

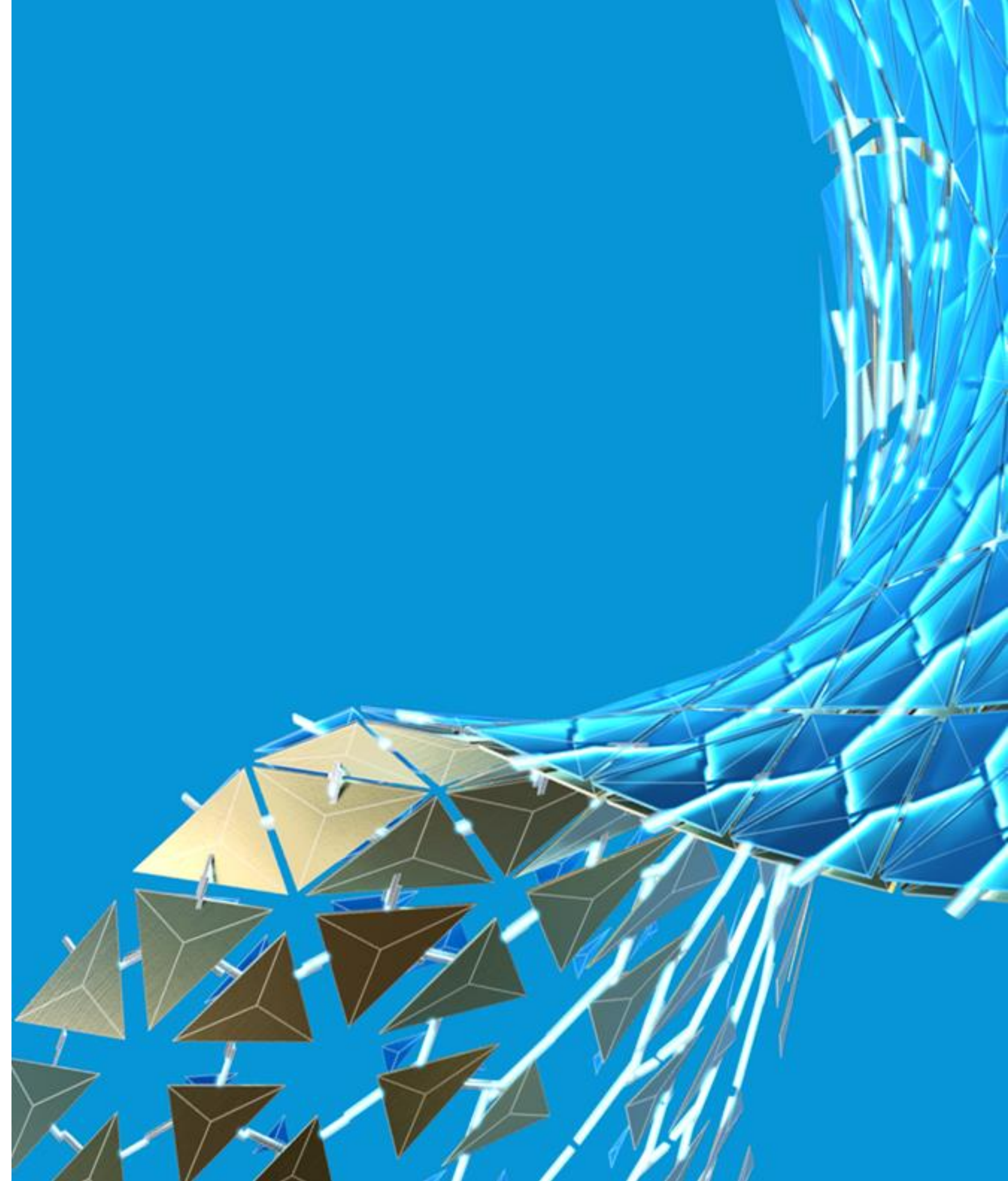
Brownfield Projects: Applying a Scalable AWP Approach with BIM 360 and Forge

Josh Girvin

CEO, O3 Solutions |  [linkedin.com/in/joshuagirvin](https://www.linkedin.com/in/joshuagirvin)

Learning Objectives

- Why Scalable AWP is important to the industry
- How O3 and Autodesk can scale AWP for brownfield projects and portfolios
 - Create and manage work packages digitally on brownfield projects
 - Automate constraints, approvals, and workflows to support AWP best practices
 - Gain visibility into the status and progress of your portfolio of projects





About the Speaker

Josh Girvin, CEO, 03 Solutions

- Serial Entrepreneur
- CII AWP Performance & Benchmarking Co-Chair
- CII Technology Committee Member
- Former SVP Product & Market Strategy for Materials Management / RFID Software
- 12 Technology Patents
- BSE Mechanical Engineering, Princeton University



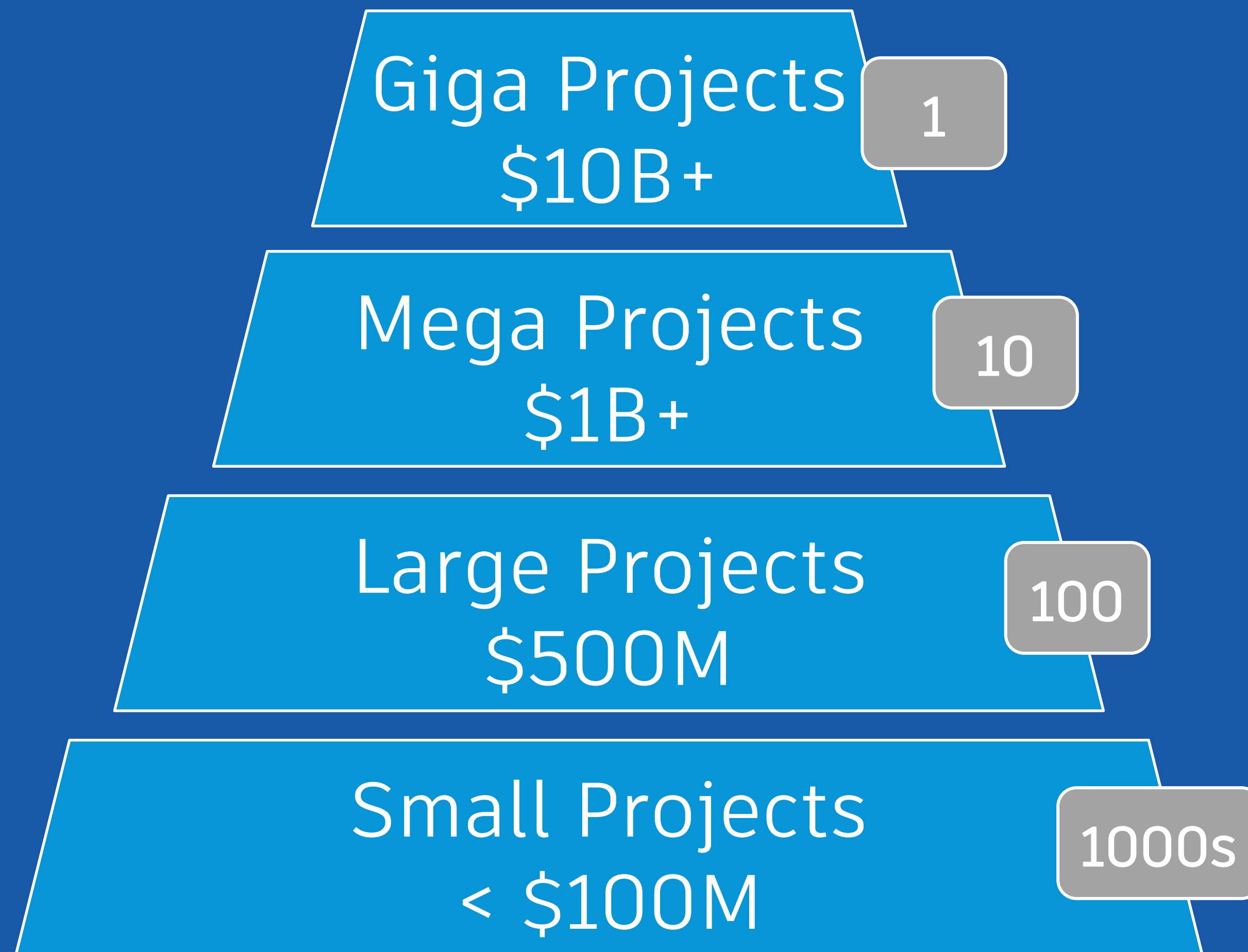
Presentation Overview

- So What: Why are we here today?
 - Why Scalable AWP for Brownfield Projects is Important
- O3 Experience with Brownfield Projects
- The Background: Advanced Work Packaging & Agile for Construction Primer
- The Challenge: Scaling Project Delivery for Brownfield Projects
 - Why a New Approach is Needed
- The Solution: O3 Leveraging Autodesk Forge Viewer & BIM 360
- The Results: Brownfield Case Studies
 - Scaling AWP from Zero to 50 Small Projects in Less Than 30 Days
 - Work Package Management With & Without a 3D Model
 - Enterprise Productivity Management & Visualization
- Key Takeaways

Why It's Important: Scaling Project Delivery for Brownfield Projects



Portfolio Landscape



To move the needle,
your focus should be
on the majority of
your spend

The Project Landscape

Mega & Large Projects

Large-scale

Complex

\$1 Billion+

Many years to
develop & build

Multiple public
& private stakeholders

Operating Facilities

Small projects

Short duration

\$50k - \$100M

Multiple
simultaneous projects

Impact to daily
operations

Size Matters

Nuances that Impact Implementation

Mega & Large Projects

Rigid Upfront
Requirements

Multiple Disconnected
Stakeholders

Dedicated Project
Management Team

Operating Facilities

Ability to Crawl,
Walk, Run

Embedded Contractors

Internal Construction
Management Team
Spread Thin

03's Experience: Scaling Project Delivery for Brownfield Projects



Who is O3?

