 43,44, 45, 46, 47, 111, 151,196, 197B, 198, 199, 200, 202 refer to Section
10	SPAH	- SPAH Type - Roof Collection Area - Tank size	UBBL cl.115, refer to Section
11	Portable Extinguisher, Hose Reel Dry Riser Wet Riser Sprinkler Fire detection & alarm system	- Space Type - Distance Markers & ID	UBBL cl. 226, 227, 228, 230, 231, 239, 253 refer to Section
12	Road	- Road Type - Road Width (for fire appliance access & car parking)	UBBL cl. 140 refer to Section 4.2.7 Road Width & Gradient

No	Elements	Required NBeS Ruleset Parameters	Section/Reference
12	Road	- Road Gradient	UBBL cl. 140 refer to Section 4.2.7 Road Width & Gradient
13	Swimming pool UBBL cl.128, 131	- Swimming pool depth - Footbath & shower length & width	UBBL cl. 125, 128, 129, 130, 131 refer to section
14	Compartment Volume	- Compartment Purpose Group - Height - Fire Protection Provision - Occupant Load sq.m. per - “Aras Purata Ketinggian Isipadu Bumbung” Storey Level	UBBL cl. 136, 137, 138, 139 refer to Section
15	Parking Provision	- Parking Type - Length - Width - No of parking spaces provided & required	MS 1184, JPBP & PBT Guidelines refer to Section
16	Hydrant	- Object & Marker ID - No of hydrants provided - Distance Markers	UBBL cl. 225 refer to Section
16	Dead end Turning Provision	- Road Type - Dead End Distance	UBBL cl. 140 refer to Section
17	Topmost Building Peak Level	- Storey Level	KM compliance refer to Section
18	Fire Appliance Access Levels & Building Height	- Fire Appliance Access Level - Fire Appliance Access Level-Tower - Fire Appliance Access-Topmost Usage Level - Fire Appliance Access-Topmost Usage Level-Tower - 4.5m Head Clearance Compliance - 6m Back Lane Access	18m UBBL cl. 144, 197, 197A, 200, 229,230 30m UBBL cl. 137, 195, 231, refer to Section

19	No of Storey	- No. of Habitable Floors - No of Lift	UBBL cl. 113, 124, 167, 174, 189, 194, 199,211 refer to Section
20	Fire Appliance Access way requirement by Building Volume	- Building Perimeter Length Front - Building Perimeter Length Right Side - Building Perimeter Length Rear - Building Perimeter Length Left Side - Fire Appliance Access Min. Proportion Building Perimeter	UBBL cl. refer to Section

No	Elements	Required NBeS Ruleset Parameters	Section/Reference
20	Fire Appliance Access way requirement by Building Volume	- Unit Areas - Common Areas - Roof Area	UBBL cl. refer to Section
21	Dead End Limit Alternative Exit	- Maximum Travel Distance Type - Distance Markers & ID	UBBL cl. 165, 166, 167, 170 refer to Section

3.6 Local PBT Technical Design Reference or Checklist

NBeS template is prepared based on the Uniform Building by-Law 1984 and other generic requirements throughout the architectural practice. The guidebook has incorporated detailed requirements from specific local authorities:-

le Perbadanan Putrajaya (PPj)
Majlis Bandaraya Petaling Jaya (MBPJ)

Majlis Perbandaran Kangar (MPK)
Majlis Bandaraya Melaka Bersejarah (MBMB)
Majlis Perbandaraan Kulim (MPKK)

PSP/SP is advised to obtain the “Checklist” and understand the Local PBT technical requirements during consultation with them. If available in the PBT website, PSP/SP may download the “BIM Technical Compliance Checklist” for reference while modeling the construction elements.

3.7 Fire Performance Based Assessment (PBA) / Special requirement exclusion

NBeS model submitted is not applicable for PBA uses because the assessment only focuses on ‘prescriptive’ requirements which are objective and may be limited to certain building complexity.

The PBA approach is subjective and is assessed by Putrajaya after the PSP has obtained approval from zone or state level, depending on where they are submitting. Because of this, PBA is not considered as part of this NBeS. Although the NBeS process delivers a 3D model, a project pursuing PBA is advised to develop the PBA model separately to avoid modeling confusion.

