

Preparing for Change: Navigating a New Process

Er. Clement Tseng

Group Director

Building Plan and Management Group, BCA

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**Our Service Journey and
the Vision of CORENET X**

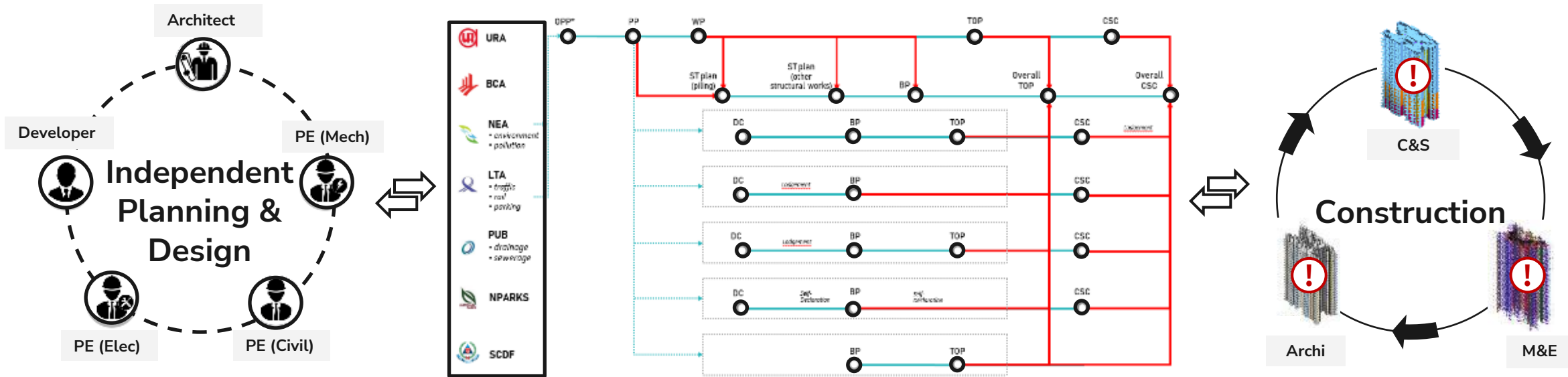
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**The new Regulatory Approval
Process - 3 Gateway Process &
the Direct Submission Process**

3

**Call to action: Getting ready
to onboard CORENET X**

Today's Separate & Concurrent Approval Process



Industry

Agencies

Construction

upstream

downstream

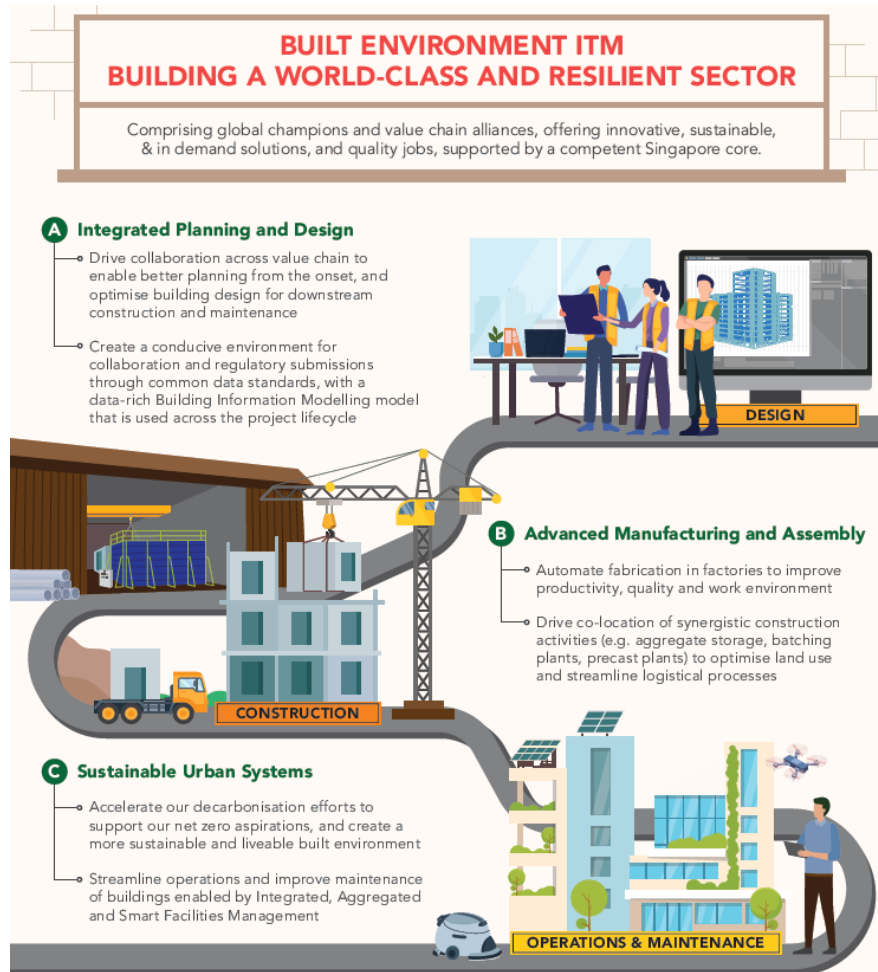
- Plans are prepared by **different professionals independently**
- Plans are **submitted separately** to different agencies at different milestones concurrently