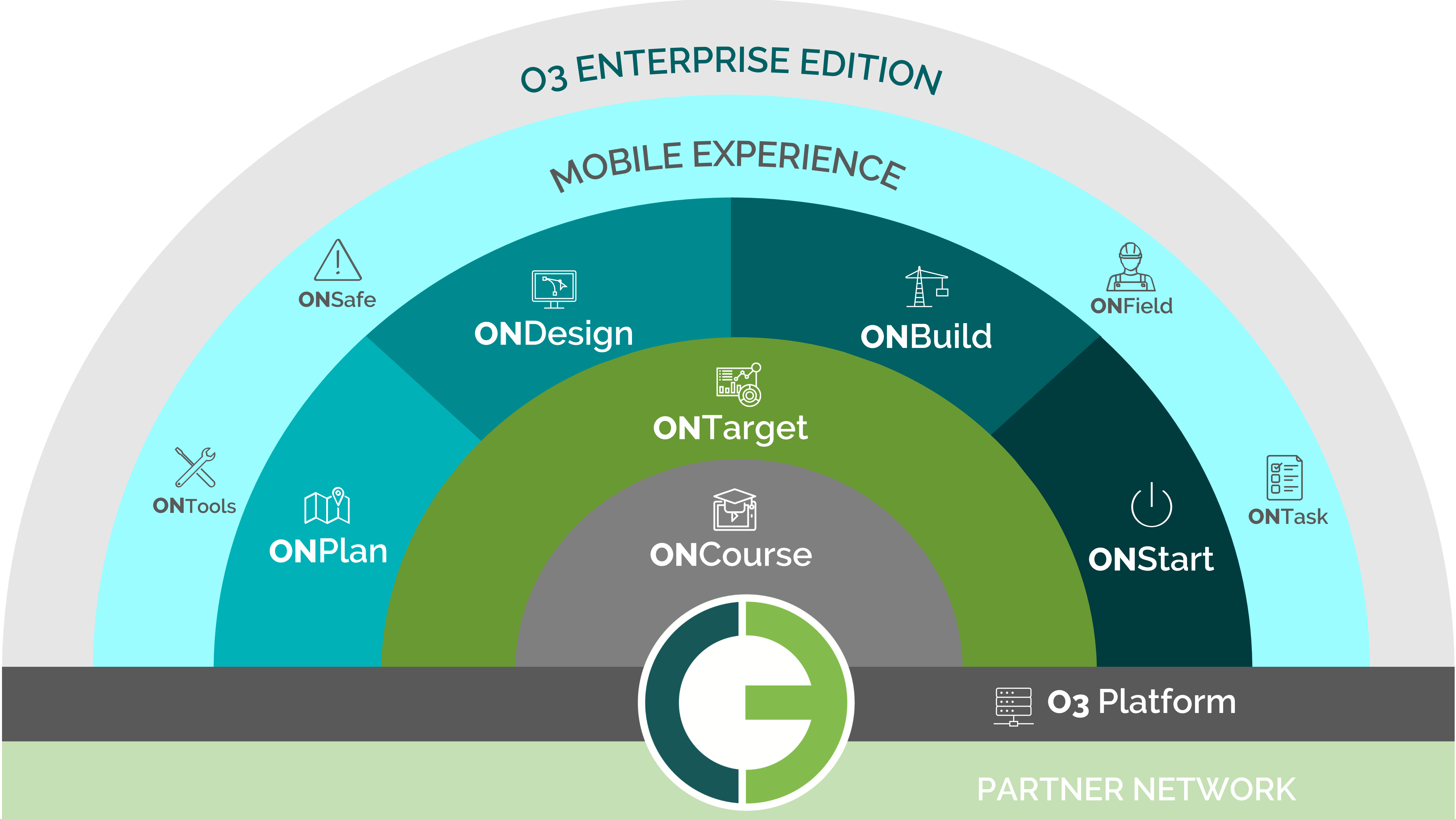
O3 is a **modern SaaS platform** that leverages **Advanced Work Packaging** and **Agile** best practices to disrupt the status quo for companies **in industrial construction** who want to improve productivity, safety, quality, and predictability.



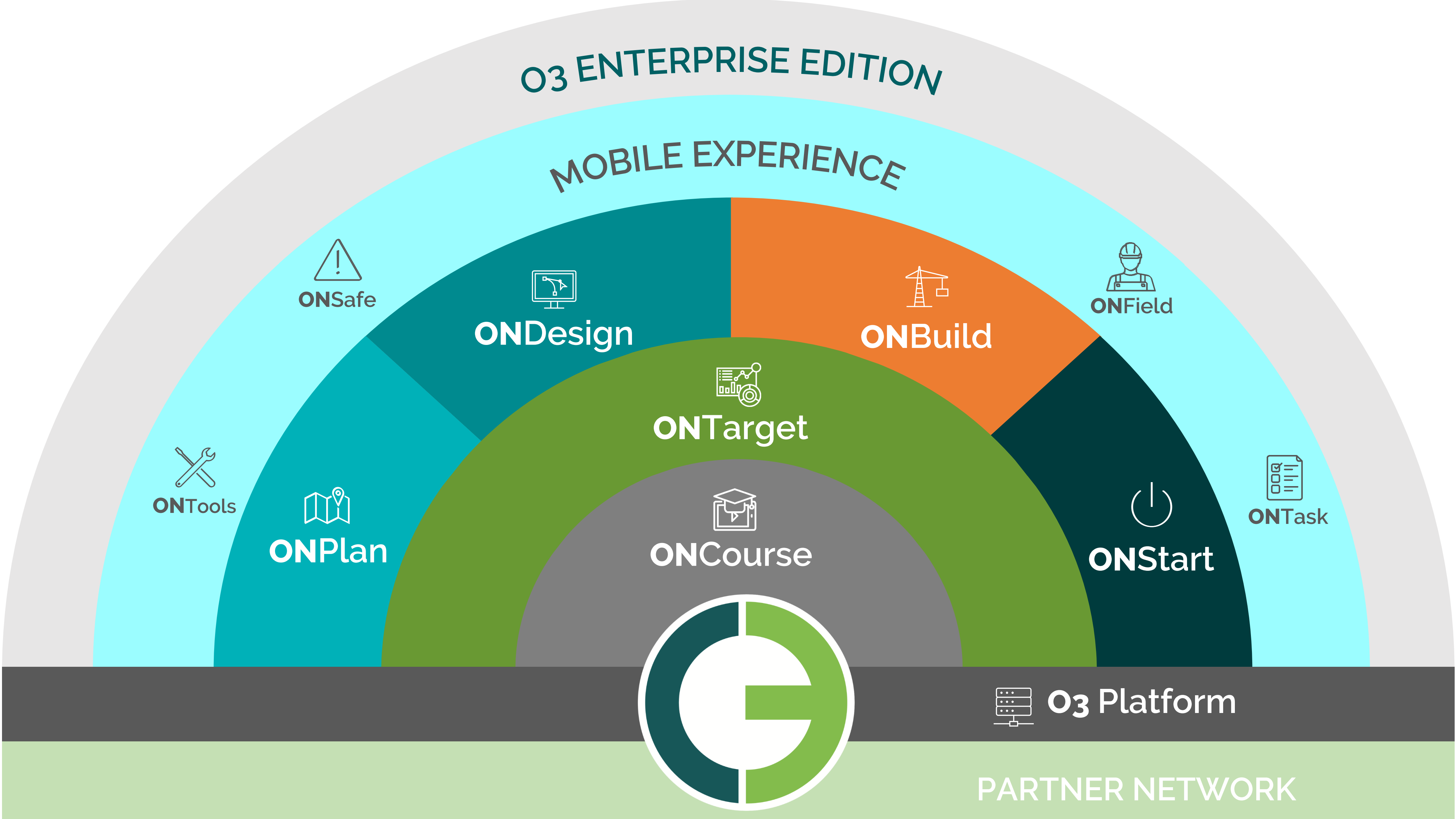
O3 SOLUTIONS

Turn ON
the Power of O3

03's Solution Suite



03's Solution Suite



Sample 03 Experience



Change Management

Managing enrollments and certifications for 4,500+ users across 75+ courses



Collaboration

Supporting 3,500+ users across 30+ contractors on \$70B Oil & Gas project



Automation

Connecting 38 data threads across 6 systems to manage data for LNG Project



Scalability

Managing portfolio of 50+ small cap projects across 7 offshore assets



Optimization

Driving Owner engagement from concept through commissioning



Co-Chairs - CII CBA
Performance & Benchmarking,
Education & Outreach



Conference Strategist
since 2015



CII Technology
Committee

Sample 03 Experience



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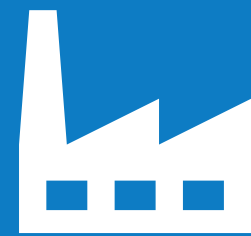


Conference Strategist
since 2015



CII Technology
Committee

03's Operational Facilities Experience



Multiple
Projects



Multiple
Contractors



Multiple
Owners

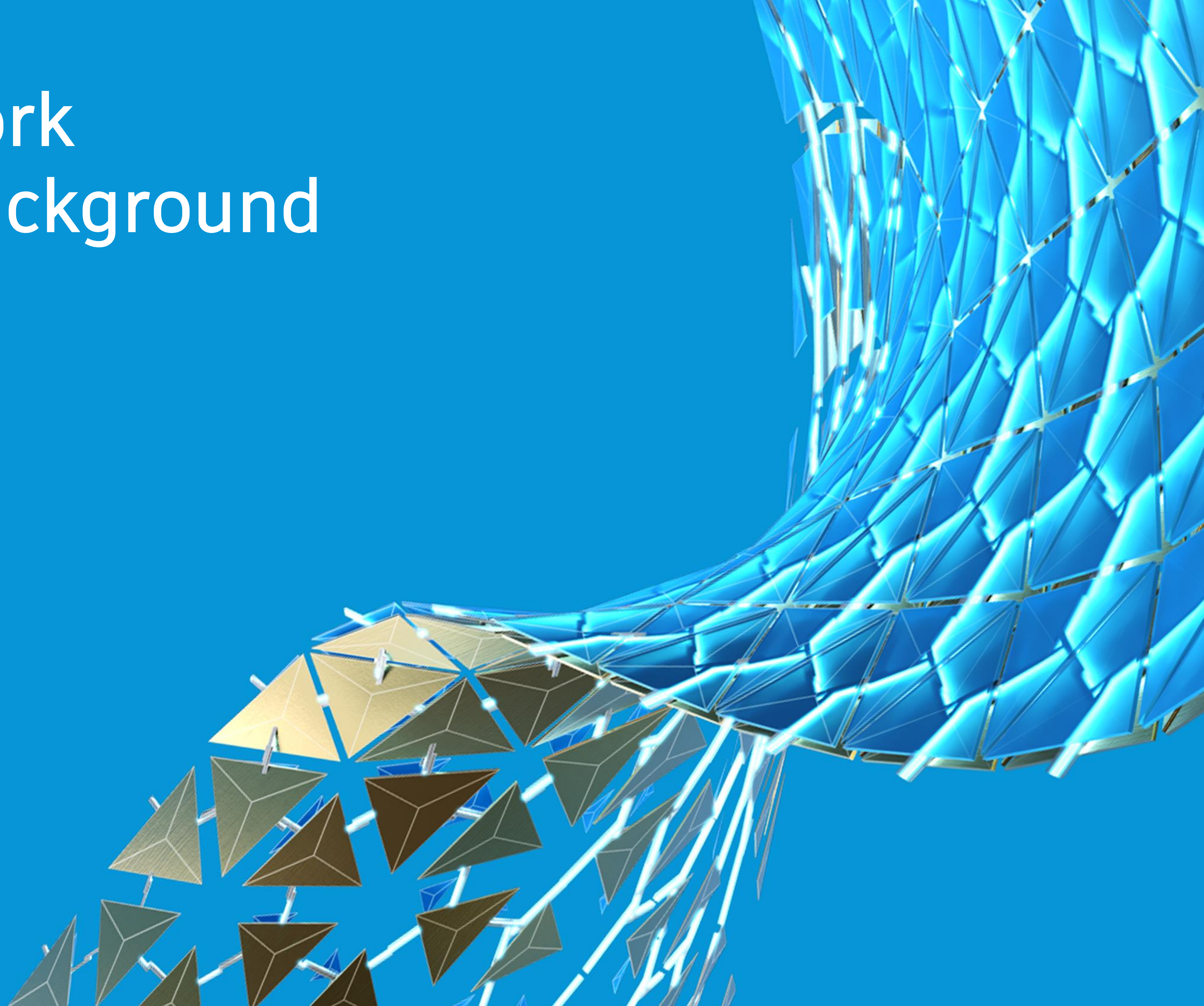


Multiple
Job Sites

Implementation Scope



Advanced Work Packaging Background



Advanced Work Packaging Adoption

More and more owners are adopting and mandating AWP best practices and have included it in their procedures and contract documents