4.0 MODELING METHODOLOGY AND DATA INPUT

This section outlines the modeling methodologies for inputting BIM non-graphical data and BIM element parameters by using the developed NBeS Revit template provided by CIDBeC. This template shall enable PSP/SP to prepare the Building Plan (BP) submission model. PSP/SP is required to use the Revit template of similar version or later. The BIM submission model shall either be modeled from the beginning using the NBeS template or transfer the template parameters into the PSP/SP’s completed Revit model. The process for transferring the template parameters shall be explained further in this guidebook. PSP/SP **shall backup** the original model before transferring NBeS template parameters into the submission model. Modification to the NBeS template parameters is not advisable as it may affect the system from working properly. CIDBeC and their development teams shall not be liable for any file or data being damaged or corrupted during the template transferring process.

All revit individual and linked models will be required to be upgraded to the same Revit template version before transferring of NBeS parameters and project standards. BIM models which were being developed in worksharing mode must also first be detached from the central model. PSP/SP shall use the PBT’s NBeS Revit template and not from another PBT as they may differ from one Local Authority to another. Good modeling practice shall be adhered throughout the process to ensure the model integrity and accuracy are achieved before exporting for submission.

4.1 Non-Graphical Input Sheet

Many BIM software allows PSP/SP to add non-graphical parameters such as project, PSP/SP, client and land information. Developed in NBeS Revit template, a sheet layout has been added to input information required by the Local PBT. Therefore, PSP/SP shall fill up all the required information inside the template accordingly before exporting the IFC model for model compliance checking and print out for hardcopy submission.

4.2 Units and Measurement

The unit measurement used in the BIM model shall be consistent throughout the project. Default project units shall be in millimeters without any decimal points in order to display accuracy in the temporary dimensions. Angular dimensions shall be in decimal degrees.

4.3 Modeling Using The Correct Tool

Elements modeled are categories into “Site Elements” & “Building Elements”. Site elements are modeled on “NBES Site/Fire Appliance Access Level” while building elements are modeled on building storey levels. If “Component” > “Model in Place” tool is used to model an element, the modeler shall make sure that the elements modeled are classified to the correct “Family Category”. Furthermore, NBES parameters are set to the correct family category to input the required data.

Table below outlined the model elements, tool used and export IFC classes.

Table 7 Site elements & exported IFC Classes

No	Site Elements	Modeled using specified Revit Tool	Exported ifc Classes
1	Site Topography/Geometry	In-Place Mass	ifcSite
2	Flat/Sloping Roads	Slab	ifcSlab
3	Kerb & other road furnitures	In-Place Mass	ifcBuildingElementProxy
4	Ramp	Ramp	ifcRamp
5	Fences - Solid	Wall	ifcWall
6	Fences - metal grille	Railing	ifcRailing
7	Fences	Curtain wall (not recommended tool)	ifcCurtainWall
8	Fire hydrant & hose, Bridging inlet	Insert Component	ifcBuildingElementProxy
9	Street & Landscape Light	Insert Component	ifcBuildingElementProxy

10	External Wall	Wall	ifcWall
11	Parking	Insert Component	ifcBuildingElementProxy
12	DImension markers	Insert Component	ifcBuildingElementProxy
13	Landscape Element	Hide element & do not export out	
14	Transport Element	Hide element & do not export out	
15	Underground Service	Hide element & do not export out	

Table 7 Building elements & exported IFC Classes

No	Building Elements	Modeled using specified Revit Tool	ifc Classes
1	Internal full and low wall	Wall	ifcWall
2	Door	Door	ifcDoor
3	Window	Window (curtain wall tool not recommended)	ifcWindow
4	Floor or roof slab	Slab	ifcSlab
5	Sloping roof	Roof	ifcRoof
6	Staircase	Stair	ifcStairFlight, ifcSlab (landing)
7	Steel Handrail & guard rail	Railing	ifcRailing
8	Column	Column	ifcColumn
9	Beam	Beam	ifcBeam

10	Ceiling	Ceiling	ifcCeiling
11	Sanitary fitting	Insert Component	ifcSanitaryTerminal
12	Internal Ramp	Ramp	ifcRamp
13	Furniture	Hide element & do not export out	

4.4 Project North & True North

North is always pointing up. True North is the actual geographic direction of North. Daylighting rendering and shadow casting in Revit is oriented to true north (except those set to the “Lighting” scheme). Therefore, site plan orientation shall reflect the exact true north in order to get a realistic scenario of actual building completed on site. So to set True North go to :-

Manage Tab > Project Location > Rotate True North

This command behaves like a rotate command except that the rotation may go opposite of what is expected.

