

Project Controls Expo, Australia – 26<sup>th</sup> November 2019

Melbourne Cricket Ground, Melbourne

pushing the boundaries of cost & time

5D + 4D workflow design & implementation

Caitlin Shields

Associate & 5D Quantity Surveyor

Mitchell Brandtman



**MitchellBrandtman**  
5D Quantity Surveyors & Construction Expert Opinion



**Project Controls**  
**EXPO**  
Melbourne, Australia

# About the Speaker

Caitlin Shields – Associate & 5D Quantity Surveyor

- Caitlin's expertise in 5D quantity surveying combined with her in depth knowledge of the construction and development industry has seen her play an integral role within Mitchell Brandtman 5D cost planning team on some of the company's largest and most challenging projects



**MitchellBrandtman**  
5D Quantity Surveyors & Construction Expert Opinion



**Project Controls**  
**EXPO**  
Melbourne, Australia

as an industry, we've come to accept;

### cost risks

- tender uncertainty
- rule of thumb contingencies
- scope changes & variations


### time uncertainty


- programme challenges
- standard s-curves
- lack of project status clarity



traditional barriers are today's opportunities

## how 5D+4D is driving positive change

- all good design models are all rich in data & inherent geometry ∴ quantities
- quantities can be dynamically linked to models
-  quantity leads both cost & time outcomes
- quantities ∴ cost & time can be visualised & trusted
- cost & time can be simulated ∴ proactively managed



**Klang Valley MRT, Malaysia**  
case study  
5D+4D workflow design & implementation



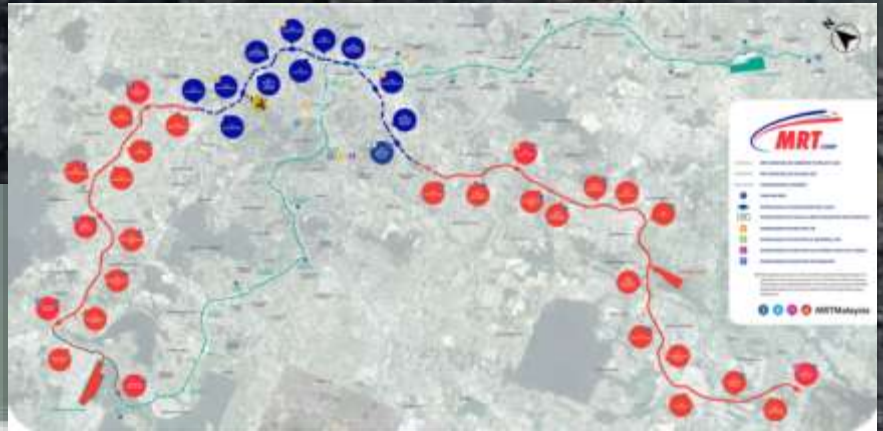
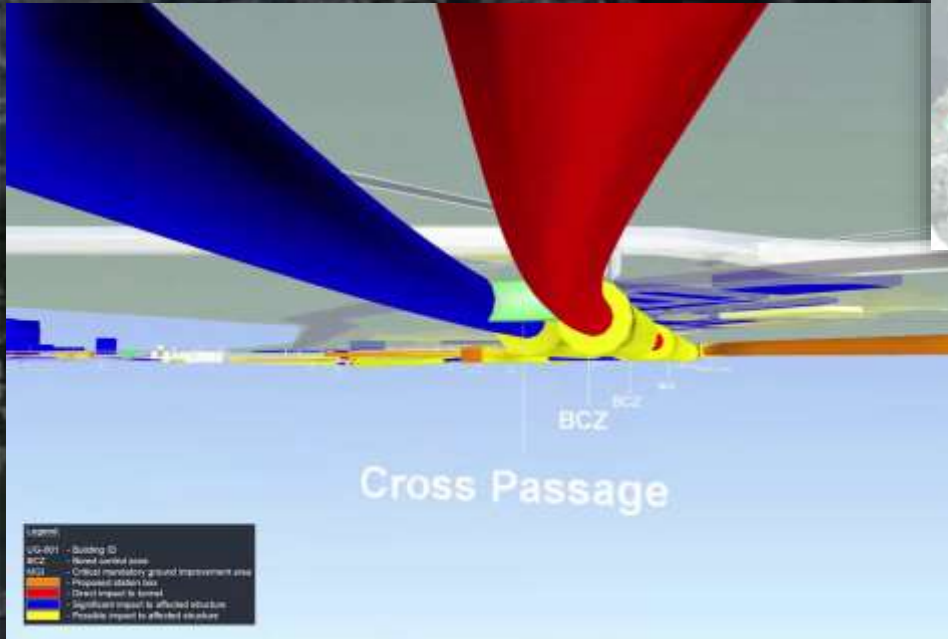
**MitchellBrandtman**  
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**MMC-GAMUDA** 