- Each of the 7 agencies has a **different regulatory mandate**
- Comments from 1 agency may lead to **resubmission/ amendment** to others
- Approved plans may **conflict; no single integrated view** of approved plan

- Plans contain **conflicts that need to be resolved** during construction
- Rectifications = **Abortive Works**
- **Delayed issuance** of TOP/CSC

Built Environment Industry Transformation

Tomorrow's Vision: Integrated Planning & Design (IPD), Advanced Manufacturing and Assembly (AMA) and Sustainable Urban Systems (SUS)



Integrated Planning & Design (IPD)

- Drive collaboration across value chain to enable better planning
- Create conduciveness for collaboration & submissions using data-rich BIM model used across project lifecycle



Advanced Manufacturing and Assembly (AMA)

- Automate fabrication in factories to improve productivity, quality and work environment
- Drive co-location of synergistic construction activities

Sustainable Urban Systems (SUS)

- Accelerate decarbonisation efforts to support net zero aspirations
- Streamline operations and improve maintenance of buildings enabled by Integrated, Aggregated Smart FM mgmt



Integrated Planning & Design (IPD)

Providing conducive environment for upfront collaboration and IPD

Where are we today?

Abortive Work and Lack of Collaboration. Full potential of BIM/IDD not realized

Where are we headed?

Optimised design for entire building / district lifecycle (including FM), enabled by **digitalisation, collaboration and progressive procurement**



a. Digital Platforms

(e.g. CORENET X, Built Environment Digital Platforms)

b. Standards / Guidelines

(e.g. Common Data Environment Standards, Design for Maintenance)

c. Progressive Procurement

(e.g. Collaborative Contracting; Early Contractor Involvement)

CORENET X

One-stop shopfront for regulatory submissions and requires well-coordinated BIM

Digital Collaboration Platform + CDE

Enable data sharing and cross-disciplinary collaboration

Collaborative Contracting

Working collaboratively with shared project vision

Our Service Journey and the Vision of CORENET X

New Regulatory Process Through Service Journey

Co-creation through Service Journey from Oct 2018 - 2019



Engaged **57** firms

- Comprising Developers, Consultants (architectural, C&S and M&E), and Builders



Engaged **6** TACs

REDAS: Developers
SIA: Architects
ACES & IES: C&S and M&E Engineers
SCAL: Builders
SISV: Land Surveyors

New Regulatory Process Through Service Journey

Co-creation through Service Journey from Oct 2018 - 2019



Consulted

56

BIM Managers

7 Sessions involved

106 39

industry reps agency reps



New Regulatory Process Through Service Journey

Co-creation through Service Journey from Oct 2018 - 2019

“ The BE community & industry is aligned on the more integrative, collaborative & productive approach ”

“The need for opportunities for industry and agencies to work together for co-creation. “



“ The agencies, developer and QPs able to see eye to eye on the need to evolve the process ”

Service Journey Approach; Co-Created with Industry

Business Re-engineering for a collective vision to meet tomorrow's aspirations



a new approach working together towards a common goal

co-create • collaborate

Different Strokes for Different Folks

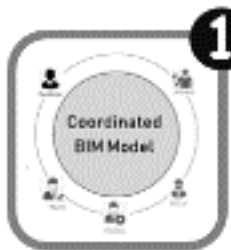
5Cs of CX

clarity • connect • co-share

transparency aligning to work as one share gain share pain
 nothing to hide harmony in diversity balanced relationship