Project North is typically parallel to the building footprint and oriented for convenience when composing sheets. By default, floor plan views are oriented to Project North. Each plan view can be set either Project North or True North as required.

4.5 Importing NBeS Parameters and Standards into Existing Revit Model

For PSP/SP who are interested to submit their Building Plans using NBeS e-Checker system is most likely

to have a 3D Revit model which has not incorporated the required NBeS parameters & standards.

Therefore, the submission model is required to import these NBeS parameters & standards followed by

assigning the element parameters and input the data required for ruleset checking. The following

chapters explain the process of transferring the NBeS template parameters and standards into an existing model.

Open the submission model in Revit 2022 version and if the model is not this version and of older

version, make a duplicate copy of the model and open the model in Revit 2022 version.

Save the

converted submission model by renaming the model by stating the revit version.

If the submission model consists of several linked Revit models into a central model, you are required to

update each of the linked models to the same version. Once upgraded, transfer the NBeS parameters and standards to the central and every linked revit models.

Before the importing process, download the latest “NBeS Revit 2022 Template” file.

Open a “New” Revit

project file and select the NBeS template file to open. Once opened, save the new project with the same

file name. The saved file should be a “.rvt” file format and not “.rte” file format.

If your model has the previous version of NBeS template, you are required to delete all Building

Component & Key Schedules that have “NBeS” heading in the schedule.

You will be required to populate the data using the new parameters and schedules provided from the

latest version of the NBeS Revit template.

4.5.1 Insert Views from File

With the submission model file opened, go to
“Insert” menu > “Insert Views from File” and an “Open” dialog box
will appear.

Find the earlier saved NBeS Revit Template project file and open the
file.

Click the “Check All” to transfer the NBeS
views and sheets into your
project.

To complete click “OK”.

Verify in the “Project Browser” of your
submission project that all
schedules & sheets have been transferred.

4.5.2 Transferring NBeS Template Project Standards into Submission Model

Open the saved NBeS Revit Template project file and
switch to your revit submission model.

Click the “Manage” menu > “Transfer Project Standards
and the following dialog box will appear.

Click “Check None” to deselect all elements

to be transferred.

Scroll down and select “Project Info” and
“Project Parameters”.

Click “OK” to proceed.

A “Duplicate Types” dialog will appear. Click “New Only” to complete the transfer 50

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Verify that the “Project Information” and “Project Parameters” have been transferred into your submission project.

4.6 Create “Area Plan” views

In Nbes, “Area Plans” are created for the purpose of calculating the following:-

- a. Total gross building floor area for every units, car parking, facilities, circulations & services
- b. Total building volume calculation for fire fighting requirements
- c. Total building submission plan fee calculations

To create the “Area Plans” , click on the

“Architecture” menu > “Area” > “Area Plan” to open up the “New Area Plan” dialog box.

Select the “Fire Provision” type, followed by the required floor levels (inclusive Roof Level) to create the area plans. Click “OK” to complete.

Confirm the creation of the area plans by going to

“Project Browser” > “Views” > Area Plans (Fire Provision)

Create floor areas for units, car park areas, facilities, circulation and services depending on your building type. Complete all areas on every floor level.

For Strata development, model the areas of individual units and common spaces depending on the area space types listed on the right figure.

For Landed development, model the areas based on each of the units.

The roof areas are modeled and if the roof is a pitch roof, the height of the roof shall be half of the total height of the roof. Indicate the floor to floor

height in the “0.01 NBeS Area Data” schedule.

Note:

For the roof area type, set the parameter to “Void”. The “Void” parameter in the schedule is filtered off just to indicate the floor area of the unit and for the building fee calculation.