# KVMRT, Malaysia

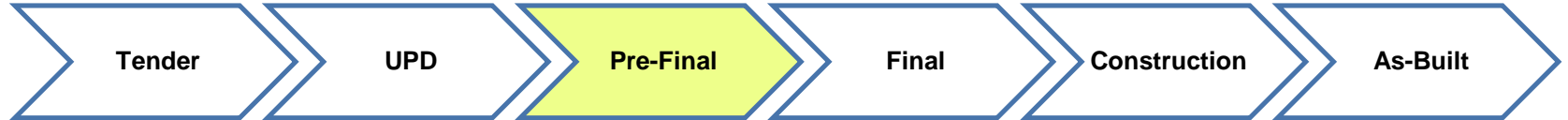
## SSP Line 2



52.2km : 24 above ground stations : 11 underground stations : AUD\$11.8B

# Mitchell Brandtman's role

- deliver & implement 5D+4D BIM
- design advanced 5D+4D workflows to overlay traditional processes
- leverage existing technology (Revit, Navis, P6)
- lead 5D+4D BIM at Gamuda Training Academy
- train and inspire the next generation of 5D leaders within the business



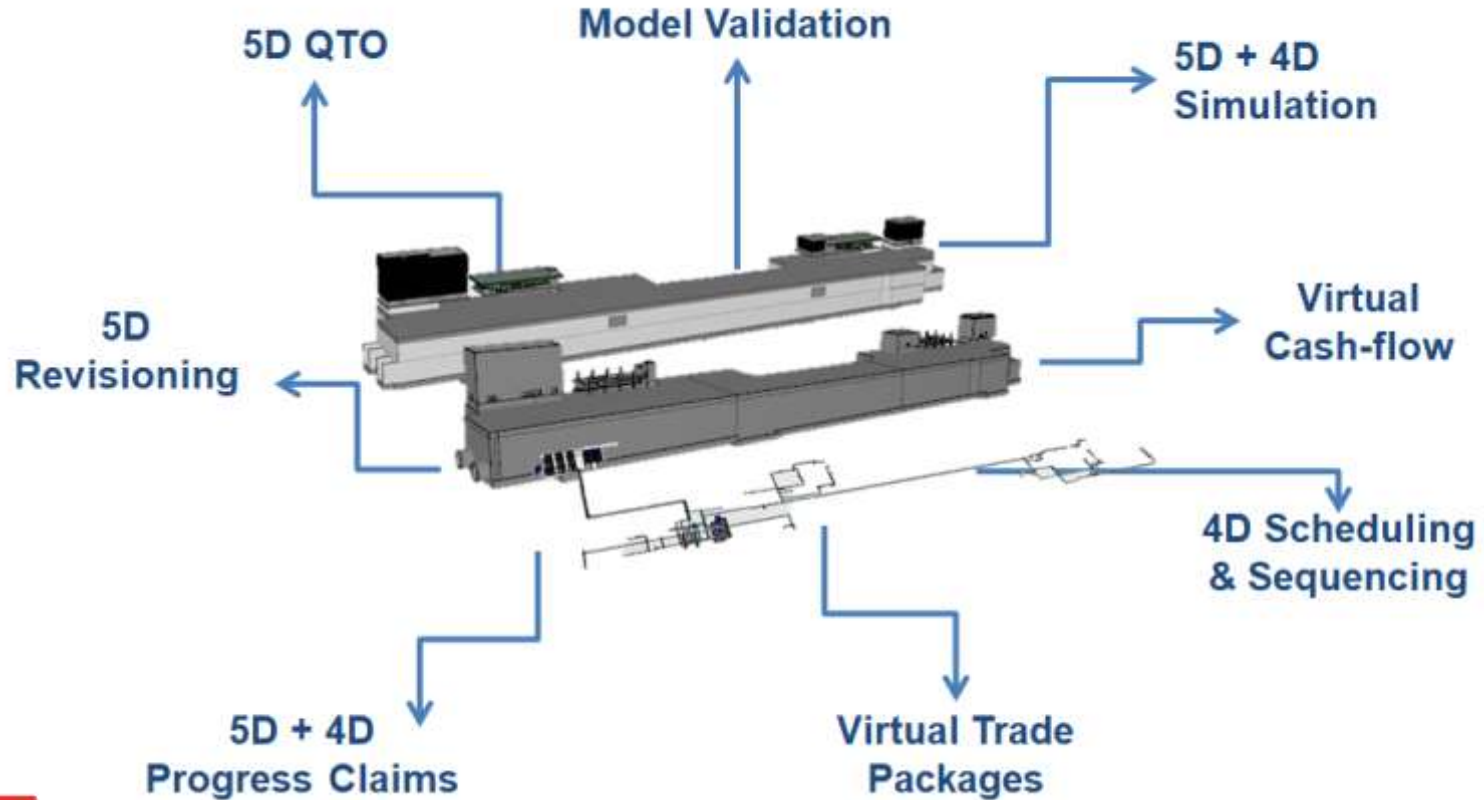


# discovery phase: identified opportunities

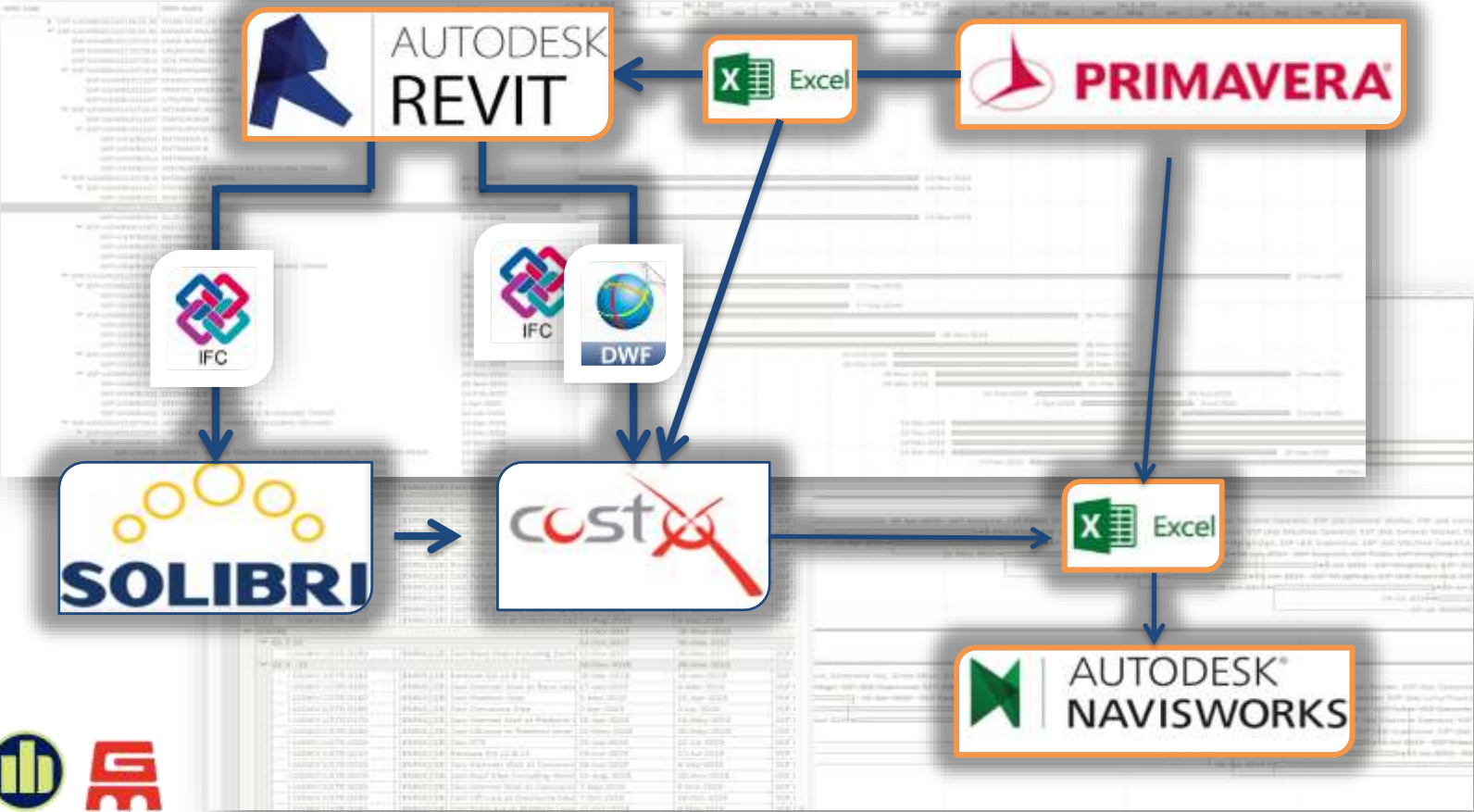
- traditional siloed structure, large inefficient teams (100+ QS's)
- duplication of effort
- heavily reliant on slow manual tasks
- excessive 2D documentation, complicated information flow
- reactionary solutions to common, complex problems
- established digital 'Revit' team, of 5 people
- 3D design models exist, produced for 2D only - no BEP in sight



