

Key Updates on CORENET X



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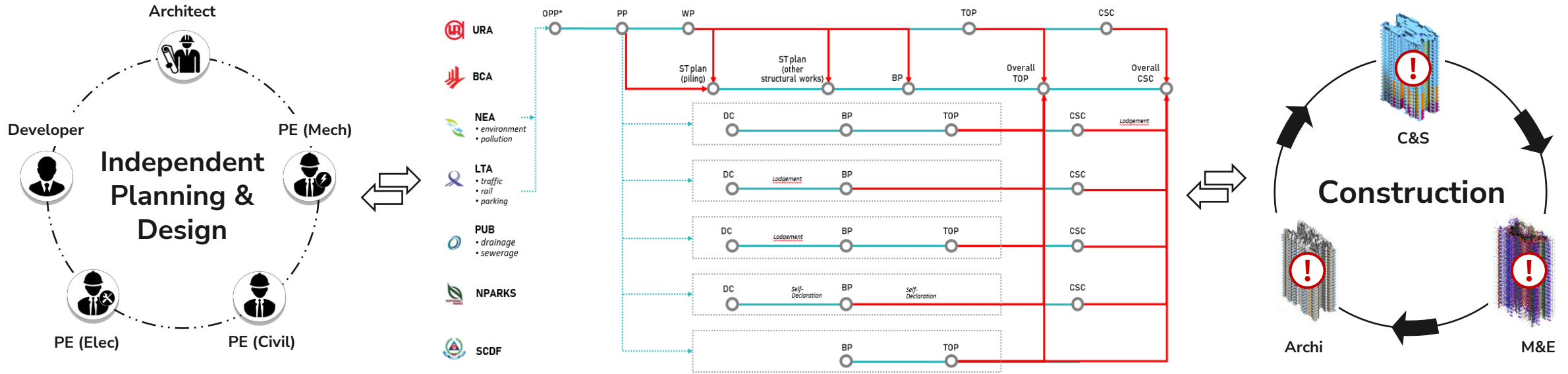




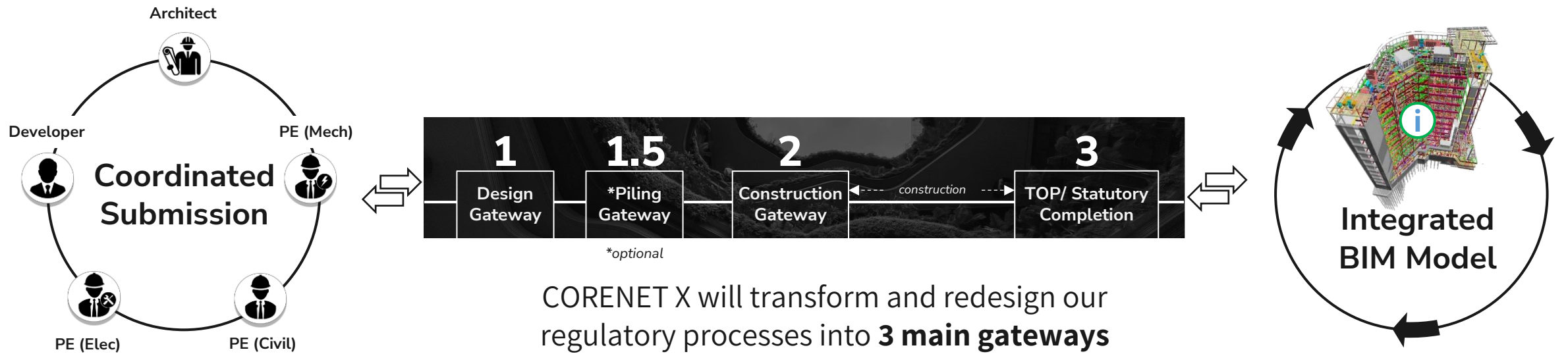
Overview of CORENET X: Brief Recap & FAQs