lyondellbasell

EASTMAN

SUNCOR
ENERGY

ONTARIO POWER
GENERATION

ExxonMobil



RioTinto

VALERO

Syncrude

 Southern Company

 VALE

DOW

Williams

 **DTE Energy**

 **andeavor**

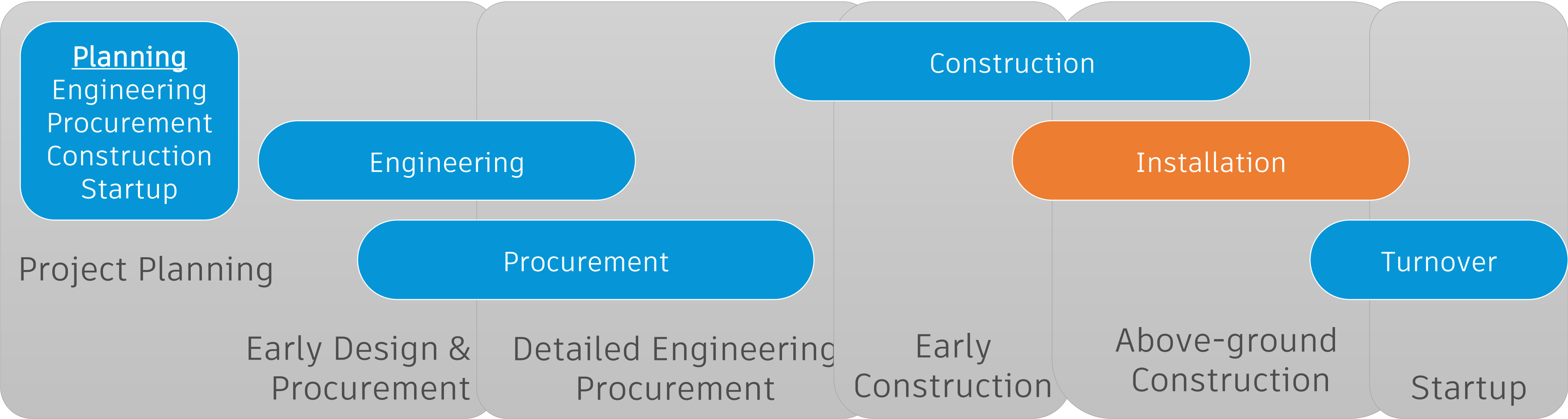
 **Canadian Natural**

WorkFace Planning is a Subset of AWP

Project



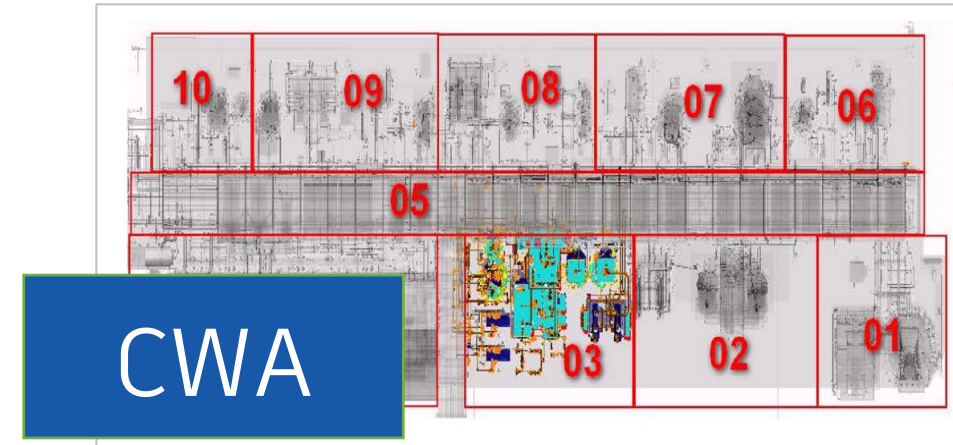
AWP



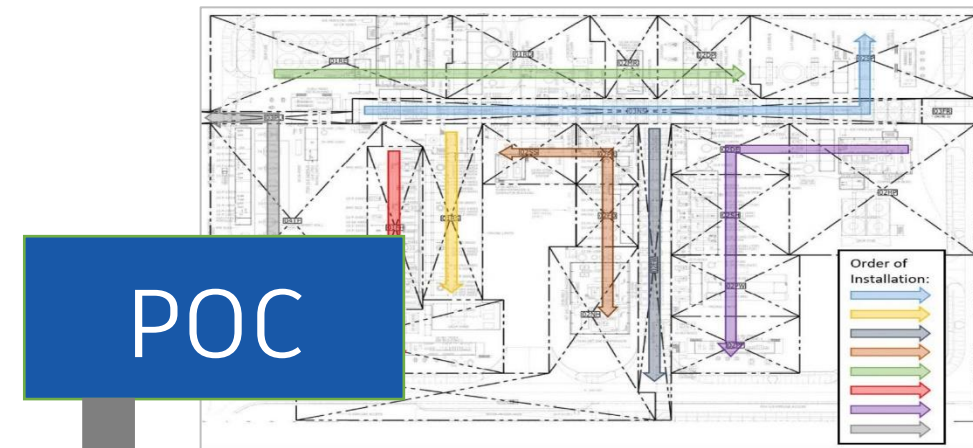
Workface
Planning (WFP)

Advanced Work Packaging (AWP)

AWP Process Flow



Construction Work Area
a geographical division of work



Path of Construction
a definition of the most efficient sequencing of work



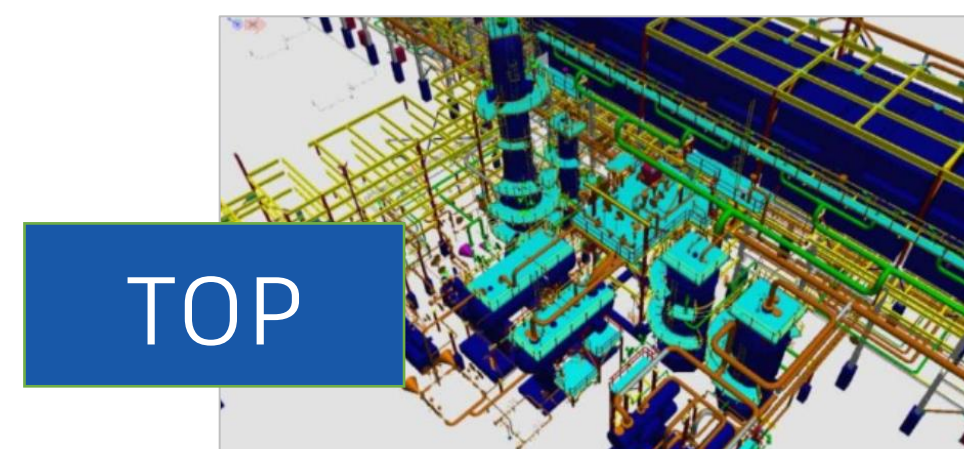
Construction Work Package
a division of the Construction Work Area by discipline, corresponding to Level 3 Project Schedule activities



Engineering Work Package
scope of work that includes drawings, procurement deliverables, specs, and vendor data typically defined by discipline and area

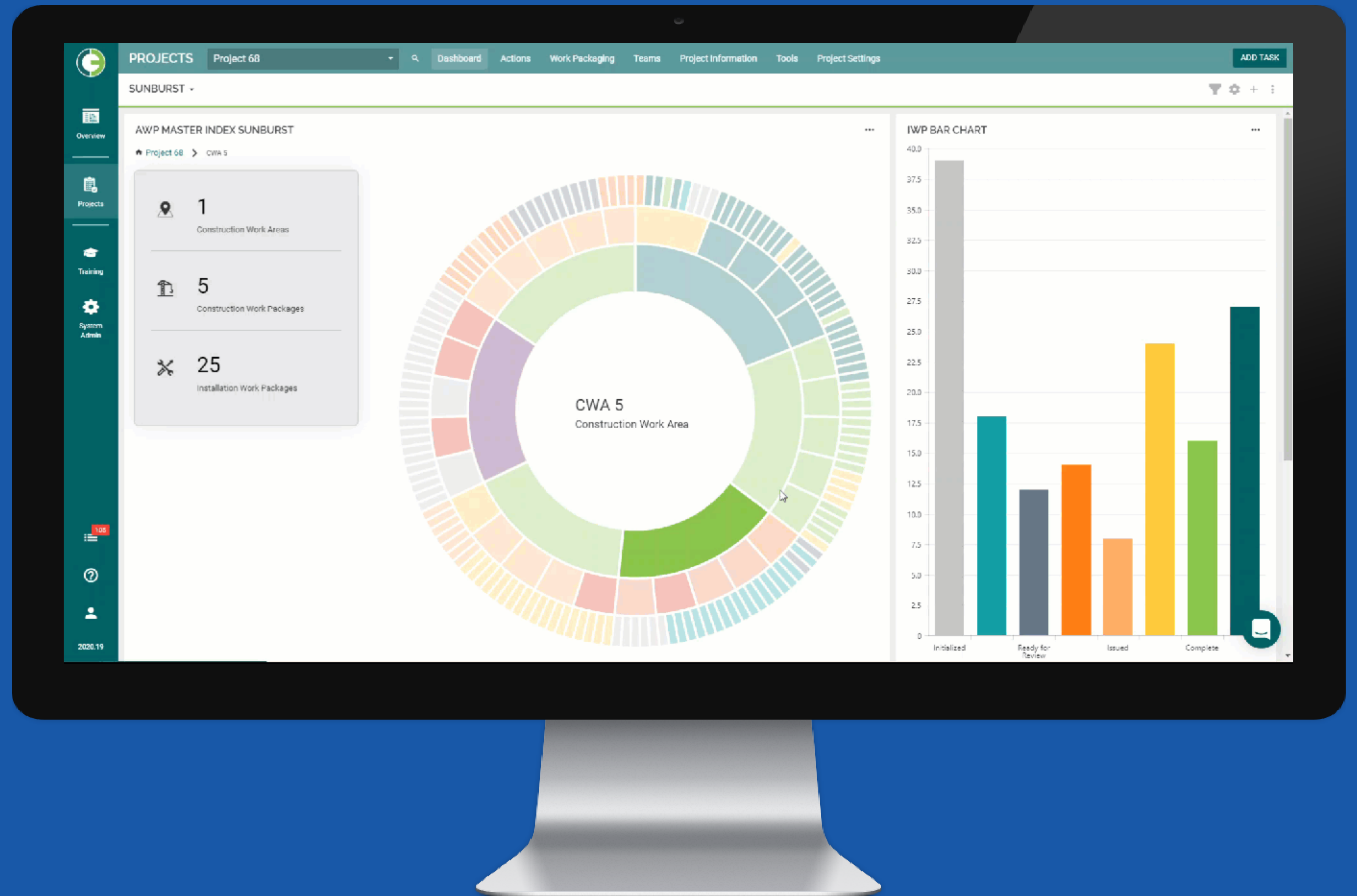


Installation Work Package
detailed execution plan that is generally 500-1000 work hours

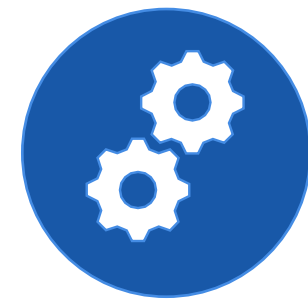


Turnover Package
qualification and process validation activities, and reference materials for the life of a system, process, or piece of equipment

AWP Master Index



Benefits of AWP



Efficiency

Advanced Work Packaging can reduce project Total Installed Cost by as much as 10%. ([CII](#))



Predictability

Improving “basic” project-management skills offers the most potential to improving site performance. ([McKinsey](#))



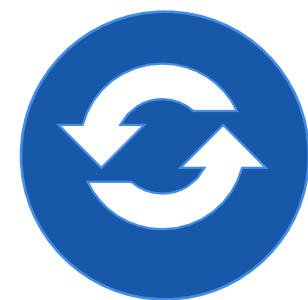
Cost Savings

98% of megaprojects suffer cost overruns of more than 30%; 77% are at least 40% late. ([McKinsey](#))