# tailored 5D+4D solutions



# custom 5D+4D workflow design & data exchanges



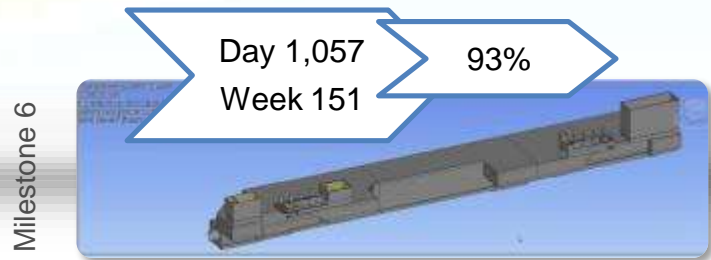
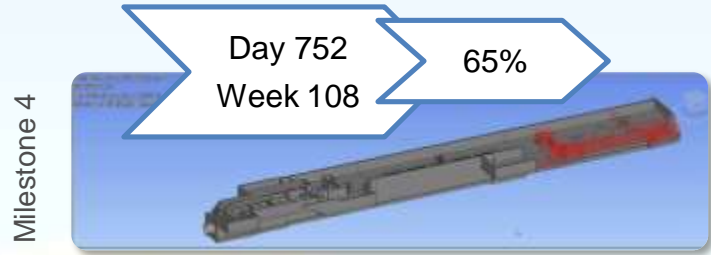
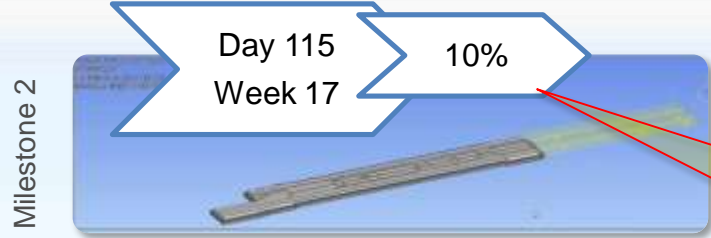
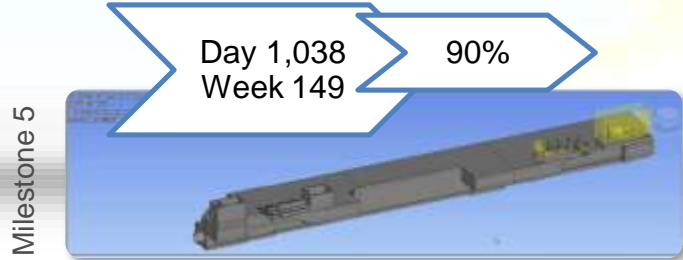
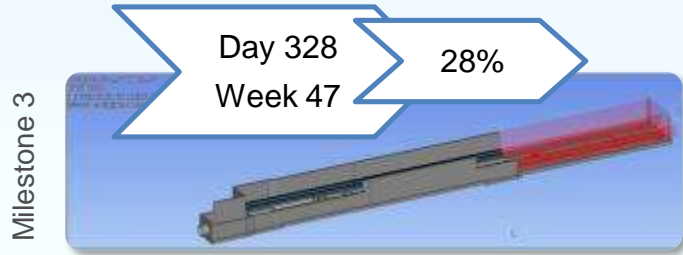
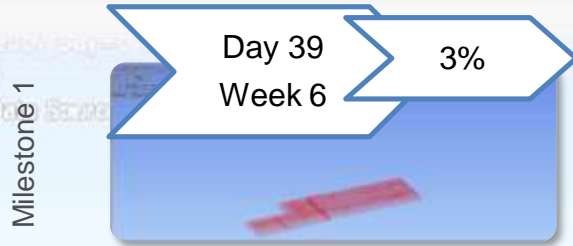
# 5D+4D virtual cashflow, simulation & progress assessments

The screenshot displays the Autodesk Navisworks software interface. The top ribbon includes tabs for Home, Viewport, Review, Animation, View, Output, BIM 360, and Render. The main workspace shows a 3D model of a building structure, currently highlighted in yellow. The bottom section features a Timeline window with a playback control bar and a data table.