Today's Separate & Concurrent Approval Process

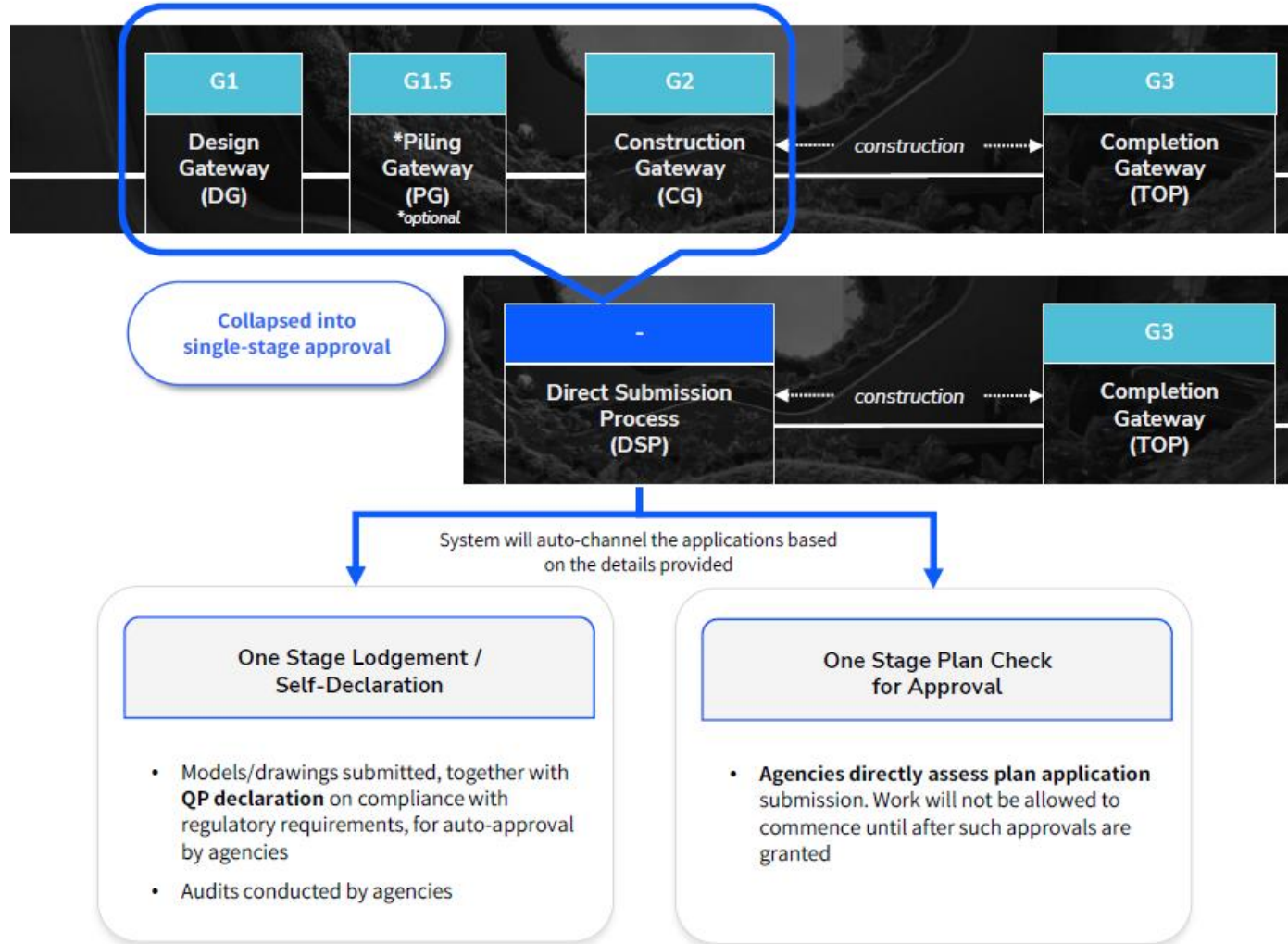


New Regulatory Approval Process for Building Works (RABW)



Direct Submission Process

Differentiated approach for simple building works that need not be subjected to the typical RABW 3-Gateway process (e.g. single-unit residential landed development, standalone pavilion/ linkway, etc)



Direct Submission Process

- Only eligible projects will be put under DSP
- Through a guided submission process, QP will answer a set of eligibility questions to determine whether project will be auto-channeled to either:
 - Lodgment/self-declaration/simplified submission scheme OR**
 - One-stage plan check**for the respective agencies
- Independent submission for agency-specific requirements is still available and supported under DSP

Common Misconceptions/Myths about CORENET X

DEBUNKED

1 CORENET X is just a system upgrade from CORENET 2.0.

Myth!