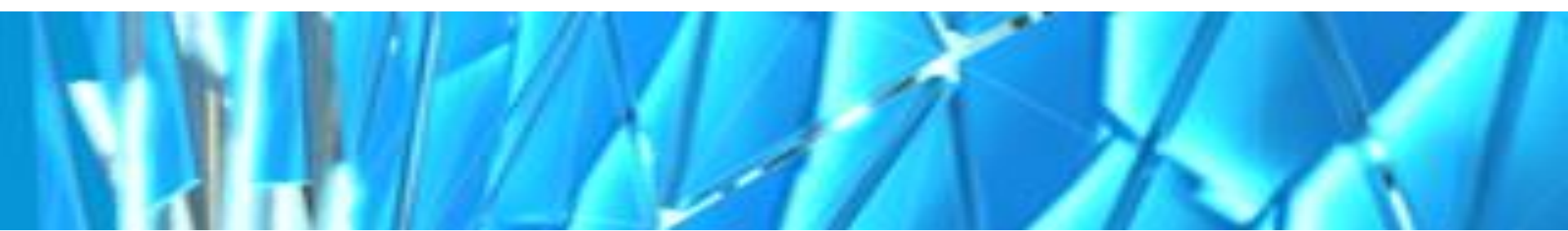


Quality

Advanced Work Packaging leads to improved safety awareness and performance. ([CII](#))



Adaptability



Why A New Approach is Needed: Scaling Project Delivery for Brownfield Projects



Operating Facility Challenges

- Data management and IT investments make introducing legacy solutions cost prohibitive
- 3D models are not always available or are poorly attributed
- Multiple contractors use different engineering authoring tools
- Project Management Teams are stretched thin and forced to operate in a reactive, firefighter mode
- Everyone has “a day job” and other competing priorities
- Change management is greater due to institutional inertia



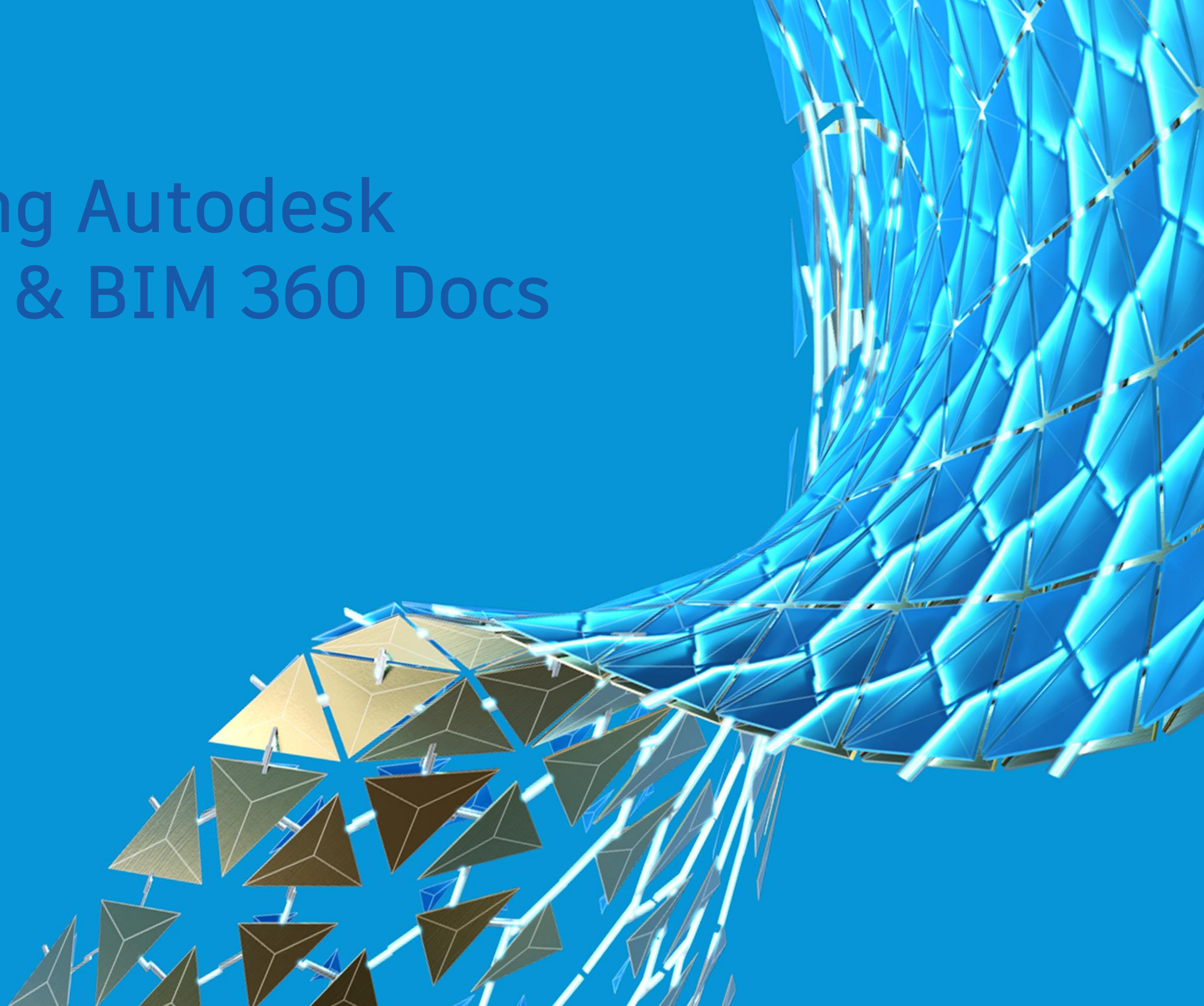
“I am managing 10 projects and one is always on fire.”

*- Construction Manager,
Operating Facility*



The Solution:

03, Leveraging Autodesk Forge Viewer & BIM 360 Docs

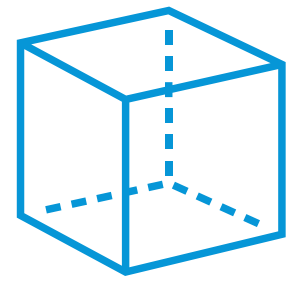


03 + Autodesk = Comprehensive Scalable AWP

- Purpose-built to drive Advanced Work Packaging & Agile Best Practices
- Supports the entire process from Concept through Commissioning
- Modern SaaS platform designed to support an entire portfolio of projects
- Supports 3D models of any type and any size
- Status visualization for 10 types of packages
- Meets the client where they are with a crawl, walk, run approach

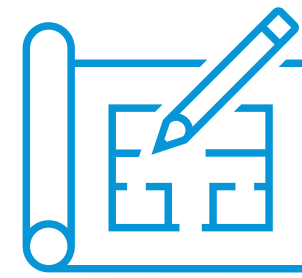


The First Scalable Work Packaging Solution



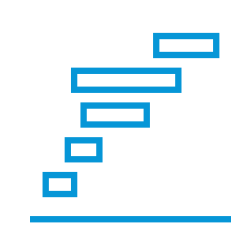
GRAPHICAL SCOPING

3D virtual construction model
for graphical work package
development and visualization



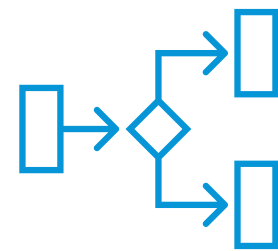
NON-GRAPHICAL SCOPING

Ability to build packages without a 3D
model using drawings, materials,
equipment, and other non-graphical data



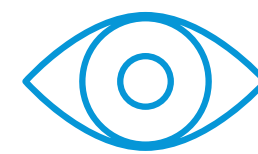
CONSTRAINT MANAGEMENT

Identify, visualize and proactively
remove constraints that are blocking
work from execution



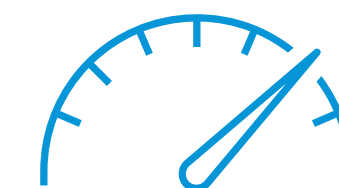
WORKFLOWS & AUTOMATION

Configurable workflows and robust
automation of package status, approval,
progress, and tracking



STATUS VISUALIZATION

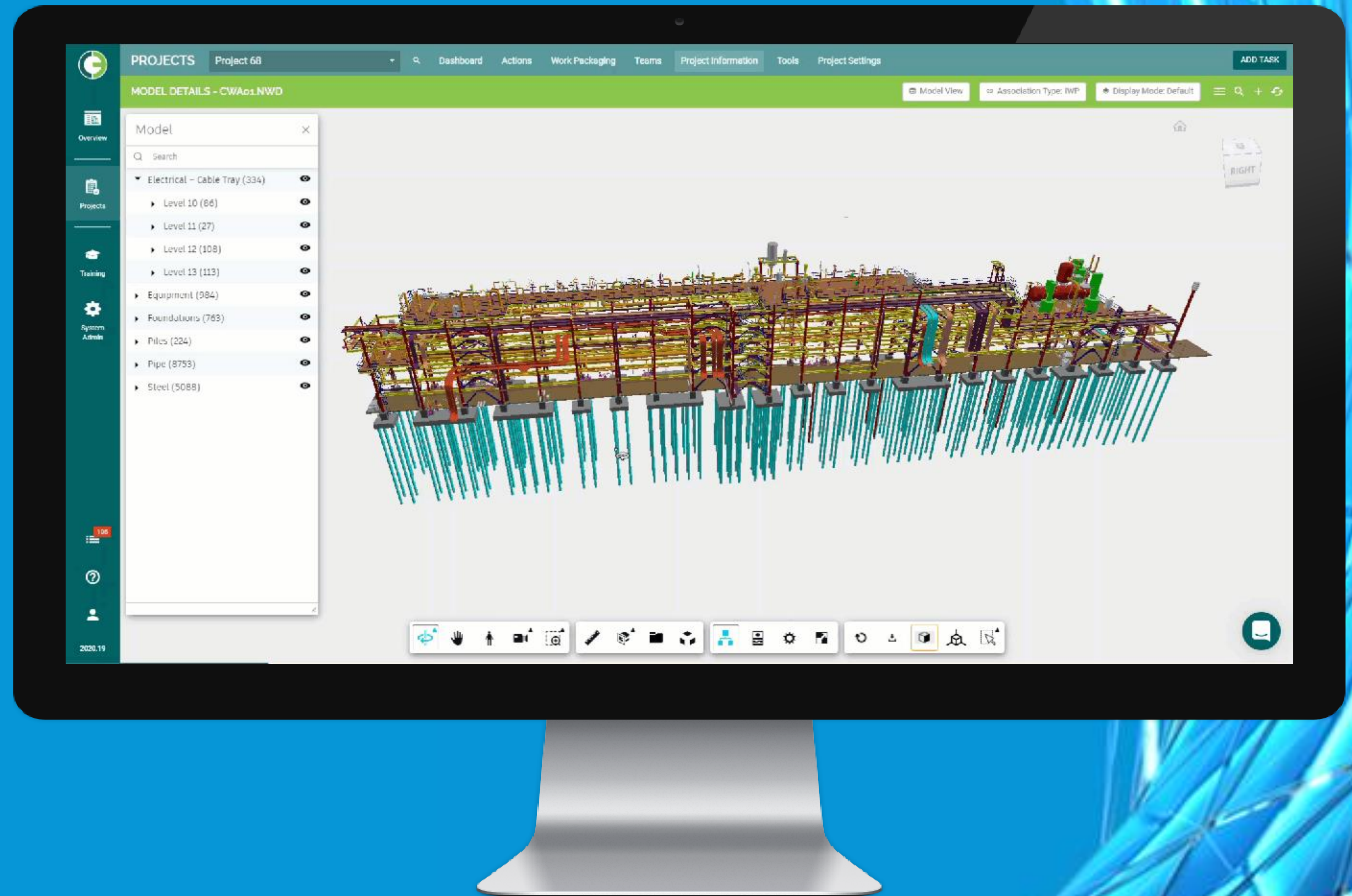
3D visualizations of key project
data including status, progress,
blockers, and critical path