Name	Status	Planned Start	Planned End	Actual Start	Actual End	August 2017	September 2017							
001 - New Data Source (root)		4/08/2017	23/08/2020	3/08/2016	N/A	W02	W03	W04	W05	W06	W07	W08	W09	W10



# 5D+4D milestone status for cash-flow & progress assessments



*\$ Value of  
Trade Works  
Complete*



# new skills, new opportunities

## Digital Data

Revit, Navisworks  
Model Validation  
Solibri

## 5D QTO

Advanced CostX  
CostX 5D Mapping  
5D Revisioning

## 4D Scheduling

CostX 4D Mapping  
4D Sequencing  
Navis Timeliner

## 5D+4D Sequencing

Virtual Cash-flow  
5D+4D Progress &  
Status



### TITIWANGSA STATION CONSTRUCTION PROGRESS UPTO FEBRUARY 2018

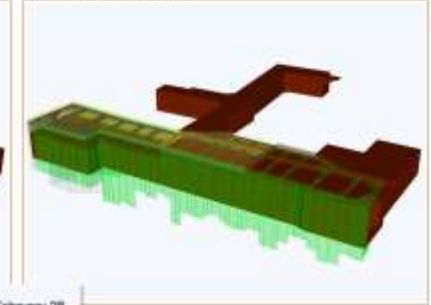
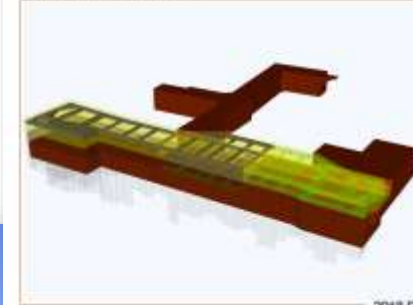
Based on Baseline 3.0.0 ver