Figure 4 Sample Area Plan with Area Names and Outlines

The area plans are used both to determine the Building Plan Submission fees and the Total Building Volume.

Go to the “Project
Browser” and open the
“0.01 NBeS Area Data”
schedule.

Table 8 Area Schedule & Input Data

COLUMN	HEADER	DESCRIPTION	EXAMPLE
A	UNIT LOT/ BLOCK NO	Area /Identity Data / Unit Lot or Block No / For repetitive Bungalow, Semi-D or Terrace houses, enter the unit lot no For repetitive Apartments, enter the block name. <i>(Note: apartment blocks should a separate revit model file if they do not share the same podium block)</i>	LOT 1, LOT PT 32154 A, A1,
B	UNIT TYPE	Area / Identity Data / Unit Type / Represent individual unit type which can be used for sorting out rooms within each unit.	A1, B1, C

C	UNIT NO	Area / Identity Data / Unit No / Represent the address of the unit. (Floor Level-Unit no). Shared spaces will not have any numbering (00 - Ground Floor, 01 - First Floor, MZ - Mezzanine).	00-01, 01-01
D	AREA NAME	Area / Identity Data / Name / Represent Unit/ Space Name.	UNIT 01-01, STAIR
E	AREA TYPE	Select from the list of “Area Types”.	
F	AREA	Areas are automatically calculated	
G	FLOOR TO FLOOR HEIGHT	Enter the floor to floor height of the area	
H	FIRE EXTINGUISHING SYSTEM	Select from the list of “Fire Extinguishing System”. Set to “None” if no systems are used for the project.	

4.7 Set Room Parameters in “NBeS Room Data Schedule”

The Revit submission model should already have the “Room” created on every spaces in the floor plan. To view all created rooms, goto

“Project
Browser”
and double
click on
“1.01 - NBeS
Room Data
(by Storey)”
to open the
Storey room
data
schedule.

In the schedule, if there are any spaces that are any “**Not Placed**” shown in column “I”, select all these rooms and click, “Delete” button in the ribbon bar to delete all these unboundaried rooms.

4.7.1 Set NBeS Room Data schedule by Unit Type

In a project where you have multiple similar unit types, lot designation and unit no, it's best to make sure all the repetitive units are pointed to the correct unit parameters. These parameter headers are already set in your project where you can enter your desired naming parameters.

Select all rooms of the same unit type or lot and input the appropriate data.

Repeat the unit assignments for every unit type and on other floors before moving to the next section of this guidebook.

4.7.2 Set NBeS Room Data Schedule By Individual Levels

Duplicate the NBeS Room Data (by Storey) and rename the new schedule with your desired storey level.

E.g. "1.01 - NBeS Room Data-Aras 1"

In the “Properties” > “Other”
> “Filter” >, Click on the “Edit”
button to open the Schedule
Filter Properties.

Add “Level”, “equal” & “(your
storey)” filter to list the Room

Data schedule by level.

Click “OK” to complete the setting for the room data by level.

Duplicate the NBeS Room Data Schedule for each floor level by adjusting the filter to match the floor level required. (see sample “Project Browser” on the right)

Table 9 Room Schedule & Input Data

COLUMN	HEADER	DESCRIPTION	EXAMPLE
A	UNIT LOT/ BLOCK NO	Room /Identity Data / Unit Lot or Block No / For repetitive Bungalow, Semi-D or Terrace houses, enter the unit lot no For repetitive Apartments, enter the block name. <i>(Note: apartment blocks should a separate revit model file if they do not share the same podium block)</i>	LOT 1, LOT PT 32154 A, A1,

B	UNIT TYPE	Room / Identity Data / Unit Type / Represent individual unit types which can be used for sorting out rooms within each unit.	A1, B1, C
C	UNIT NO	Room / Identity Data / Unit No / Represented the address of the unit. (Floor Level-Unit no). Shared general spaces will not have any no. (00 - Ground Floor, 01 - First Floor, MZ - Mezzanine).	00-01, 01-01
D	ROOM NO	Room / Identity Data / Number / Represented the room no of a specific unit (Floor Level-Unit No-Room no) or general shared rooms (Floor Level-Room name abbreviation-Room no).	.