Smart Nation Starts with Disrupting Ourselves

\$hare
\$afe
\$mooth
\$mart
\$imple
\$peedy
\$mile



1 Reaping Full Benefits of IDD, BIM Value Chain

Improved productivity across value-chain with better quality products



2 Striking the Right Regulatory Balance

Industry attains high level of professionalism; Regulators can be less interventionistic



3 Facilitating Regulatory Compliance

Efficient, smooth & transparent process enabled by tech & refined through data-driven reviews

The new Regulatory Approval Process for Building Works

Vision of CORENET X

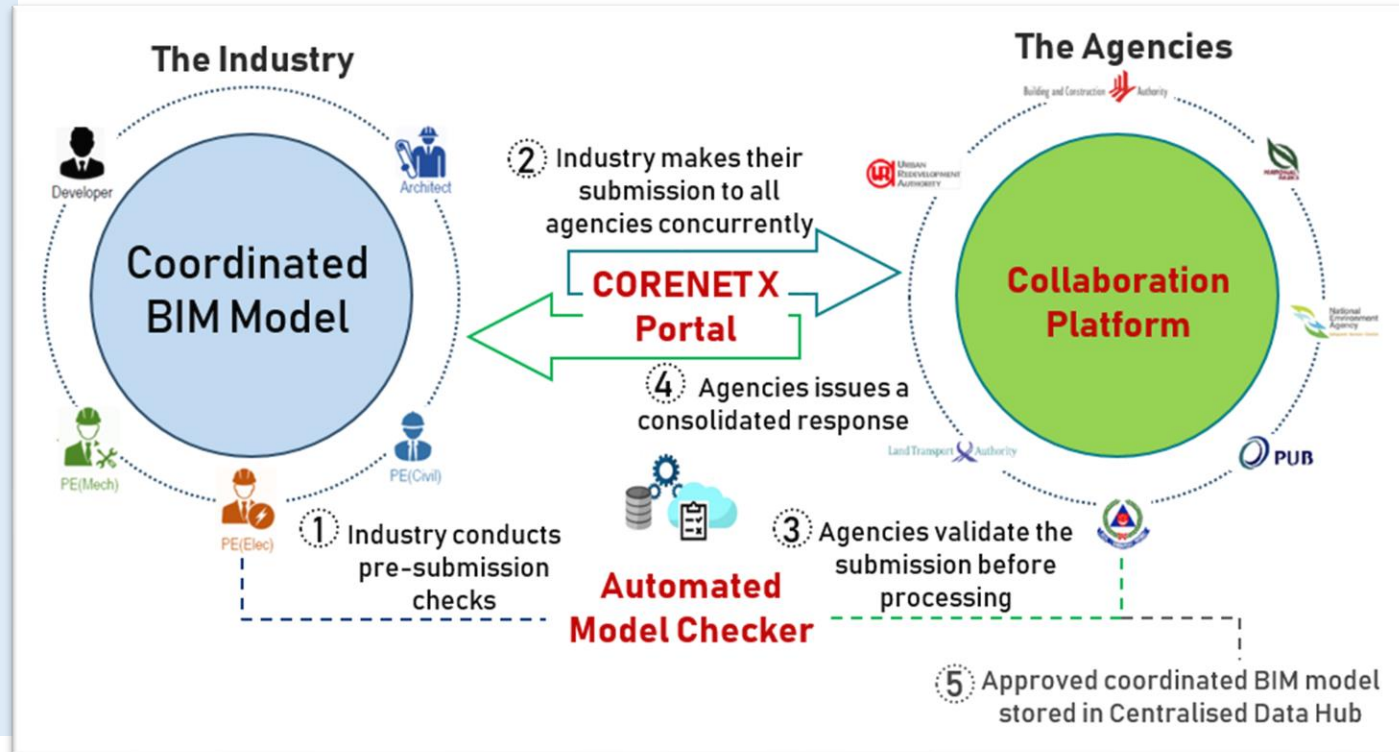
A Future Ecosystem of Regulatory Approval of Building Works that Accelerates The Transformation of the Construction Industry

FIRST IN THE WORLD

One-Stop Integrated Digital Shopfront

TRANSFORMATION of INDUSTRY

- Promote design coordination and teamwork
- Promote digitalization of construction sector
- Support IDD & DfMA imperatives