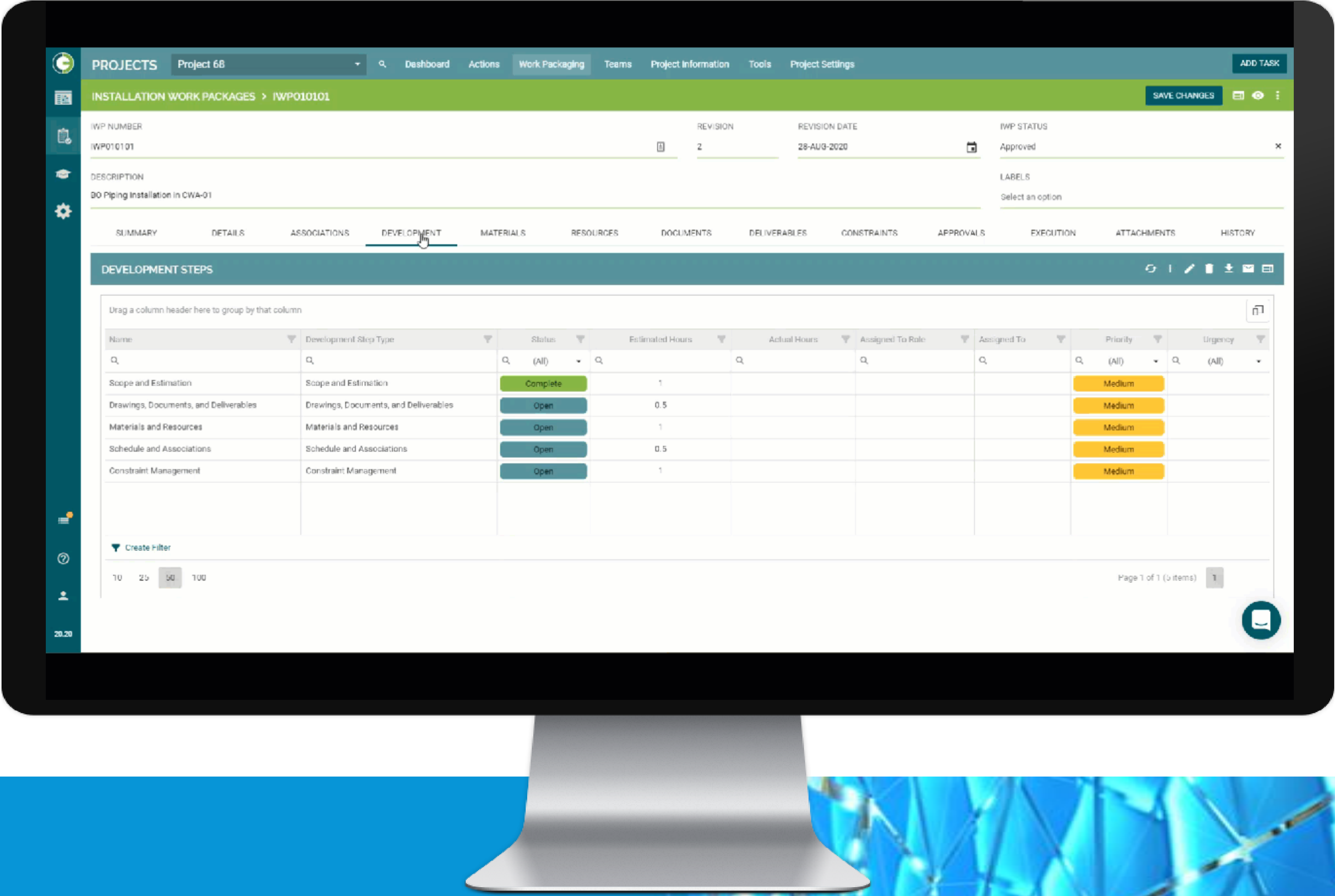
DASHBOARDS

Interactive views purpose-built for each
stakeholder reduce the time it takes to identify
issues, make decisions and take action

Creating Work Packages WITH a 3D Model



Creating Work Packages WITHOUT a 3D Model



Constraint Management

The screenshot displays a web-based project management application. The top navigation bar includes a logo, a 'PROJECTS' dropdown menu set to 'Project 68', a search icon, and several menu items: 'Dashboard', 'Actions', 'Work Packaging', 'Teams', 'Project Information', 'Tools', and 'Project Settings'. A 'SAVE CHANGES' button is visible on the right. Below the navigation bar, the breadcrumb trail reads 'INSTALLATION WORK PACKAGES > IWP010101'. The main content area is divided into two sections. The first section, 'IWP NUMBER', shows 'IWP010101' with a 'REVISION' of '2' and a 'REVISION DATE' of '28-AUG-2020'. The 'IWP STATUS' is 'Approved'. The second section, 'DESCRIPTION', shows 'BO Piping Installation in CWA-01'. Below these sections is a horizontal tab bar with options: 'SUMMARY', 'DETAILS', 'ASSOCIATIONS', 'DEVELOPMENT', 'MATERIALS', 'RESOURCES', 'DOCUMENTS', 'DELIVERABLES', 'CONSTRAINTS' (which is selected), 'APPROVALS', 'EXECUTION', 'ATTACHMENTS', and 'HISTORY'. The 'CONSTRAINTS' section has a '2 Columns' and 'Hide Complete' filter. It shows a 'No Stage' filter and a 'RIM' category with '3 of 3 completed'. The 'RIM' category contains three items, each marked 'COMPLETE' and with a completion date: 'C-011964 RFI-001' (Completed by Demo User on 05-NOV-2020 12:38:04 PM), 'C-012028 RFI-002' (Completed by Demo User on 02-OCT-2020 09:26:21 AM), and 'C-001436 RFI complete and closed out' (Completed by Demo User on 28-SEP-2020 11:25:53 AM). Below the 'RIM' category is a 'Company Materials' category with '2 of 2 completed'. It contains one item marked 'COMPLETE': 'C-001437 Company Materials secured and available' (Completed by Demo User on 12-SEP-2020 05:00:06 PM). A '2020' label is visible in the bottom left corner of the interface.

PROJECTS Project 68 Dashboard Actions Work Packaging Teams Project Information Tools Project Settings ADD TASK

INSTALLATION WORK PACKAGES > IWP010101 SAVE CHANGES

IWP NUMBER IWP010101 REVISION 2 REVISION DATE 28-AUG-2020 IWP STATUS Approved

DESCRIPTION BO Piping Installation in CWA-01 LABELS Select an option

SUMMARY DETAILS ASSOCIATIONS DEVELOPMENT MATERIALS RESOURCES DOCUMENTS DELIVERABLES CONSTRAINTS APPROVALS EXECUTION ATTACHMENTS HISTORY

CONSTRAINTS 2 Columns Hide Complete

No Stage

RIM 3 of 3 completed

COMPLETE C-011964 RFI-001 Completed by Demo User on 05-NOV-2020 12:38:04 PM

COMPLETE C-012028 RFI-002 Completed by Demo User on 02-OCT-2020 09:26:21 AM

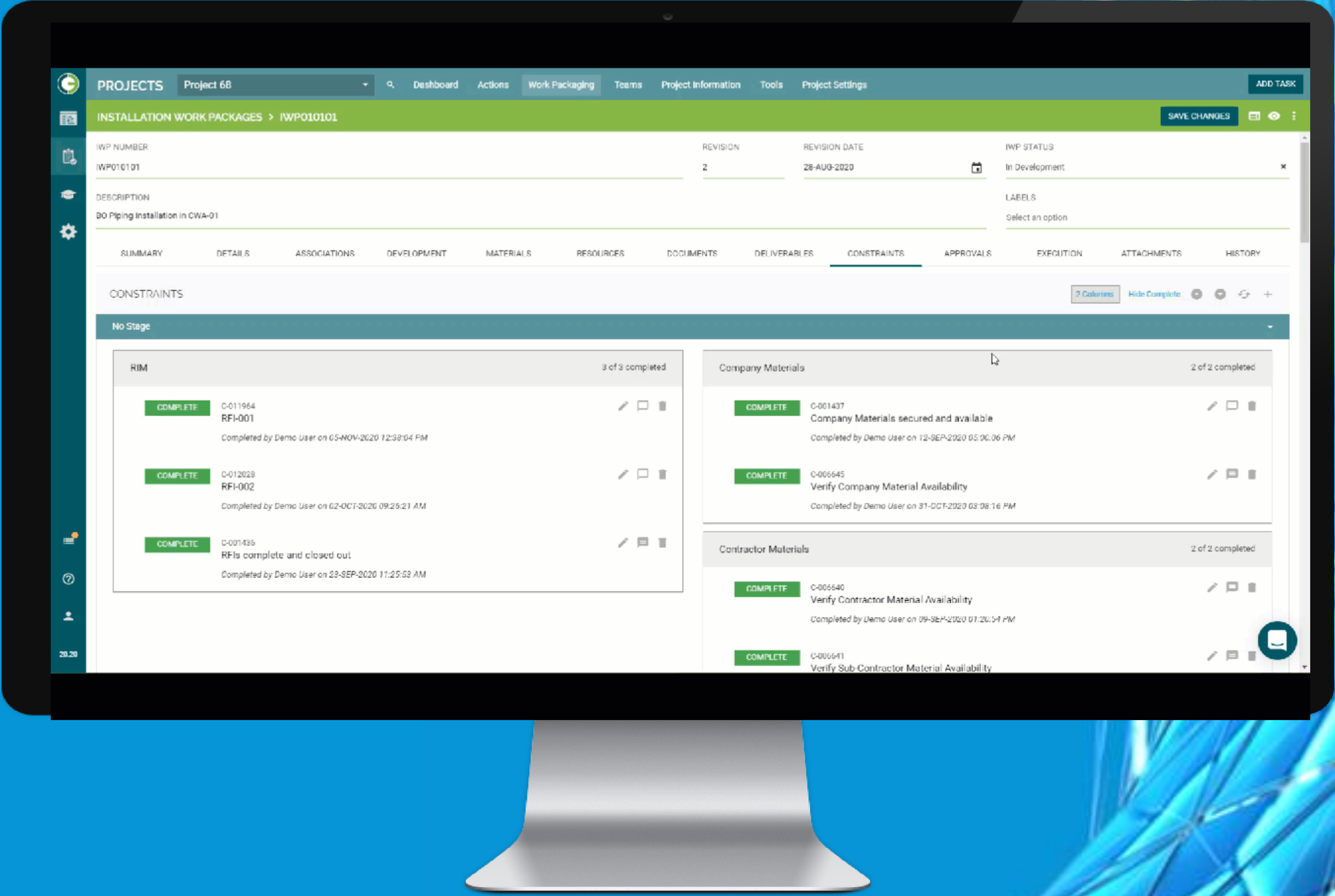
COMPLETE C-001436 RFI complete and closed out Completed by Demo User on 28-SEP-2020 11:25:53 AM