No! More than just a system upgrade, CORENET X revamps today's regulatory approval process. In CORENET X, QPs will have to **collaborate across disciplines** and submit coordinated plans at the Gateways. Agencies too will have to provide a consolidated response to the project team at the Gateways.

2 All projects must submit in BIM format in CORENET X.

Myth!

No! CORENET X covers both non-BIM and BIM projects. BIM submission is **ONLY mandatory for projects with GFA ≥ 5000m²**. **It is optional for smaller projects** to submit in BIM though highly encouraged. For BIM submission in CORENET X, the models will have to be exported to and **submit in IFC-SG, an openBIM format**.

3 All M&E details must be furnished under Construction Gateway and modelled in BIM.

Myth!

No! It is not true that all the M&E details must be provided upfront. Only relevant aspects requiring multi-disciplinary coordination (e.g. space provision) need to be included in Construction Gateway submission. Agency-specific requirements (e.g. equipment details) can be submitted later as independent submissions. In addition, not every detail must be provided in BIM. Please refer to CORENET X Code of Practice for more details.

Common Questions about CORENET X

1 Are pre-submission consultations & waivers still allowed?

Yes! Consultations and waiver application are still allowed. CORENET X encourages upfront planning and hence waiver applications should not be an after-thought that is done after plan approval or before TOP/ CSC application. Unlike plan application at the Gateways, waiver applications are not joint submission. Instead, they will be made individually to each agency by the respective QP in accordance with the respective Act and Regulations.

2 Are amendments allowed?

Yes! If there is any change in design from the approved plans, the project team will need to submit the Amendment Plans. For amendments at PG and CG, the project team will have to assess which agencies are affected and require re-approval. Similar to today's practice, amendment plan fees would apply. The amendment submission workflow can be found in the CORENET X Code of Practice.

3 Will TOP/CSC applications be consolidated in a single submission at the Completion Gateway?

No! The Completion Gateway will be similar to today's process where QPs may proceed to clear the respective agency concurrently and independently. The final TOP/CSC will be issued when the project obtains all the necessary clearances from the technical agencies. To improve the user experience, CORENET X will provide a dashboard / checklist for project members to view the status of the TOP/CSC application to each agency.



Ongoing Pilot Projects:

Current Status & Progress

Live Submission Projects

23 Onboarded Projects

15 Gateway Projects:

- 7 private residential non-landed
- 3 public residential non-landed
- 3 industrial
- 2 infrastructure (MRT & Sewers)

2 of these projects have obtained CG approval

8 Direct Submission Process Projects:

- 6 landed houses
- 1 non-landed A&A works
- 1 minor infra works

4 of these projects have obtained DSP approval

24 Upcoming Projects

17 Gateway Projects:

- Institutional (school, sports centre, nursing home)
- Mixed use with commercial component
- Industrial
- Infrastructure works

7 Direct Submission Process Projects:

- Landed houses
- Infrastructure works
- A&A works

**No. of Firms
Involved:**

Architects

27

C&S

27

M&E

20

Builders*

17

Developers**

21

** Builders for some projects
are not onboarded yet*

*** Excludes landed
house owners*

Performance of Pilot Projects



NORWOOD GRAND CONDOMINIUM

Developer: City Developments Limited
 Architect: ADDP Architects
 C&S: TW-ASIA Consultants
 M&E: Belmacs Consulting Engineers
 Builder: Woh Hup (Private) Limited