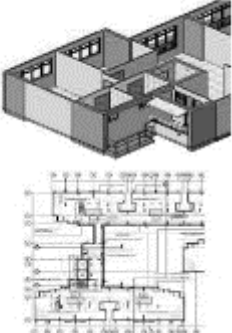
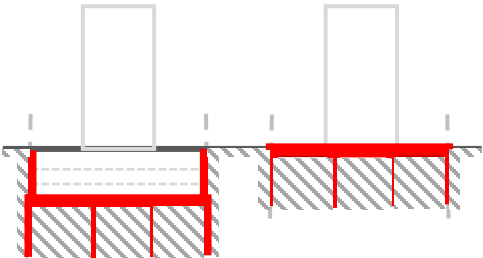
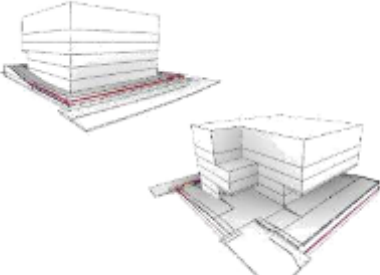


TRANSFORMATION of REGULATORY AGENCIES

- Reduce silos, iterations & regulatory gateways
- Embrace collaboration & raise productivity amidst rising demands
- Improve accessibility & centralise information towards a Single Source of Truth

New Regulatory Approval Process for Building Works (RABW)

The 3-Gateway Regulatory Approval Process



① Design Gateway

①.5 Piling Gateway (Optional)

② Construction Gateway

③ Completion Gateway



Critical Design Parameters

Structural Design Parameters

Detailed Design Requirements

All Other Requirements

Compliance to Approved Design & Statutory Completion

"Showstoppers, non-negotiables"

"Must-haves before Piling"

"Must-haves before Super-structure construction & Launch of Sales"

Independent requirements with no conflict across agencies

←----- construction ----->

3 Gateway Regulatory Approval Process

① Design Gateway

①.5 Piling Gateway (Optional)

② Construction Gateway

Definition

Critical Design Parameters

Foundation Parameters

Detailed Design Requirements

← construction

Rationale

Resolve key parameters impacting design parameters & client's brief, before proceeding to detailed design

Resolve multi-agency requirements on design details that need to be coordinated before commencement of superstructure construction

Requirements to be cleared (examples)

Examples

- Master Plan Land Use / Intensity
- Building Massing e.g. height
- Site Layout, Access to Site
- Impact analysis e.g. PAFS, Traffic/Noise/Env

Examples

- Structural Design
- Earth Control Measures
- Earthworks

Examples

- Super-structural Design
- Building Layout e.g. floor, fire safety
- Services e.g. plumbing, public health
- Connectivity e.g. pedestrian network
- Strata boundaries, External Works

Key clearances

Issuance of Provisional Permission + DC clearances

- Issuance of ST approval for piling
- Able to carry out permissible works e.g. ERSS, piling

- Issuance of WP, BP Approval + BP clearances
- Able to launch sales, carry out main structural works

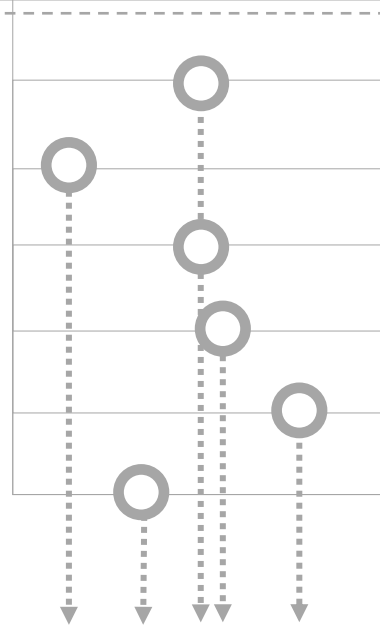
3 Gateway Regulatory Approval Process

③ Completion Gateway (TOP/CSC)

construction
All Other Requirements
 Check for compliance of specialist details and agency-specific details.

Examples

- Equipment and services e.g. Lifts, Cooling Tower, Fire fighting system, water pumps
- Structural details of ancillary components e.g. barrier/curtain wall
- Materials e.g. fire resistance



Issuance of agencies' clearances/ acknowledgements

Compliance to Approved Design & Statutory Completion

Site inspection to ensure building works are constructed as per approved plans and comply with requirements.