Company Materials 2 of 2 completed

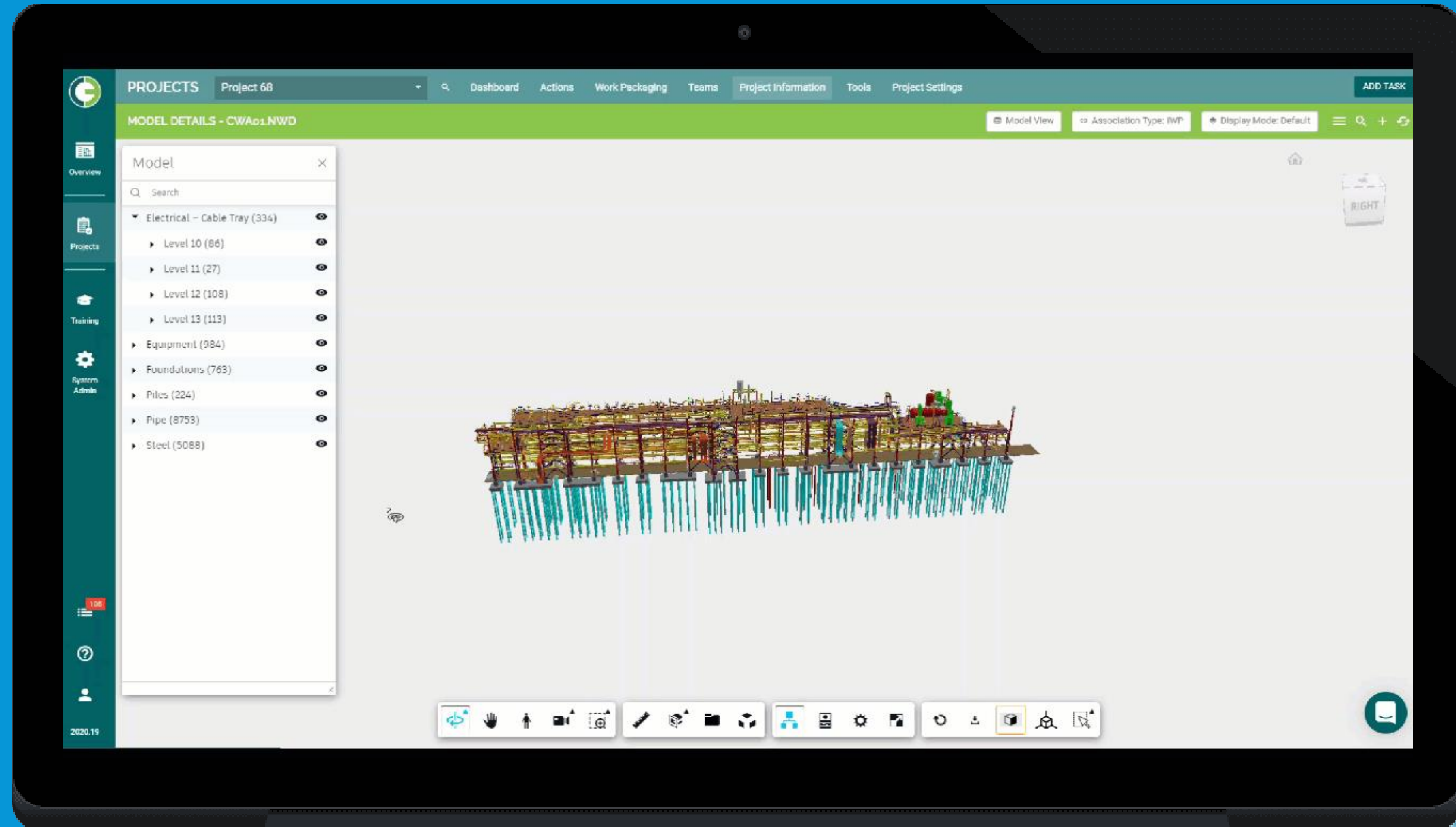
COMPLETE C-001437 Company Materials secured and available Completed by Demo User on 12-SEP-2020 05:00:06 PM

2020

Work Package Management



Status Visualization



Reporting & Analytics



THE PARTNERSHIP

Forge Viewer & BIM 360



Document Management



Forge Viewer for 3D Virtual
Construction Model Package
Creation



Status Visualization of Package
Status, Constraints, & Materials

“By incorporating the detailed information contained in construction models within BIM 360 Docs, customers can now realize the full benefit of model-based Advanced Work Packaging.”

- James Cook, Head of Integrations, Autodesk

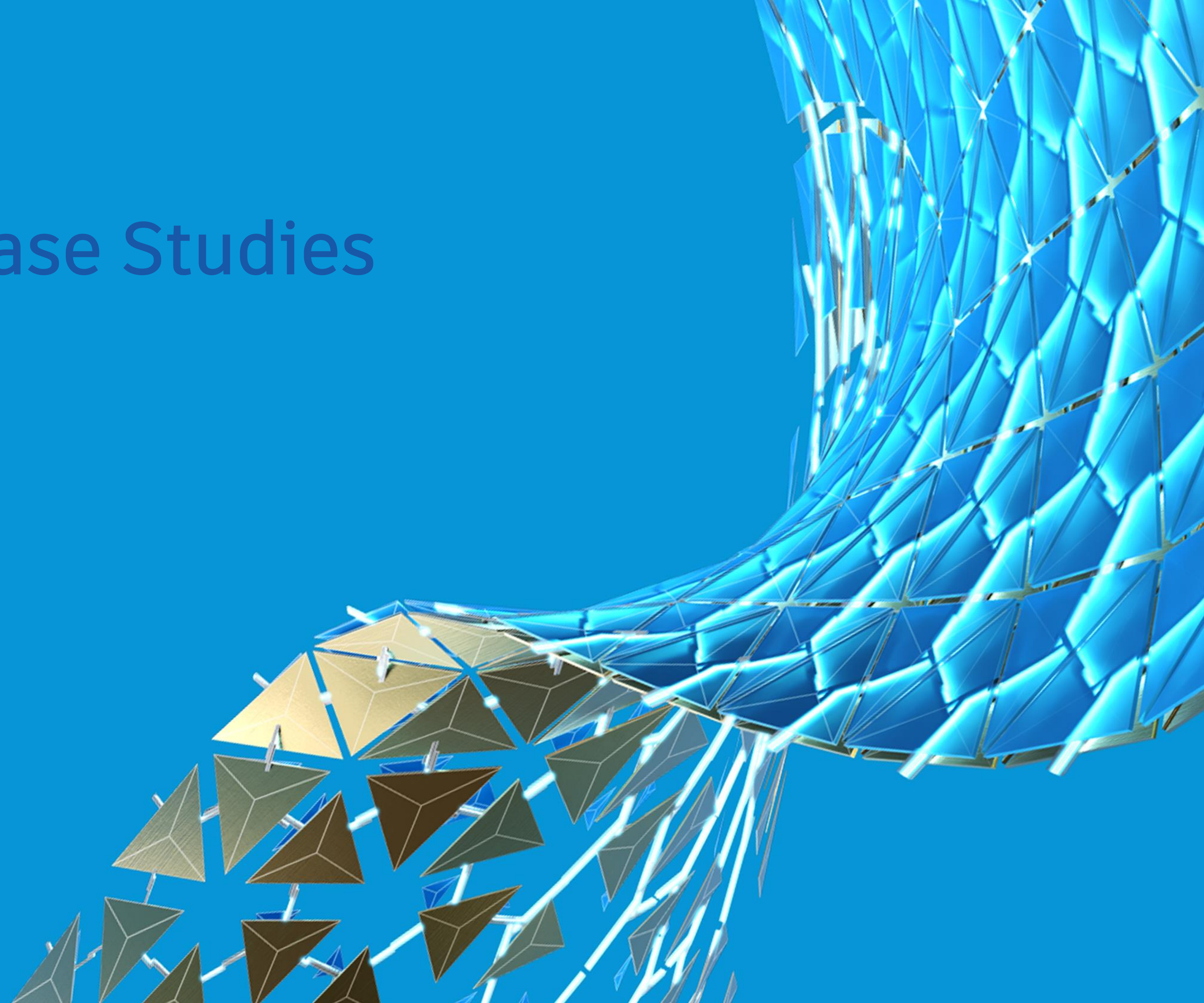
Why Autodesk?


Engineering
Tool Agnostic

Ability to Support
Large & Small Models

SaaS-based to Support
Multi-project Setup

The Results: Brownfield Case Studies



The background features a complex, abstract geometric design. It consists of numerous faceted, crystalline structures in shades of blue and gold. These structures are arranged in a way that suggests depth and movement, with some elements appearing to recede into the distance while others are in the foreground. The overall effect is one of a high-tech, futuristic environment.

Case Study 1: Deep Water Portfolio

Phase 1

- 4 Assets
- 46 Projects: Annualized Project TIC ~\$30M
- 78 Construction Work Packages
- 148 Installation Work Packages
- 4,500+ Constraints Identified
- 1,000+ Constraints Closed
- <30 Days to Implement O3

Phase 2

- Added 3 Additional Assets
- 7 More Projects ~\$45M Total TIC



CWP Creation & Management

- Development and workflow management of construction work packages

IWP Creation & Management

- Development and workflow management of installation work packages

Constraint Management

- Collaborative constraint management process across contractor and owner

Team Collaboration

- Managing actions in team-specific Kanban boards

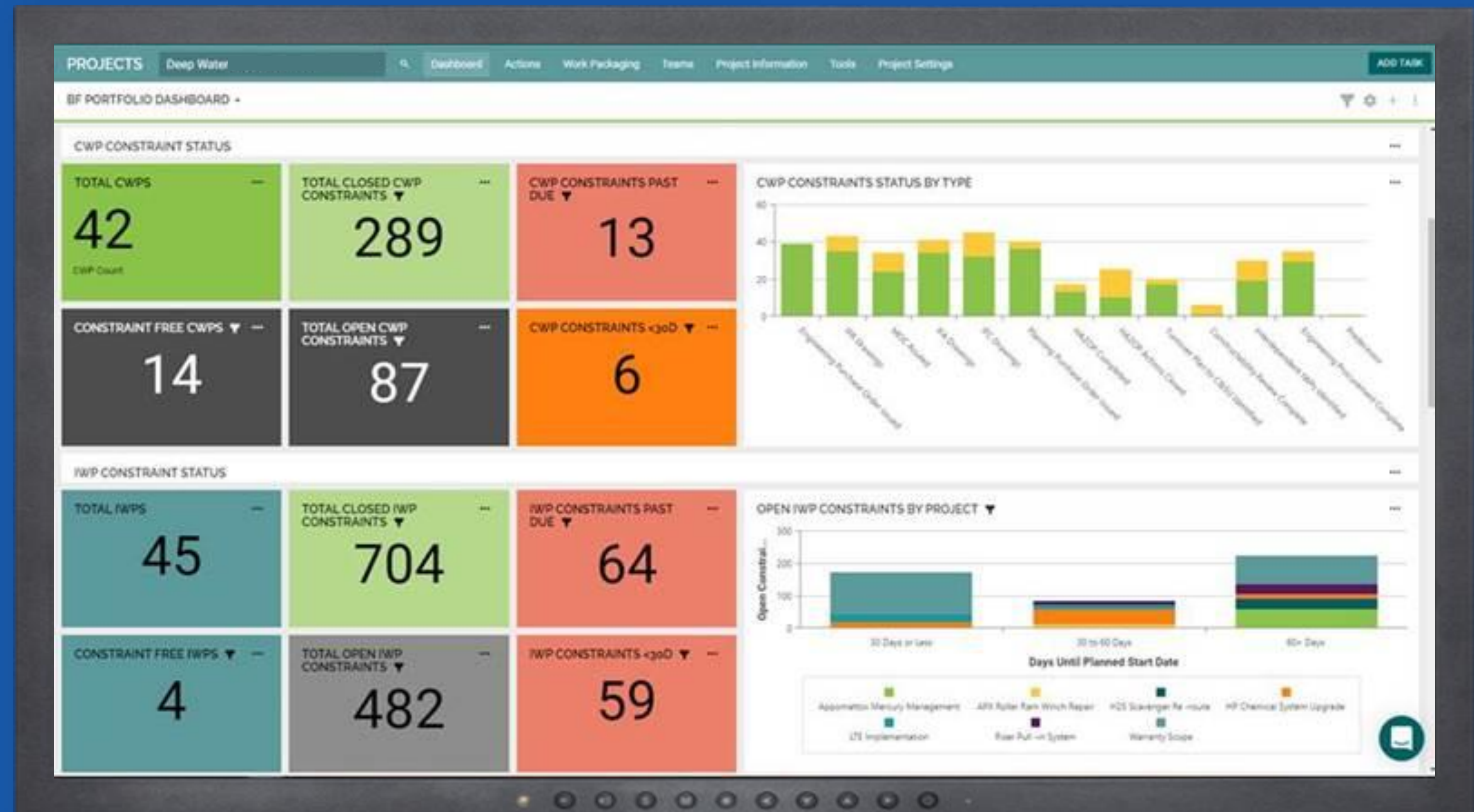
“We’ve already added significant visibility to gaps in our delivery as an organization as well as individual projects.”