NOVO PLACE EXECUTIVE CONDOMINIUM

Developer: Hoi Hup Sunway Jurong Pte Ltd
 Architect: ADDP Architects
 C&S: Ronnie & Koh Consultants Pte Ltd
 M&E: Rankine&Hill (Singapore) Pte Ltd
 Builder: Straits Construction Group Pte Ltd

Land Award

Construction Gateway Clearance & Launch of Sales

- ✓ Design Gateway
- ✓ Piling Gateway
- ✓ Construction Gateway

- ✓ Independent Submissions
- ✓ Pre-Submission Consultations
- ✓ Waiver Submissions

Service Level Agreements by Agencies

1

Coordinated & consolidated response



2

Iterations through Written Directions



20

Working days response time by Agencies





Lessons Learned:

Observations & Best Practices

Key Takeaways from CORENET X Pilot Projects



Developers



Consultants



Builders

BIM Modelling & IFC-SG

**Interacting with the New
CORENET X Submission Portal**

Key Learning Points from CORENET X Pilot Projects



Developers – Time vs Quality

Observations

- Developers **may not factor in and cater adequate time for upfront planning and design.**
- Project team tends to **compromise on the quality and completeness of the submission** to meet with tight deadline.
- This impedes the review process by agency officers, **resulting in unnecessary iterations** (more WDs) and **ultimately lengthening project approval.**

Learning points / Good Practices

- ✓ Developers should attend the RABW training and understand the new approval process. It requires more upfront design and coordination, which is different from today's approval process.
- ✓ **Timeline should be discussed and agreed upon as a team.** Project team should take into consideration the necessary resources and efforts required by each discipline at the various milestones. Factor in **time/cost savings from less rework/abortive works downstream** because of better upfront coordination.
- ✓ Developer, as the lead, should set the direction and emphasize the importance of collaboration and quality submission

Key Learning Points from CORENET X Pilot Projects



Consultants – Inter-disciplinary Dependency and its Impacts

Observations

- **Designs are still largely done in silos**, with limited communications among some teams for effective multi-disciplinary collaboration.
- QPs often do not have comprehensive understanding **of the interdependencies of their work and impact on other disciplines**.
- Example: In a project, a minor shift in the unit layout by the architect triggered significant changes in structural and M&E designs, resulting in additional time spent on redesign. The architect was unaware of the implications, while the engineers did not communicate the impact.

Learning points / Good Practices

- ✓ **Timely and clear communication** among all project parties is important to ensure cohesion and accuracy.
- ✓ Agree on and put in place a **design change SOP** as a team. Communication across discipline helps to assess the impact of change and allows decision makers to make an informed decision (e.g. additional time and effort required for rework and resubmission).
- ✓ **Each discipline plays an important role.** Involve the engineers early in the design process.

Key Learning Points from CORENET X Pilot Projects



Consultants – Project Timeline Planning

Observations

- QPs that are **unfamiliar with the changes** under CORENET X **find it difficult to effectively plan** the time and effort required at each milestone.
- This leaves decision makers unclear/misinformed about the project timelines and resources required. Due to **inadequate planning**, the project team may **struggle with resources** and/or **late discovery of certain submission requirements** leading to **insufficient preparation and last-minute scrambling**.

Learning points / Good Practices

- ✓ QPs should not **underestimate the need to attend training** courses on the new regulatory approval process both for themselves and their assistants.
- ✓ **Each QP (Arch, C&S, M&E) must be familiar with the new process** and should not be solely reliant on the project coordinator to **plan out the submission timeline, scope of work to be completed and resource required at each stage**. It should be **discussed as a team**.
- ✓ **Plan for concurrent activities where possible to save time** (e.g. Preparation for PG and CG can be concurrent rather than sequential). **Any time saved by one discipline is time saved for the whole team**.

Key Learning Points from CORENET X Pilot Projects



Consultants – Project Timeline Planning

Observations

- Preparations (mainly by the Architect) for **Design Gateway resubmissions may take longer than expected**, especially for firms that are unfamiliar with the new regulatory approval process.
- If engineers only starts preparing/submitting for Piling Gateway after Design Gateway approval, project timeline may be extended.