Issuance of agencies' TOP/CSC + overall Temporary Occupation Permit/ Certificate of Statutory Completion

Definition

Rationale

Requirements to be cleared (examples)

Key clearances

Key implementation principles of new RABW

No change in
statutory
responsibilities

1

Coordinated & consolidated response

- Agencies review, deconflict & respond collectively. Comments can be location-tagged on BIM model
- Industry no longer be required to produce comments/clearances from another Agency

2

Iterations through Written Directions

- With collective review and collaboration across Agencies, submissions should not iterate with more than 2 Written Directions at each gateway

3

Gateways RABW serve as building block process

- The gateway process facilitates the sequential layering of information in BIM models
- Design Gateway clears macro-level design before details get cleared at Construction Gateway, reflecting a building block process

20

Working days response time by Agencies

- BIM submissions go through Agencies' inter and intra-agency level reviews
- Agencies will collaborate to respond to industry collectively within 20 working days

Supporting Mechanisms for the New RABW

PRE-SUBMISSION CONSULTATION

Industry can seek guidance from Agencies prior to and at any point in the Gateway submissions



WAIVERS

Industry may apply for deviations from compliance for Agencies' assessment and decision prior to Gateway submissions

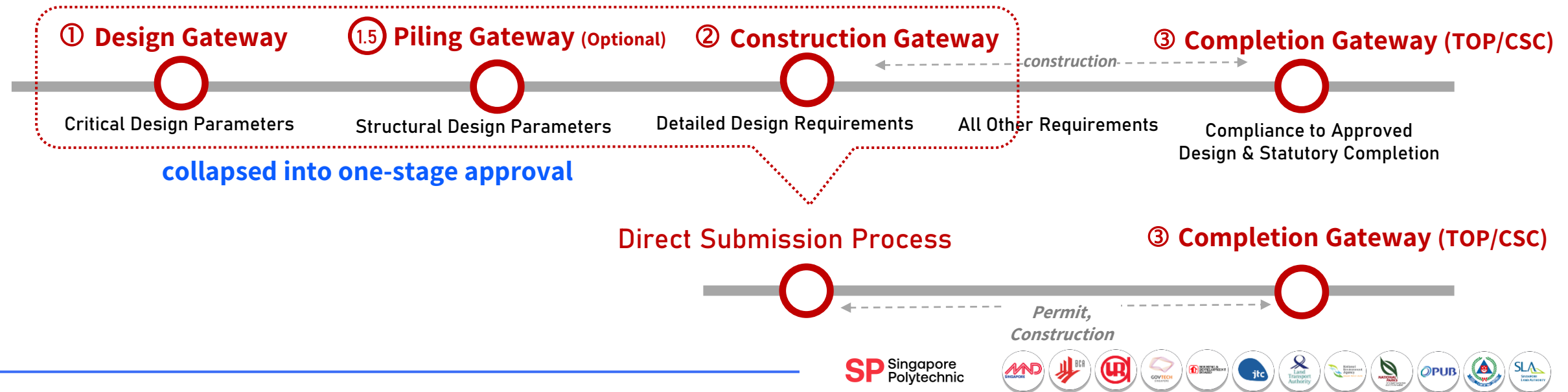
ESCALATION MECHANISM

Industry can seek upfront resolution on inter-agency regulatory conflicts at the **Inter-agency Coordinating Committee (IACC)**



Differentiated Approach - Direct Submission Process

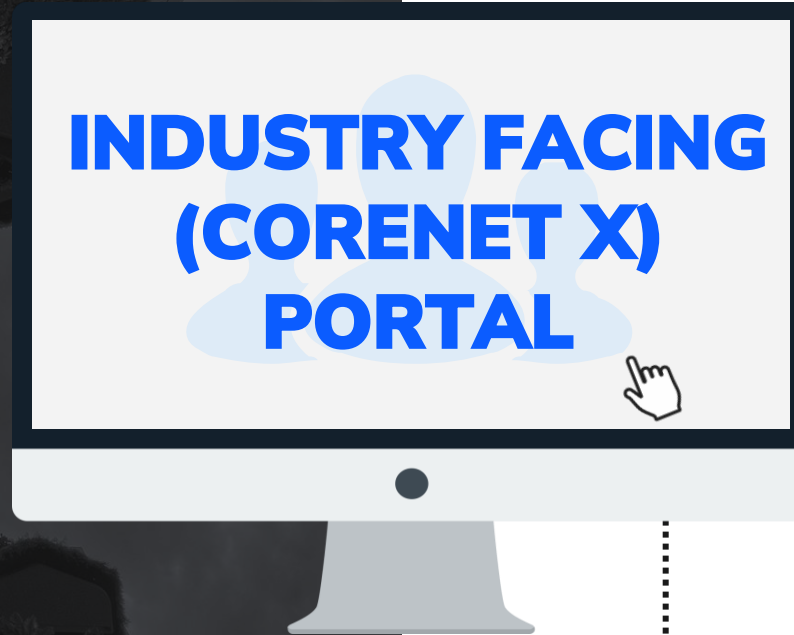
- For simpler, less complex building works of lower risk that need not be subjected to the 3 Gateway process
- **Direct Submission Process** (DSP) has been developed to facilitate a **single stage approval** prior to TOP/CSC. This will also support existing lodgement, self-declaration, simplified submission schemes
- Development types and building works currently identified include:
 - Single-Unit Residential (landed) developments;
 - Standalone structures e.g. pavilion, linkways, racking system
- Ongoing development of eligibility criteria to facilitate other project types for DSP