I’m very pleased with the capabilities of the system, responsiveness of the team, and the structure of implementation that O3 has managed.”

-- *Project Manager*

Cross Project Reporting & Analytics

- Determining mobilization readiness offshore with dashboards & real-time reports



“Having these dashboards not only allows the team to be reactive to past due items but has also allowed us to be proactive by clearly highlighting constraints on upcoming work.”

“Prior to using O3, data was tracked in a spreadsheet and communicated via email .”

Benefits

- Standardization of approach across 100's of small projects
- Consistent definition of progress across multiple contractors
- Real-time visibility into project status allowing for optimization of limited offshore resources



Lessons Learned

- Self-paced, online training for AWP is an excellent alternative to in-person, especially during COVID-19
- Small projects can be managed as CWPs rather than individual projects to reduce overhead effort



Next Steps

- Roll-out across the entire Deep Water business unit
- Incorporation of BIM360 Mobile for access to IWPs in the field



Case Study 2: Refinery Operating Facility

Operating Asset

- Active Projects: 13
- Total Projects: 56
- 1,070 Construction Work Packages
- 1,150 Installation Work Packages



Graphical & Non-Graphical Package Development

- CWP & IWP development using both 3D model components and engineering & materials lists

RFI Tracking

- Transitioned from spreadsheets and email to software and automation resulting in quicker resolution times

SWPs & Scaffolding

- Implemented predecessor constraints / approvals
- Scaffold Supervisor can determine when/where scaffolding needs to be built for predecessor constraints on work packages
- Reduced build costs with approvals for cross discipline reviews and coordinating build locations

Materials

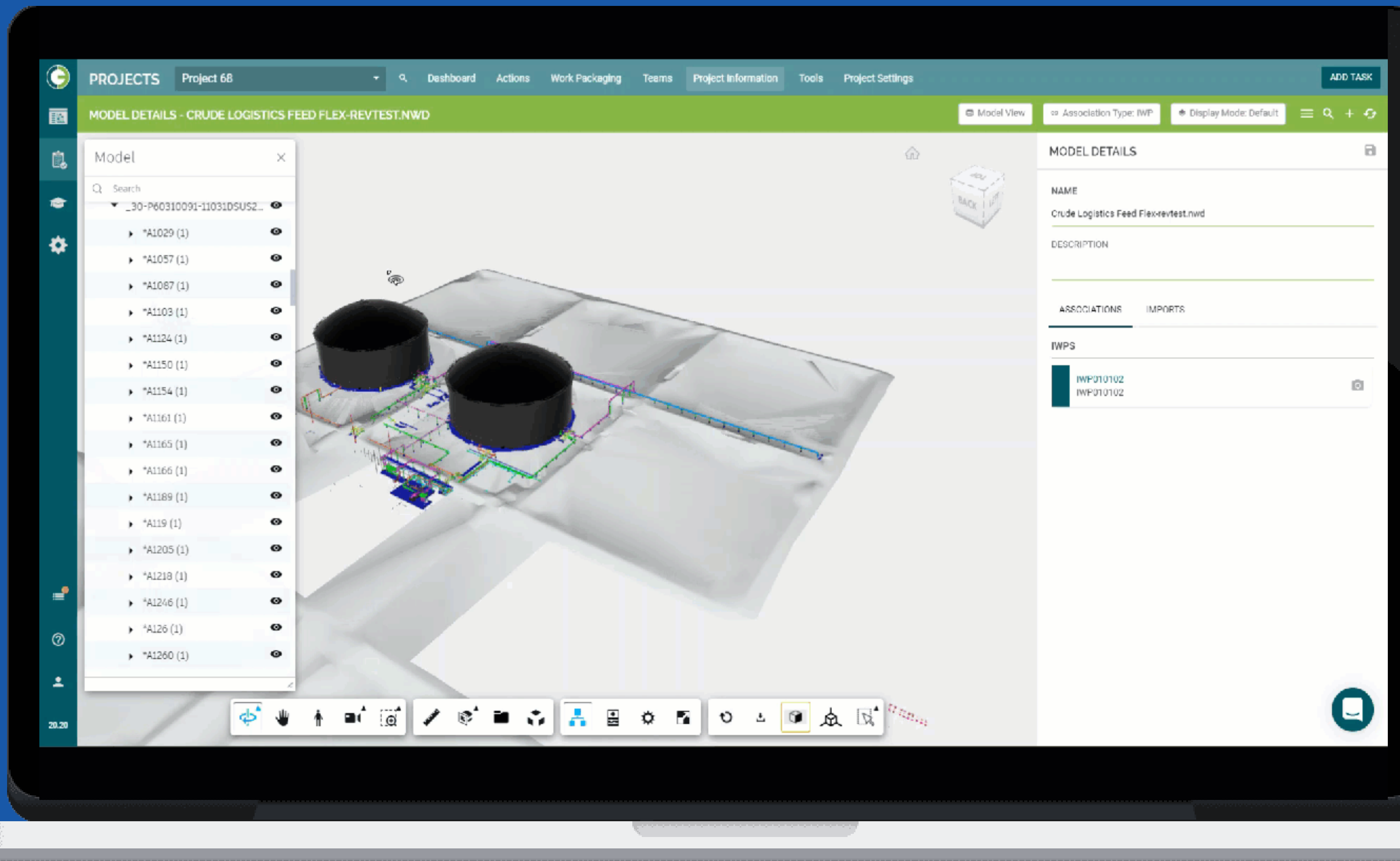
- Automatically creating constraints as part of material analysis
- Cross referencing IWP requirements against material inventory to auto create / clear material constraints

“I was able to evaluate the overall status of the project, highlight that engineering has continued to slip, and ultimately is impacting construction.

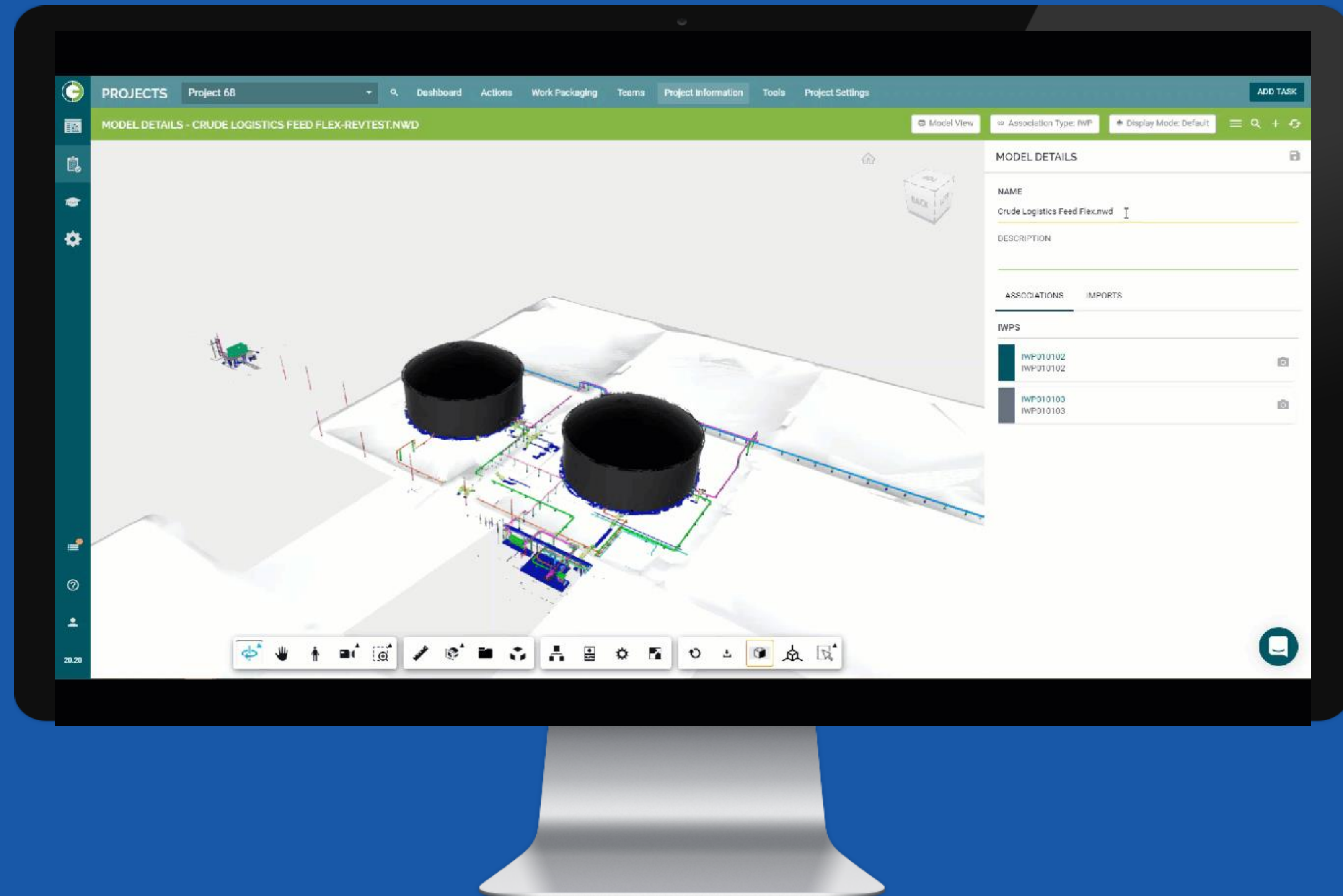
I advocated that construction start needed to push a month . . .[to] allow engineering to catch up and create a backlog of constraint free work.

Not an ideal situation, but we had the data to support the decision.”

-- *Construction Manager*



Sample Productivity Overview



Benefits

- 18% increase in field productivity of AWP projects over non-AWP projects
- Enhanced visibility, collaboration, and accountability



Lessons Learned

- Change Management at operating facilities is particularly challenging due to institutional inertia
- Engineering tends to be the least motivated to change