MMC-GAMUDA KVIBVT (T) SDN BHD



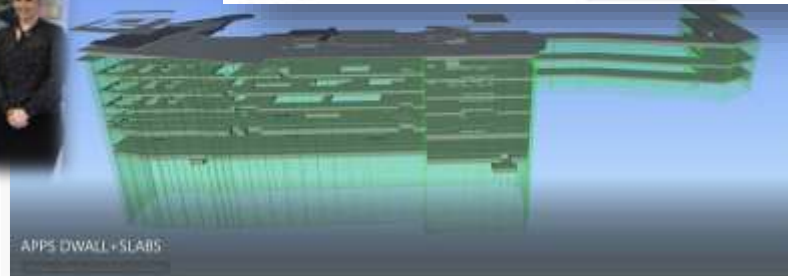
PLANNED PROGRESS PERCENTAGE: 22.02%

ACTUAL PROGRESS PERCENTAGE: 38.8%



Appearance Public:

2018 February 28



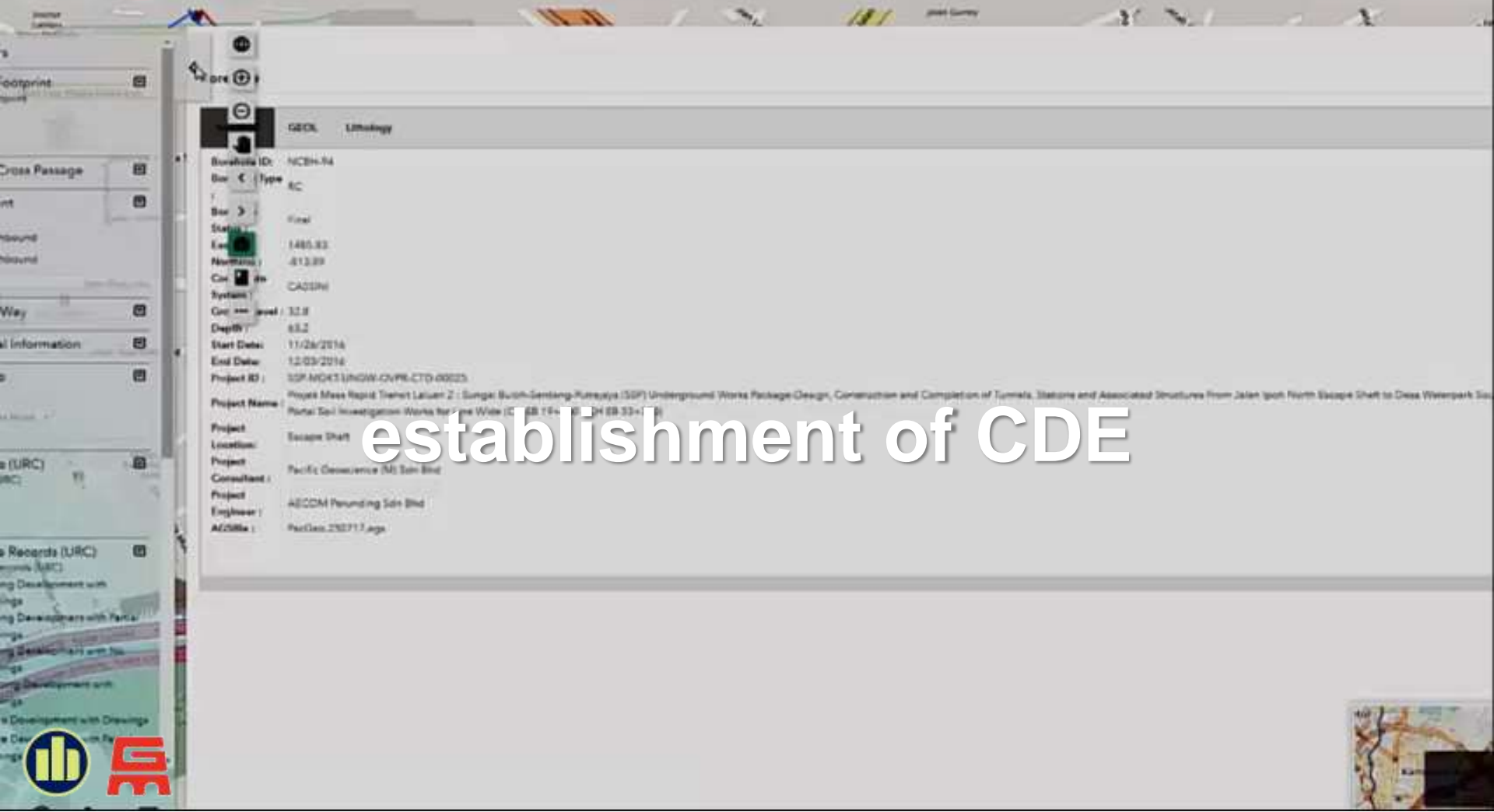
APPS DWALL+SLABS





**5D+4D implementation**  
increased efficiencies  
collaboration platform  
rapid knowledge transfer  
fast proactive solutions to complex problems





establishment of CDE





An aerial photograph of a large construction site. The site is filled with various materials, including stacks of blue and white containers, piles of earth, and several large white and blue structures. The site is surrounded by a red and white striped safety fence. In the background, there are residential buildings and green trees. The text "integration with GIS" and "project-wide visual data" is overlaid in the center of the image.

integration with GIS  
project-wide visual data





**pointcloud scans & drone photogrammetry**  
**digital verification**  
**integration with existing infrastructure networks**



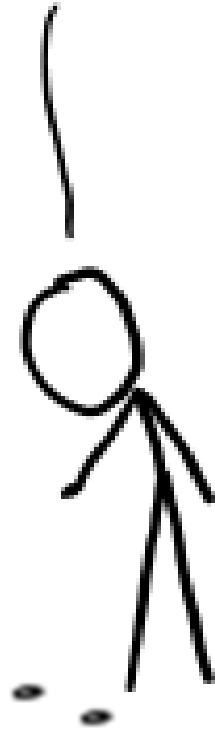
## implementation challenges

- live, intense environment
- hardware adequacy & work spaces
- access to old tools
- embedded culture
- frogs & durian
- usual change barriers...