Key Changes in Submission Processes

	Current Practice	CORENET X Process
1	Industry submits separately to Agencies through > 20 touchpoints	3-Gateway process will apply for all new projects. Industry to coordinate and submit to all Agencies for collective review Direct Submission Process (single stage check) for eligible projects
2	BIM files are submitted in native/lightweight format for new projects of GFA ≥ 5,000 sqm	BIM model to be submitted in IFC format for new projects of GFA ≥ 5,000 sqm, supplemented by documents & files of other formats
3	Submission is cleared independently by Agencies	Submission through a Gateway is deemed cleared only when Agencies' issue a consolidated clearance, without which the project cannot proceed to the next Gateway
4	Agencies' response time subjected to respective timeframes	Consolidated Agencies' responses issued within 20 working days

LEVERAGING ON TECHNOLOGIES



COLLABORATION PLATFORM



- Collaboration

AUTOMATED MODEL CHECKER



- Automation

OPEN-BIM FORMAT



- Interoperability

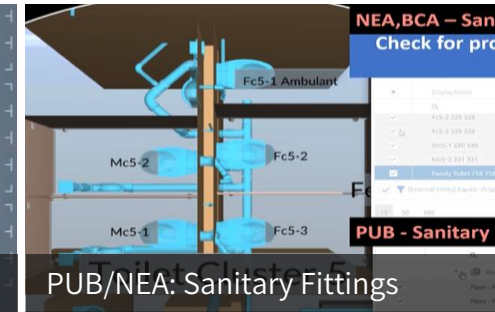
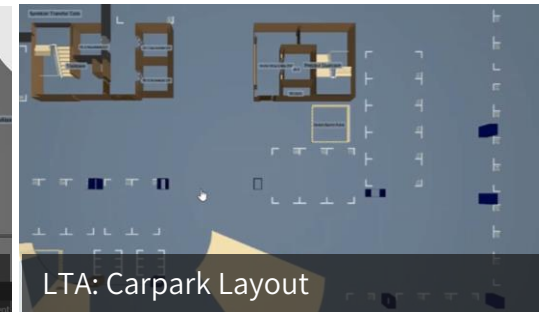
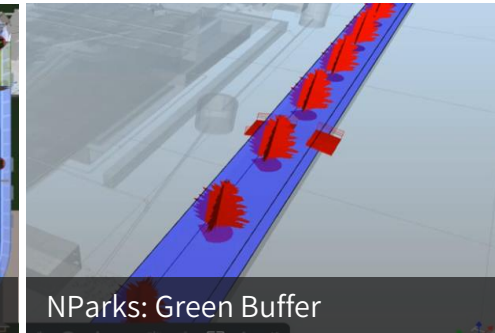
COLLABORATION PLATFORM



- ✓ **Extraction of different views / areas of interest** for review from the same model
- ✓ **Concurrent review & virtual collaboration** among agencies on the platform
- ✓ **Issuance of coordinated response** to industry