Learning points / Good Practices

- ✓ Enhancements to the Submission Portal will be carried out **to allow the project team to proceed with Piling Gateway Submission.** (**Note:** Approval for the Piling Gateway will only be granted after Design Gateway is cleared).
- ✓ If the main building layout is confirmed, the project team may wish to submit the Piling Gateway submission to seek comments concurrently while addressing comments from the ongoing Design Gateway application.
- ✓ Project team should note that comments provided by agencies at the Piling Gateway may be affected if there are changes made to the plans submitted at the Design Gateway upon approval.

Key Learning Points from CORENET X Pilot Projects



Consultants – Involvement of QPs & QP Assistants

Observations

- Submission preparations are often deemed as administrative task and **left to assistants of the key project members** to manage. Challenges faced by QP Assistants include:
 - Do not understand the dynamics of the team and **unable to achieve the desired collaboration to bring the project team together**. They may be unaware about important information that should be shared with the project team.
 - QP assistants **from different teams within the same firm do not share experiences or help each other** with submissions, resulting in repeated mistakes from the same firm that could have been avoided.

Learning points / Good Practices

- ✓ **A change of mindset** is required and **QPs should be actively involved in the submission process and discussions**, instead of delegating it to the Assistant entirely.
- ✓ Joint submission requires coordination, **with each QP playing an important role**. Timely and clear communication among all project parties is important to ensure cohesion and accuracy in the submission process.

Key Learning Points from CORENET X Pilot Projects



Consultants – Coordination & Collaboration

Observations

- QPs **made last minute changes and uploaded uncoordinated models** without informing other project members. Such actions will undermine earlier collaboration efforts and lead to unnecessary Written Directions (WDs) for the submission.

Learning points / Good Practices

- ✓ QPs should coordinate on the changes and prior to submission and use available BIM Viewers (such as BIMvision, BIMcollab etc.) **to federate and pre-check models by each discipline.**
- ✓ QPs should pay close attention to geo-referencing and ensure this is done correctly across all disciplines. Models from all disciplines must also **name levels and zones** consistently.
- ✓ Ensure that the **relevant data for each BIM component in the model follows Section 4 of the CORENET X Code of Practice** and has also been successfully exported to IFC format.

Key Learning Points from CORENET X Pilot Projects



Builders – Submission Sequence & Construction Scheduling

Observations

- For large projects, **submission sequence may significantly impact construction schedule** (both works onsite and offsite). **Project team may underestimate the time required for pre-fabrication processes and plan poorly.**
- Builders and QPs that are unfamiliar with the new process struggle to leverage on it. For example, project team may be unaware that full demolition can be made concurrently with the new erection submission, etc.

Learning points / Good Practices

- ✓ Builders should work with consultants and **adopt a collaborative approach to timeline planning.** This involves:
 - ❖ Jointly establishing key milestones for CORENET X submissions and ensure all project members are aware of the time required for submission preparation and clearance before construction starts.
 - ❖ **Leverage the visibility on CORENET X portal to monitor submission progress.** For projects that rely on off-site fabrication, project team should plan for submissions as per the construction schedule
 - ❖ Ensure all project parties including the Developer & Builder are familiar with the new Regulatory Approval Process.

Key Learning Points from CORENET X Pilot Projects

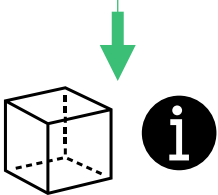
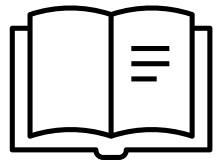


BIM Modelling & IFC-SG

1

Code of Practice

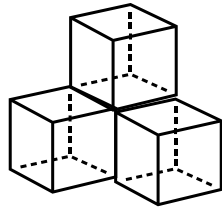
Identify submission info required



2

BIM software

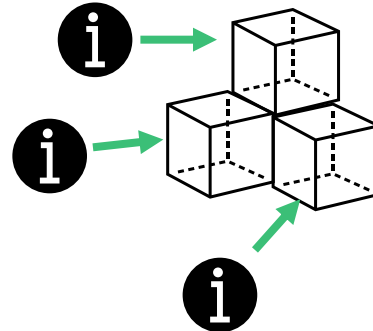
Create models



3

IFC-SG Resource Kit

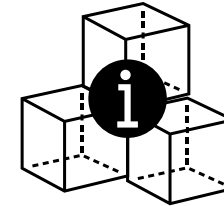
Add data into models



4

IFC viewer

Check IFC models



5

corenetX

Submit

Key Learning Points from CORENET X Pilot Projects



BIM Modelling & IFC-SG



Observations

- Project Teams do not place enough **importance in providing data required by agencies** in the submission models