Next Steps

- Graphical creation and visualization of packages beyond CWPs and IWPs



Case Study 3: Enterprise Field Productivity Program

Operating Facility A

- 56 Projects in 2019
- 28 Projects in 2020
- 15 Observers

Operating Facility B

- 8 Projects in 2020
- 17 Observers

Multiple Megaprojects

- In Implementation



Mobile Data Collection

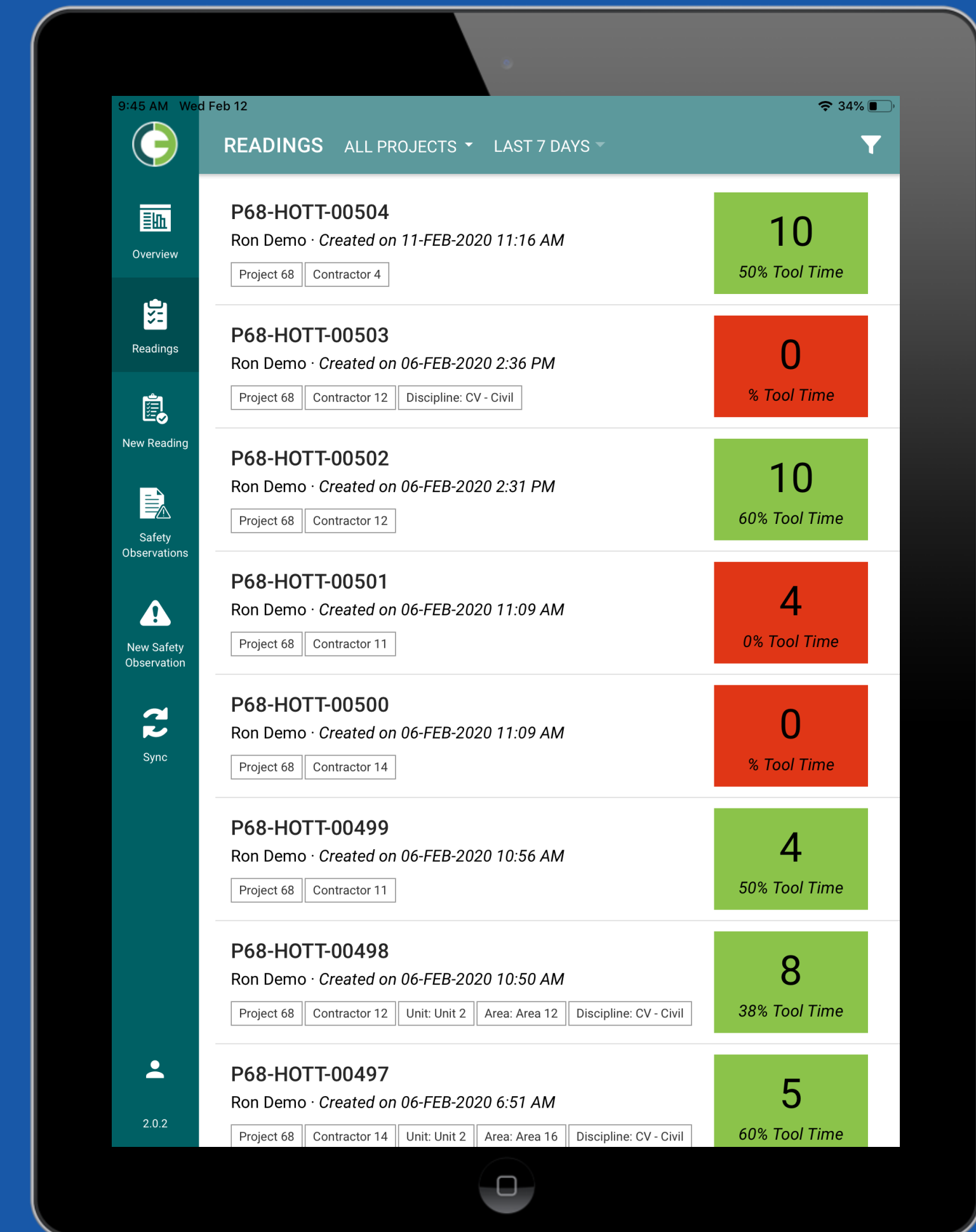
- Dedicated iPad application for data collection in the field

Cross-Project Reporting

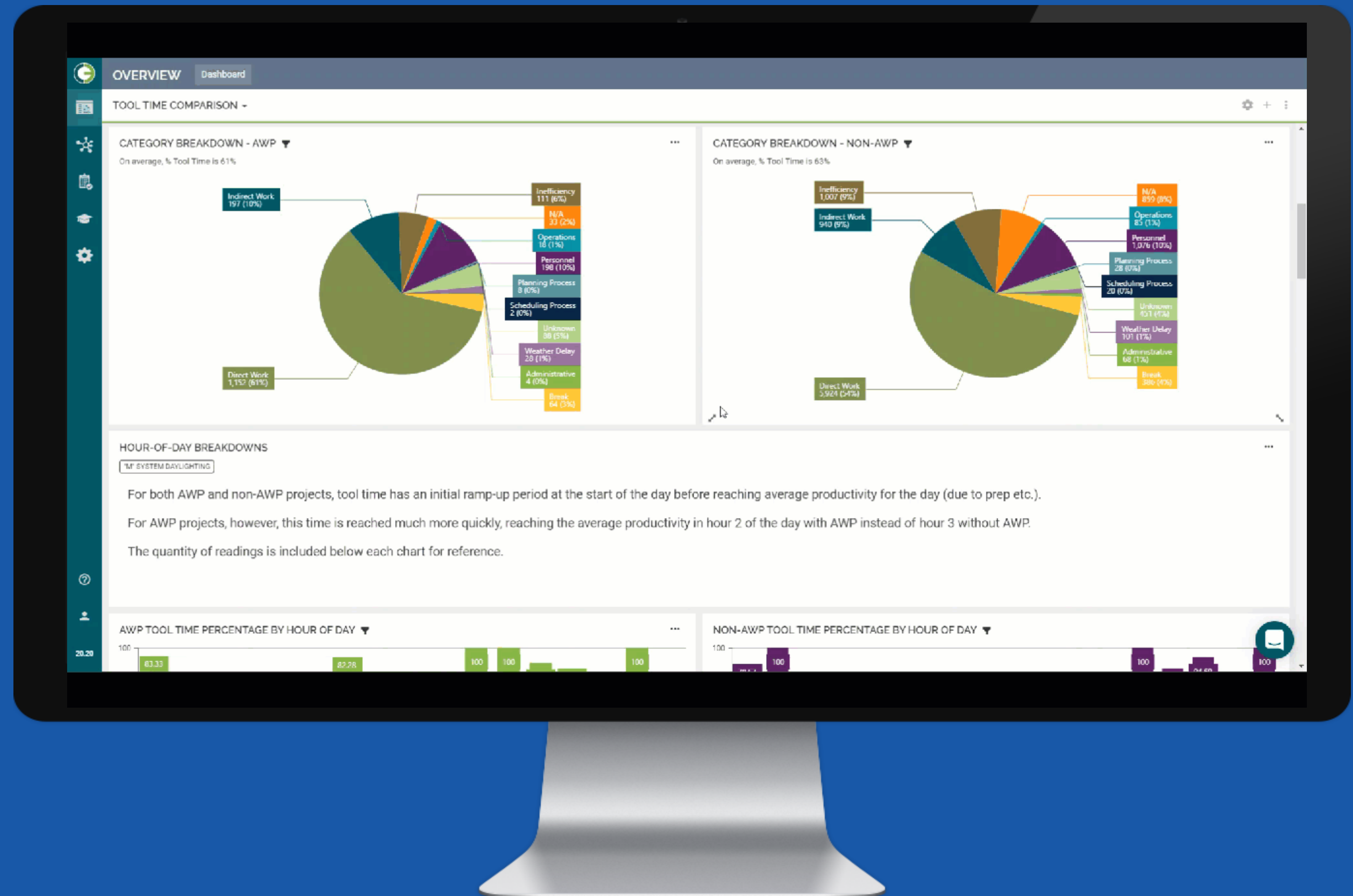
- Ability to easily compare projects, contractors, areas, disciplines, etc.

Enterprise Roll-Up

- Global roll-up of data across the entire enterprise portfolio



Sample Productivity Overview



Benefits

- Apples to apples comparison across projects enables meaningful comparison which drives continuous improvement
- Standardized data collection through purpose-built app reduces human error and increases timeliness



Lessons Learned

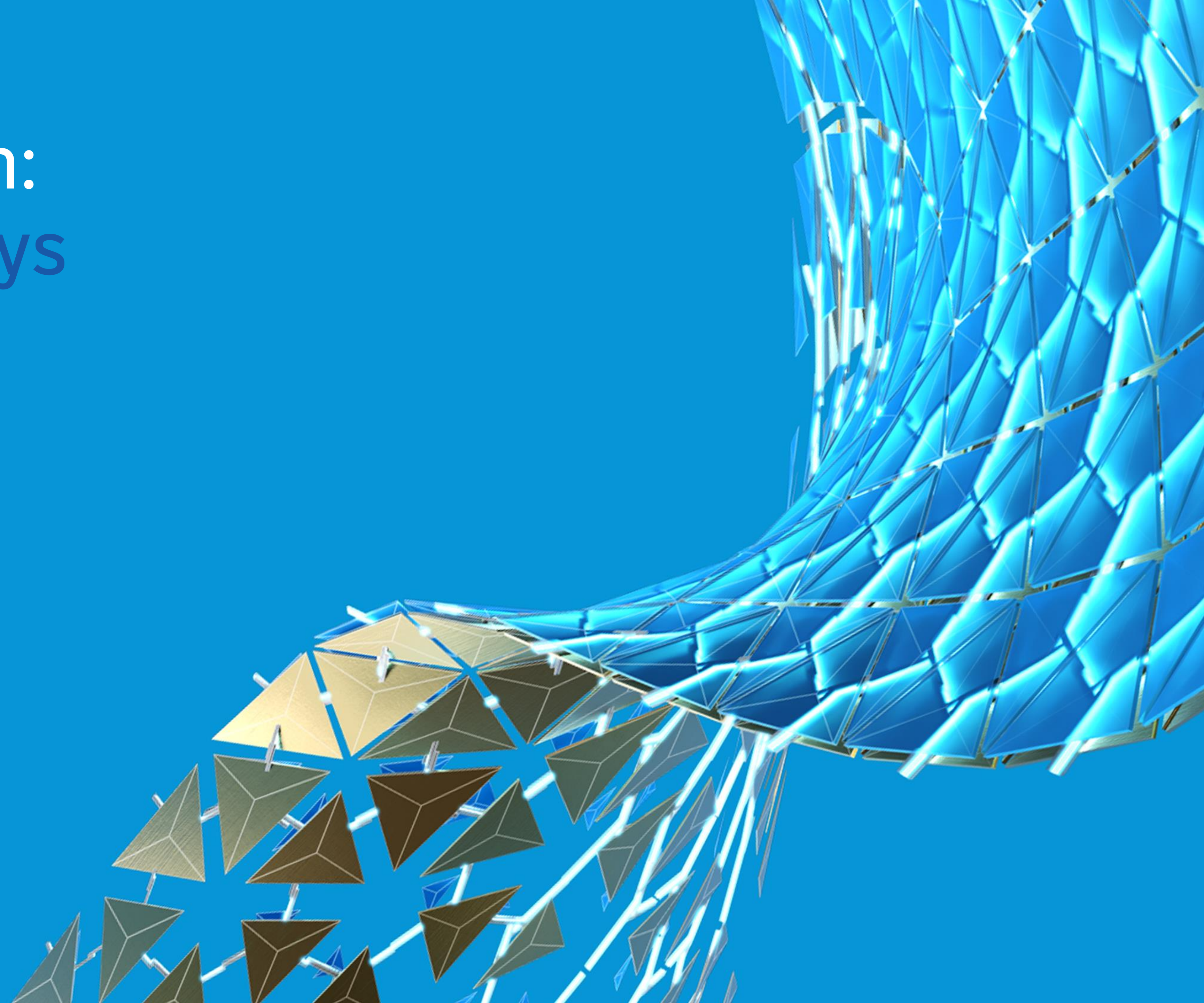
- Training on tool time measurement process is critical to standardized data collection



Next Steps

- Extend productivity data status visualization beyond the basic 3D model representation to provide additional context around areas that require attention

In Conclusion: Key Takeaways



Key Takeaways

1

Moving the needle for a portfolio requires addressing small cap projects

2

On premise, thick client solutions are cost prohibitive for scalable AWP

3

Small Cap Projects have greater change management challenges than greenfield

4

Cross-Project Reporting Requires Multi-Project SaaS Solutions

5

Status Visualization enables context for faster, better decision-making

6

Creating all work packages in one source supports a single view of work packaging program

7

Standardized cross-project reporting enables continuous improvement

8

Autodesk's solution was ideal for extending O3's offering into 3D VCM modeling

Contact Us To Learn More

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WEBSITE

www.o3.solutions

PARTNER PAGE

[www.construction.autodesk.com/
integrations/o3-solutions](http://www.construction.autodesk.com/integrations/o3-solutions)



O3 SOLUTIONS

Ownership ■ Oversight ■ Optimization



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