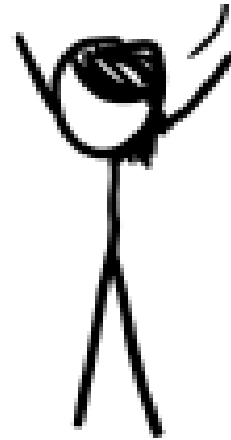


# change management

*HEY, SOME CHANGE !*

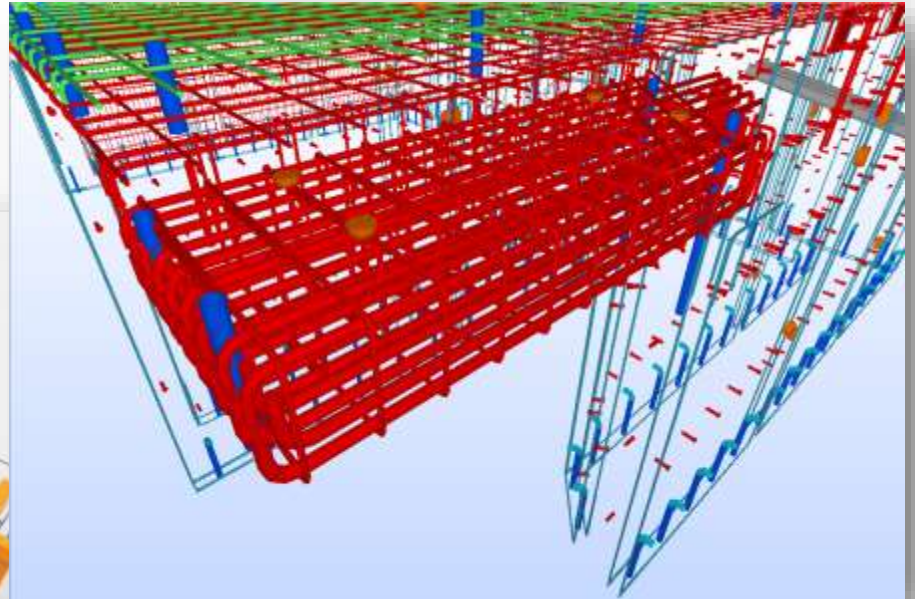
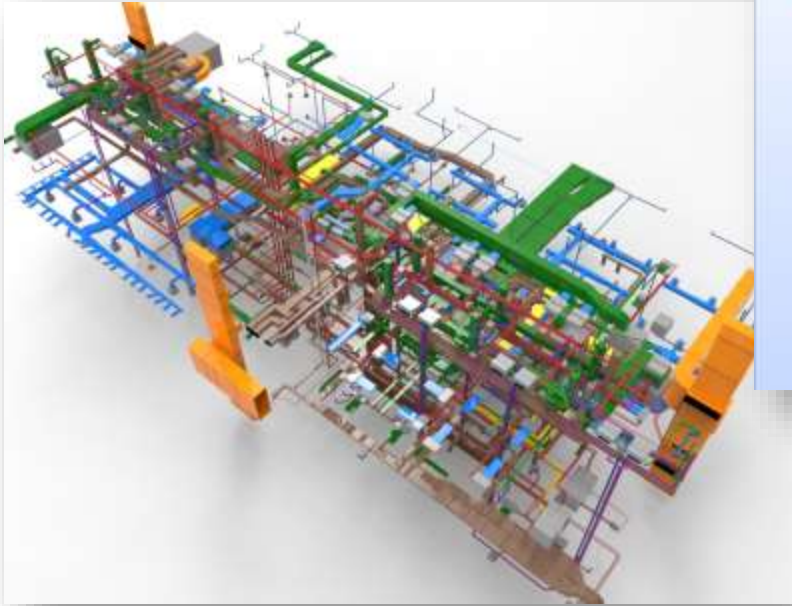


*THERE'S  
NO TIME!!!*



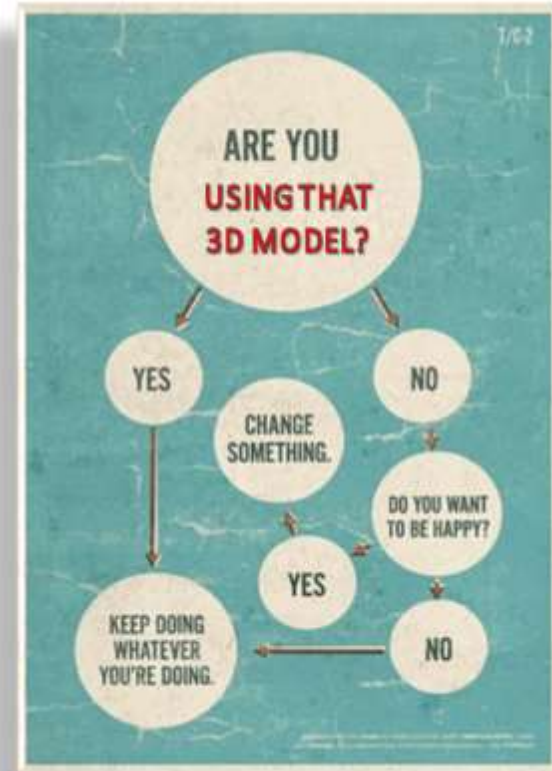


## further opportunities



# the future is here... be disruptive

- leverage 3D technology to drive better outcomes
- 5D: create trust with visual quantities
- 5D+4D: understand cost & time virtually, manage proactively
- if you don't know how to leverage 3D – find someone that does !



*Change* your own adventure





**MitchellBrandtman**

5D Quantity Surveyors & Construction Expert Opinion



## OFFICE LOCATIONS

thank you

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Sydney  
Brisbane  
Canberra  
Melbourne  
Gold Coast  
Regional QLD  
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