Learning points / Good Practices

- ✓ Refer to latest (1) Code of Practice, (2) IFC-SG resources from BIM software vendors, (3) IFC-SG Resource Toolkit
- ✓ **Attend latest trainings**, do not hesitate to ask around and **share learnings** among your project members

Key Learning Points from CORENET X Pilot Projects



BIM Modelling & IFC-SG



Observations

- Project Teams review native BIM versions of their submission models, but not the IFC versions, resulting in errors

Learning points / Good Practices

- ✓ Remember to **check the models for data completeness and geo-referencing** using 3rd party IFC viewers and apps



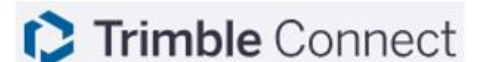
BIMvision



KIT ModelViewer



SOLIBRI
A NEMETSCHER COMPANY



Key Learning Points from CORENET X Pilot Projects



BIM Modelling & IFC-SG



Quality Check for basic IFC model quality issues has been launched on the CORENET X Submission Portal.

Project Teams can review their submission models just before you click submit.

More quality checks will be introduced along the way to help industry ensure basic model quality is met.

NEW

corenetX

✓ **Coordinated BIM**



BIM model cannot be processed for rendering due to the following error(s) detected in the BIM model. Should you proceed with submission, processing by Agencies could be affected. Please check and revise the BIM model prior to submission.

[Error details](#)

[Contact helpdesk](#)

Key Learning Points from CORENET X Pilot Projects



BIM Modelling & IFC-SG

viewer.corenet.gov.sg/21/app/viewer/6/1579/217283

Federate

Primary attachments

- Submission 01.ifc
- Submission 02.ifc
- Submission 03.ifc

A new openBIM viewer is also available on the CORENET X Submission Portal with various features to enable QPs to verify that their BIM IFC models can be rendered and federated together prior to submission.

5

NEW

Key Learning Points from CORENET X Pilot Projects



Interacting with the New Submission Portal

Observations

- Each entity's (Developer, Builder, QPs, etc.) Corppass admin **must ensure that their employees have access to Corppass and are authorised to represent their firm on CORENET X.**
- Project members who currently do not need to use CORENET 2.0 but will need to access CORENET X will need to familiarise themselves with Singpass for Business (Corppass).
- As regulatory forms have digitalised on CORENET X, the appointment of QPs and the subsequent workflows such as creation of submissions will be delayed if Corppass for each firm's representatives has not been set up.

Learning points / Good Practices

- ✓ All industry stakeholders **should set up their Corppass accounts as early as possible**, so that any issues that may arise can be addressed with their Corppass Admin (e.g. internal clearances required, Corppass Admin is away on leave, etc.)
- ✓ Corppass admins should **authorise their staff (Developer/Builder/QP and their assistants) to represent the company and be able to access "CORENET X Industry Portal" e-Service.**



Gearing Up:

Training, Resources & Support

Training Courses

1

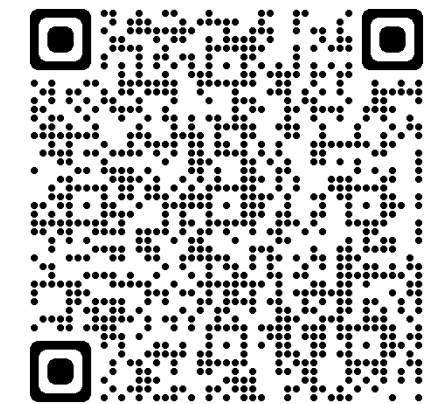
	Mode of Lessons	Trainers
CORENET X Regulatory Approval for Building Works (RABW) Course <i>Understanding the new RABW Processes</i>	Physical	BCA Academy
		The Architect's Academy by Singapore Institute of Architects (SIA)
		BIMAGE
		AcePLP(AIA)
	Self-paced Online Learning	Bluskai