Extracted Views from BIM Model for different agencies



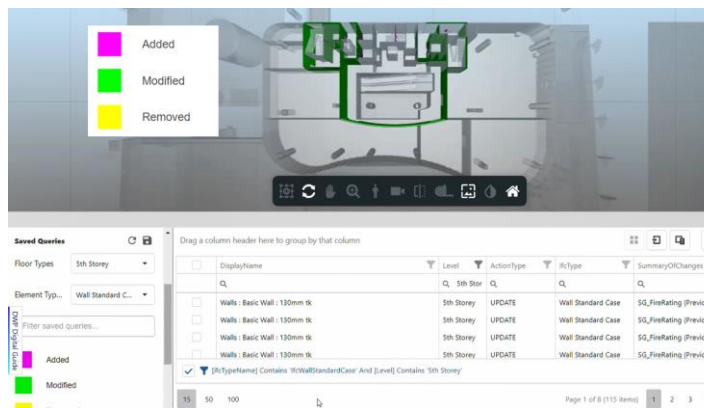
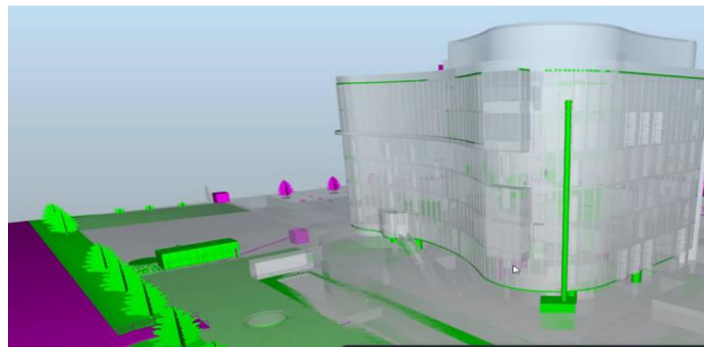
COLLABORATION PLATFORM



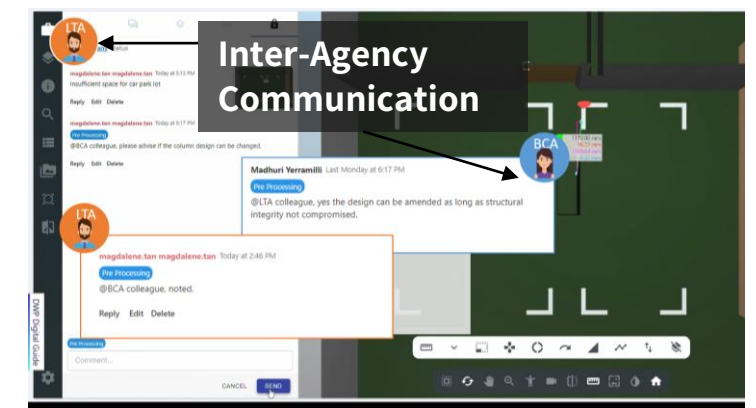
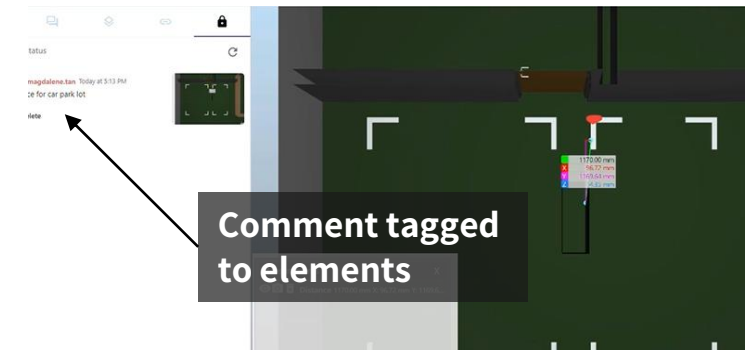
- ✓ Extraction of different views / areas of interest for review from the same model
- ✓ Concurrent review & virtual collaboration among agencies on the platform
- ✓ Issuance of coordinated response to industry



Highlighting Amendments



Virtual Collaboration



Call to Action: Getting ready to onboard CORENET X

Current efforts to help industry professionals transit

1. Aware

Aware of the changes and benefits of CX



Public Comms & Announcements



Industry Webinars



CORENET X Resource Website

2. Align

Align on the need to change and instill urgency



Leadership Forum



TAC & Firm Engagement

3. Prepare

Prepare the industry through capability building



Code of Practice & IFC-SG Resource Kit



Trainings



Community of Practice (COPr)