Table 9 Room Schedule & Input Data

COLUMN	HEADER	DESCRIPTION	EXAMPLE
E	ROOM NAME	Room name as per your original naming convention.	
F	SPACE USE TYPE	Select the appropriate space use type from the list (refer to Appendix A).	
G	HABITABLE	By selecting the space use type, the habitable “Yes or No” data will be automatically displayed.	

H	MIN FLOOR AREA	By selecting the space use type, the minimum floor area data will be automatically displayed.	
I	PROP ROOM AREA	Each room floor area proposed data is generated from the room. Otherwise, adjust the design to meet the minimum floor area required.	
J	MIN FLOOR AREA COMPLIANCE (Y/N)	Compare the area in column H & I. If the proposed area is larger than the minimum, click to check off for compliance.	
K	MIN ROOM WIDTH	By selecting the space use type, the minimum room width required data will be automatically displayed.	
L	ROOM WIDTH PROP	Room / Dimensions / Room Width Prop / Input your proposed room clear width next to the minimum room width required.	

Table 9 Room Schedule & Input Data

COLUMN	HEADER	DESCRIPTION	EXAMPLE
M	MIN ROOM WIDTH COMPLIANCE (Y/N)	Compare the minimum room width with the proposed room width in column K & L. If the proposed width is larger than the minimum, click to check off for compliance. Otherwise, adjust the design to meet minimum required.	
N	MIN ROOM LENGTH	Room / Dimensions / Room Length Prop / Input your proposed room clear length next to the minimum room width required.	

O	PROP ROOM LENGTH	Proposed room length is the value from the finish floor level to the bottom of suspended ceiling level or bottom of the slab level or bottom of beam if there are beams crossing under the space.	
P	MIN ROOM LENGTH COMPLIANCE (Y/N)	Compare the minimum room length with the proposed room width in column N & O. If the proposed width is larger than the minimum, click to check off for compliance. Otherwise, adjust the design to meet minimum required..	

*Table 9 Room
Schedule & Input
Data*

COLUMN	HEADER	DESCRIPTION	EXAMPLE
Q	MIN ROOM HEIGHT	By selecting the space use type, the minimum room width required data will be automatically displayed.	
R	PROP ROOM HEIGHT	Proposed room height is the value from the finish floor level to the bottom of suspended ceiling level or bottom of the slab level or bottom of beam if there are beams crossing under the space.	
S	MIN FLOOR AREA COMPLIANCE (Y/N)	Compare the minimum room height with the proposed room height in column N & O. If the proposed width is larger than the minimum, click to check off for compliance. Otherwise, adjust the design to meet minimum required.	
T	VENTILATION TYPE	Select the room ventilation type (Natural or Mechanical)	
U	LIGHTING TYPE	Select the room lightning type (Natural or Artificial)	
V,W,X,Y	FINISHES (FLOOR, WALL, CEILING, SKIRTING)	Insert the finishes for each room according to your office standards	

Table 9 Room Schedule & Input Data

COLUMN	HEADER	DESCRIPTION	EXAMPLE
Z	FIRE DETECTION SYSTEM	Select from the list of fire detection systems. (Automatic Fire Detection System, Heat Detector, Manual Electric Fire Alarm System, Signal Indicator Alarm System, Smoke Detector)	
AA	EMERGENCY POWER SYSTEM	Select from the list of emergency power system (Emergency Light, Emergency Light & Keluar Sign, Keluar Sign)	
AB	PORTABLE EXTINGUISHER	Select from the list of portable extinguishers (Air-Pressurised Water Fire Extinguisher, CO2 Fire Extinguisher, Dry Powder Fire Extinguisher, Foam Chemical Fire Extinguisher)	

4.8 Set NBeS Door Tags

If the doors in your model are all tagged, you may skip this step.

Click on “Annotate” menu > “Tag All” > to open up the “Tag All Not Tagged” dialog box

If the Door Tag family is not available, load in the family annotation type by placing it on a door.

Repeat the “Tag all” to open to open up the “Tag All Not Tagged” dialog box

Checked the “Door Tags” and finish by clicking on “Ok”

Select a door to open the “Type Properties”. Under the “Identity Data”, ensure that your “Door ID” is displayed using the door family “Type

Mark” parameter and not other parameters.