> **1300** professionals from
 > **450** Industry firms
 have attended the courses

2

	Software	Trainers
1 Day IFC-SG Training <i>Preparing OpenBIM submissions using IFC-SG</i>	Revit	AcePLP Pte Ltd, BIMAGE, SP Pace Academy, Innocom
	Tekla	AcePLP Pte Ltd, BIMAGE, Trimble
	Archicad	Graphisoft
	Bentley	Bentley, AcePLP(AIA)

You may scan the QR code below to register for CORENET X training:



CORENET X Code of Practice (COP) & Self-Help Resources

Self-Help Resources

Get ready for submission via CORENET X with these self-help resources!



New Regulatory Approval Process for Building Works

Discover the new regulatory approval process for building works, Direct Submission Process, independent submissions and more.



CORENET X Code of Practice

Master multi-agency regulatory submissions across key submission gateways in CORENET X with the CORENET X Code of Practice.



IFC-SG Resource Toolkit

Uncover the recommended steps and materials required to prepare an IFC-SG model for submission via CORENET X.



IFC-SG Resource Toolkit

Welcome to the IFC-SG Resource Toolkit.

This resource toolkit comprises the recommended steps and materials to prepare an IFC-SG model for submission via CORENET X.

Step 1

+ Introduction to IFC-SG, key data structures and mapping

Step 2

+ Latest Industry Mapping Excel Files

+ Further info on the Industry Mapping Excel

Step 3

Step-by-step resources on how to apply the requirements in the Industry Mapping Excel into your respective BIM software and how to export to IFC.

Notes:

1. These resources in Step 3 are optional templates created to help users embed and export IFC-SG regulatory data requirements as indicated in Step 2. Firms may use their own in-house templates instead, as long as your CORENET X submission models contain the relevant data in Step 2.
2. To download .bim and .xml files on this webpage, please right click on the URL and "Save link as..."

+ a) Archicad

+ b) OpenBuildings Designer

+ c) Revit

+ d) Tekla

Step 4

+ Quick Start Exercises before You Start Modelling

+ List of Recommended IFC Viewers

Step 5

+ IFC-SG Validator (BIMLife)

+ IFC-SG Validator (Solibri)

+ IFC-SG Validator (AcePLP)

+ 3rd Party Apps to Expedite the IFC-SG Workflow

CORENET X Website



Home > Regulatory Info > Building Control > CORENET X



CORENET X is a co-creation effort led by BCA and URA in close collaboration with regulatory agencies, leading built environment professionals, firms and Trade Associations and Chambers (TACs).

CORENET X transforms the current regulatory landscape and practices through adoption of BIM technologies and collaborative workflows. The integrated process under CORENET X will enhance regulatory governance, promote synergy among agencies, and offer a streamlined One-Stop Integrated Digital Shopfront experience.

CORENET X will bring about 3 key changes to the submission process

1. New regulatory approval process for building works (RABW)
2. BIM submissions in IFC-SG format
3. CORENET X submission portal

For a full introduction to CORENET X, download these infographics in a ZIP folder (5 MB) or in PDF (21 MB)

Watch this 2-minute clip for a quick overview of CORENET X!



CORENET X Implementation Timeline



View the Circular on CORENET X Implementation Plan for full details!

Getting Ready for CORENET X



Highlights and Announcements



Navigation

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 - New Data Requirements and Technology
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 - Code of Practice
 - IFC
 - IFC-SG Resource Toolkit
 - Geo-Referencing of BIM Model
 - More Information
 - Industry-Agency Co-Creation
 - Technological Enablers

You may scan the QR code below to access CORENET X website:



THANK YOU!

If you wish to find out more about CORENET X,
visit us at: go.gov.sg/cx