4. Adapt

Adapt to the change through actual practice



Sandbox & Hand-holding



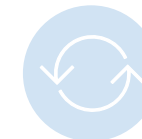
Clinics



Helpdesk

5. Reinforce

Reinforce and embed change into new way of working permanently



Refresher Workshops



Success Stories



Review and improve

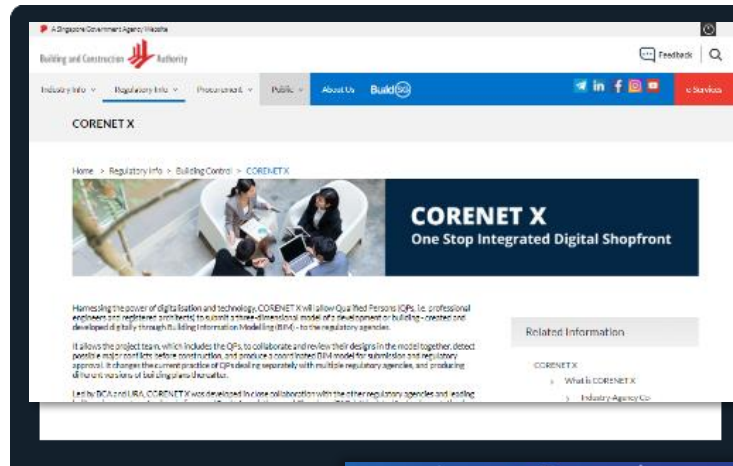
Series of initiatives to support industry professionals in adapting to CORENET X

Initiatives to engage & prepare Industry professionals

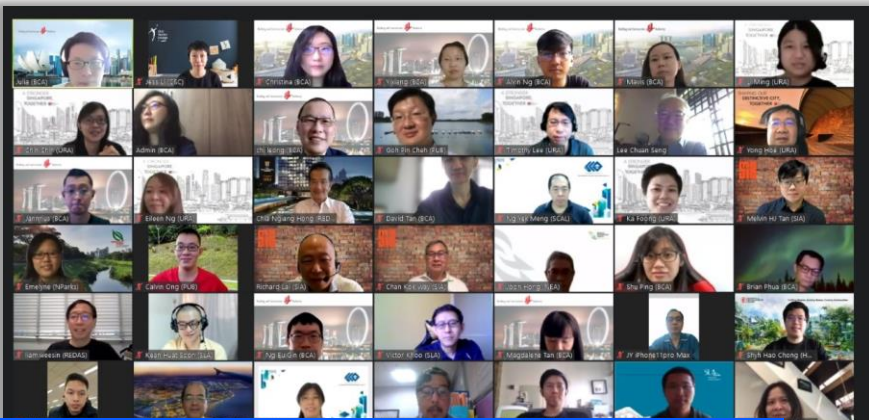
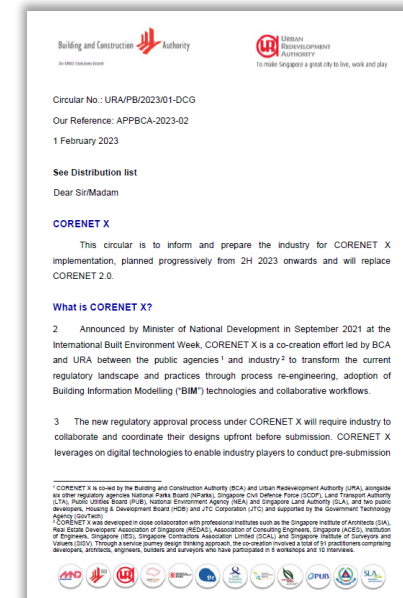
Ongoing IFC-SG training for industry, upcoming training on new RABW



CORENET X website with resource toolkits, videos, FAQs, infographics, webinar materials



Circular to the wider industry and ongoing development of Code of Practice



More than 6 Industry webinars with over 3000 participants



Developing your 'playbook' for your organisation

A guide to identify areas for your immediate intervention to get ready for CORENET X

	Employee Level	Organisation Level	Project Level
People	<ul style="list-style-type: none"> • CORENET X champions • CORENET X resource persons 	<ul style="list-style-type: none"> • Management support • Organisational structure, e.g. dedicated set-up/committee for CORENET X 	<ul style="list-style-type: none"> • Best practices for coordination with other disciplines
Process	<ul style="list-style-type: none"> • Understanding the consolidated process of Regulatory Approval for Building Works e.g. through training, available resources for continual learning (and where to find them) 	<ul style="list-style-type: none"> • Company SOP and in-house standards • Platforms to share learnings and best practices across the company • Structured training programme 	<ul style="list-style-type: none"> • Sandbox participation
Technology	<ul style="list-style-type: none"> • BIM/IFC capability, e.g. through training, available resources for continual learning (and where to find them) 	<ul style="list-style-type: none"> • ICT infrastructure and hardware adequacy • Tools to assist in BIM/IFC modelling 	<ul style="list-style-type: none"> • BIM collaboration tools

Thank you

Latest updates on CORENET X can be found at
<https://go.gov.sg/cx>