(Note: Only “Type Mark” parameters are used in NBeS

Note: For door opening element to label as “OPNG”. This door type shall be filtered off from the schedule listing.

4.8.1 Set Door Parameters (by type)

In the “Project Browser”, scroll down to “Schedules/Quantities” and double click on “2.01a NBeS Door Schedule (by Type)” to display the type of doors used.

Table 10 Door Schedule (by type)

COLUMN	HEADER	DESCRIPTION	EXAMPLE
C	DOOR ID	Door number tagging can follow your office standard numbering system. For wall opening, enter Type Mark "OPNG"	D01, SD01, FD01
D	FIRE RATING (1, 2) HRS	Key in the door fire rating	0,1,2
E	DOOR POSITION	Enter "Internal" or "External". External doors open to external areas and the opening will	

COLUMN	HEADER	DESCRIPTION	EXAMPLE
		contribute to natural ventilation calculation.	
F,G	DOOR DIMENSIONS (WIDTH, HEIGHT)	The door dimensions are automatically inserted	
H	DOOR AREA - OPENABLE AREA	Calculate and enter the clear openable area.	
I	DOOR AREA - GLAZING AREA	Calculate and enter the clear glazing area.	

J, K, L	DOOR MATERIAL - FRAME, LEAF & GLAZING	Key in the door and glazing materials used for all the doors	
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4.8.2 Set Door “Unit No” & “Unit Type” Parameter

Select all elements of one unit and click “Filter” to open the “Filter” dialog box

Click “Check None” followed by checking off “Doors” to only select the door elements.

Click “OK” to list the schedule.

With the door elements still selected, enter parameters for “Unit No”, “Unit Type” & “Unit Lot or Block No”. Repeat the same process for each unit.

4.8.3 Set Fire Rated Door Parameters

In the “Project Browser”, scroll down to “Schedules/Quantities” and double click on “2.02-NBeS Fire Rated Door Schedule (by Storey)” to display the type of fire rated door used.

Table 11 Fire Rated Door Schedule

COLUMN	HEADER	DESCRIPTION	EXAMPLE
A	UNIT LOT/ BLOCK NO	Enter this parameter where the fire door belong to (if required)	
D	ROOM NAME	Adjust the room name parameter which the door opens into by clicking on the name & “down arrow” and switch to the appropriate room name.	
E	DOOR ID	Enter the fire door number	FD01
F	FIRE RATING	Enter the fire rating	1, 2
G	DOOR POSITION	This parameter will display either “Internal” or “External” parameter following the door type parameter setting.	
K	DOOR FRAME MATERIAL	Enter the fire door frame material specified	
L	DOOR LEAF MATERIAL	Enter the fire door leaf material specified	

4.8.4 Set Door Parameters (by Storey)

In the “Project Browser”, open to “2.01b-NBeS Door Schedule (by Storey)” to display all the doors used in the project.

Table 12 Door Schedule (By Storey)

COLUMN	HEADER	DESCRIPTION	EXAMPLE
D	ROOM NAME	Adjust the room name parameter which the door opens into by clicking on the name & “down arrow” and switch to the correct room name.	
F	FIRE RATING (0, 1, 2)	Enter the Door Fire Rating	
G	DOOR LOCATION	This parameter will display either “Internal” or “External” parameter following the type parameter setting.	
J	DOOR OPENABLE AREA	This parameter will display the openable area following the type parameter setting.	
K	DOOR GLAZING AREA	This parameter will display the glazing area following the type parameter setting.	
L, M, N	DOOR MATERIAL FRAME/LEAF/ GLAZING	This parameter will display the materials set in the type parameter setting.	

4.8.5 Set Door Position to Room

The door arrow as shown in the red circle shall be flipped into the room in order for the door schedule to list out the space the door belongs to.

4.9 Set NBeS Window Tags

If the windows in your model are all tagged, you may skip this step.

Click on “Annotate” menu > “Tag All” > to open up the “Tag All Not Tagged” dialog box

If the Window Tag family is not available, load in the family annotation type by placing it on a window.

Repeat the “Tag all” to open to open up the “Tag All Not Tagged” dialog box

Checked the “Window Tags” and

finish by clicking on “Ok”

Select a window to open the “Type Properties”. Under the “Identity Data”, ensure that your “Window ID” is displayed using the window family “Type Mark” parameter and not other parameters.

Note: For window opening element

to label as “OPNG”. This window type shall be filtered off from the schedule listing

4.9.1 Set Window Parameters (by type)

In the “Project Browser”, scroll down to “Schedules/Quantities” and double click on “2.05a NBeS Window Schedule (by Type)” to display the type of windows used.

Table 13 Fire Rated Door Schedule

COLUMN	HEADER	DESCRIPTION	EXAMPLE
C	WINDOW ID	Window number tagging can follow your office standard numbering system.	W01
D	WINDOW POSITION	Select either “External” or “Internal” which the window opens out to. Window opening area with the “External” setting shall be used for natural lighting & ventilation calculation for habitable rooms.	
G	WINDOW OPENABLE AREA	Calculate and enter the clear openable area.	

COLUMN	HEADER	DESCRIPTION	EXAMPLE
H	WINDOW GLAZING AREA	Calculate and enter the glazing area.	
I	WINDOW FRAME MATERIAL	Enter window frame material used.	
J	WINDOW GLAZING MATERIAL	Enter window glazing material used.	

4.9.2 Set Window “Unit No” & “Unit Type” Parameters

Select all elements of one unit and click “Filter” to open the “Filter” dialog box

Click “Check None” followed by checking off “Windows” to only select the window

elements.

Click “OK” to list the
schedule.

Repeat it for all units.

4.9.3 Set Window Parameters (By Storey)

In the “Project Browser”, scroll down to “Schedules/Quantities” and double click on “2.05b NBeS Window Schedule (by Storey)” to display all the windows used in the project.

Table 14 Window Door Schedule (By Storey)

COLUMN	HEADER	DESCRIPTION	EXAMPLE
A	UNIT LOT/ BLOCK NO	Enter this parameter where the fire door belong to (if required)	
D	ROOM NAME	Adjust the room name parameter which the window is attached to by clicking on the name & “down arrow” and switch to the appropriate room name.	
F	WINDOW POSITION	This parameter will display either “Internal” or “External” parameter following the type parameter setting.	
H, J	WINDOW AREA OPENABLE/ GLAZING	This parameter will display the openable & glazing area following the type parameter setting.	

K, L	WINDOW MATERIAL FRAME/ GLAZING	This parameter will display the frame & glazing materials following the type parameter setting.	
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4.9.4 Set Window Position To Room

The window arrow as shown in the red circle shall be flipped into the room in order for the door schedule to list out the space the window belongs to.

4.10 Natural Lighting & Ventilation Calculation Schedule (by Lot or Type)

In the “Project Browser”, scroll down to “Schedules/Quantities” and double click on “3.01a - NBES Natural Lighting & Ventilation Calculation Schedule (By Type)” to open the habitable room natural lighting & ventilation schedule by “Unit Lot” or “Unit Type” or “Unit No”. Use the filter option to filter ventilation by “Unit Type”.

Repeat the process for other unit types by duplicating the previous schedule and modify the parameters.

Table 15 Natural Lighting & Ventilation Calculation Schedule (By Type)

COLUMN	HEADER	DESCRIPTION	EXAMPLE
E	DOOR & WINDOW ID	Check each Room to make sure that the window and doors are correctly placed into the room. If a window ID is missing from the schedule, go to the floor plan and make sure the door or window are correctly placed.	
F	DOOR GLAZING AREA	Each room will show the glazing area for every “External” door attached and will total the opening areas below.	
G	WINDOW GLAZING AREA	Each room will show the glazing area for every “External” window attached and will total the window openable areas below	

F&G		Adding the total area of column F & G will provide the glazing area provision for the room. This figure will be transferred to the next schedule.	
H	DOOR OPENABLE AREA	Each room will show the openable area for every "External" door attached and will total the opening areas below.	
I	WINDOW OPENABLE AREA	Each room will show the openable area for every "External" window attached and will total the window openable areas below	
H&I		Adding the total area of column H & I will provide the openable area provision for the room. This figure will be transferred to the next schedule.	