



SVTC & VTA INVITES YOU TO A FREE ONLINE
MENTOR PROTEGE WORKSHOP SERIES



WORKSHOP TOPIC #2
Digital Delivery
Noon May 6, 2021

Presenter: Jay Mezher, Mott-McDonald,
Vice President | Digital Delivery Practice Leader

This program is part of a holistic effort to help small and minority enterprises grow their businesses in Silicon Valley and the broader Bay Area, as part of VTA's BART Phase II.



Agenda

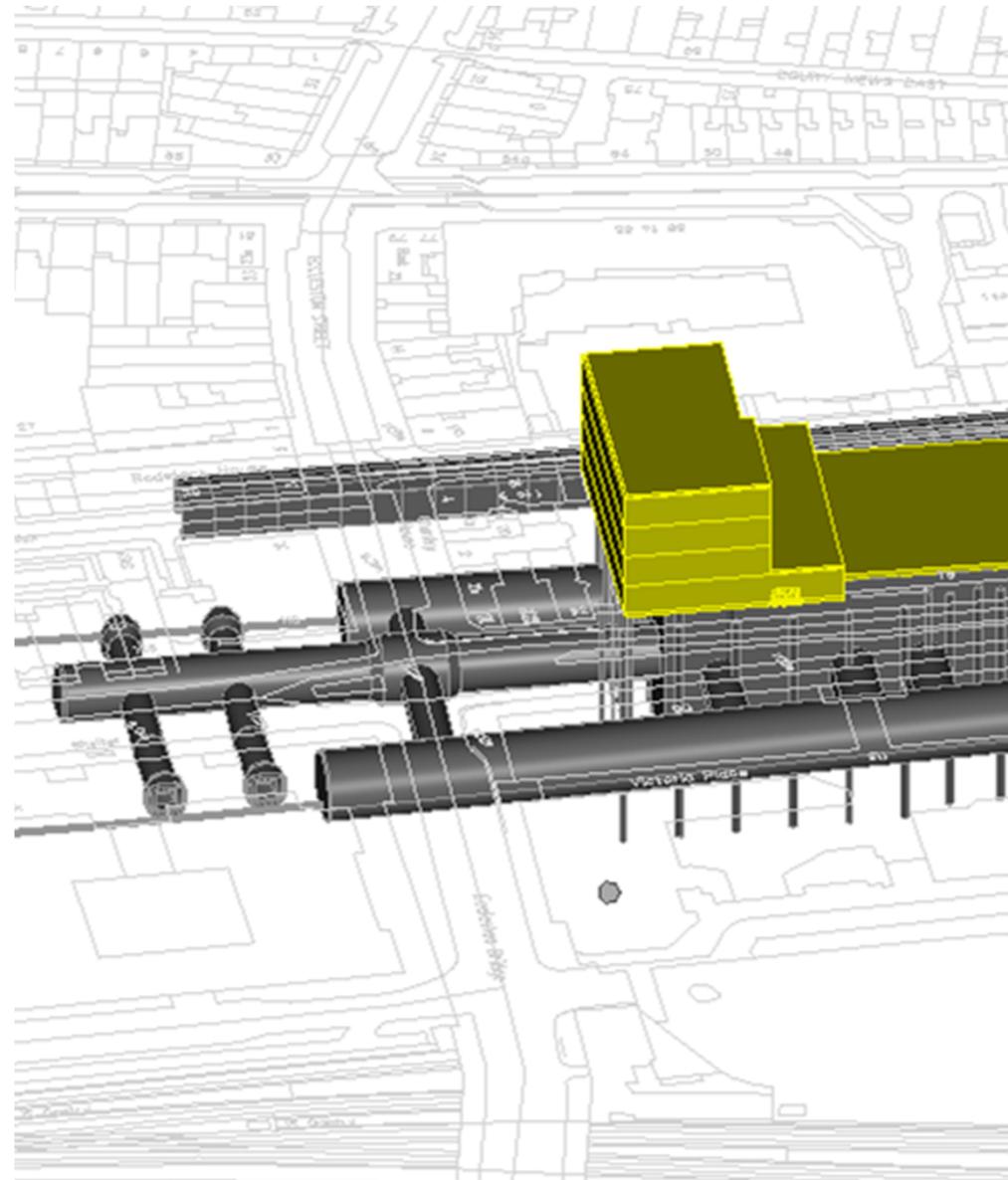
Introduction

What is Digital Delivery?

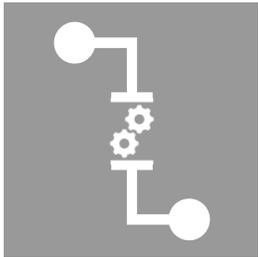
Digital Delivery Technologies

Summary

Q&A



What is Digital Delivery?



Digital Delivery

Digital Delivery is not a deliverable, it is a system of platforms, processes and tools used to generate, validate, transfer and interrogate data and feeding back opportunities for improvement.



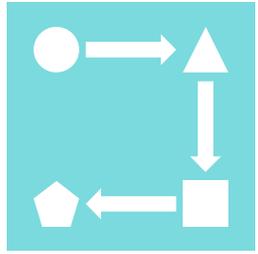
Tools

Tools used to interrogate data and realize additional benefits.



Platforms

Software platforms used to generate and store data.



Process

Processes which govern information generation, assurance and transfer.



People

Project Team delivering the work in a digital delivery environment.



Feedback

Drawing conclusions from data to identify opportunities for improvement.

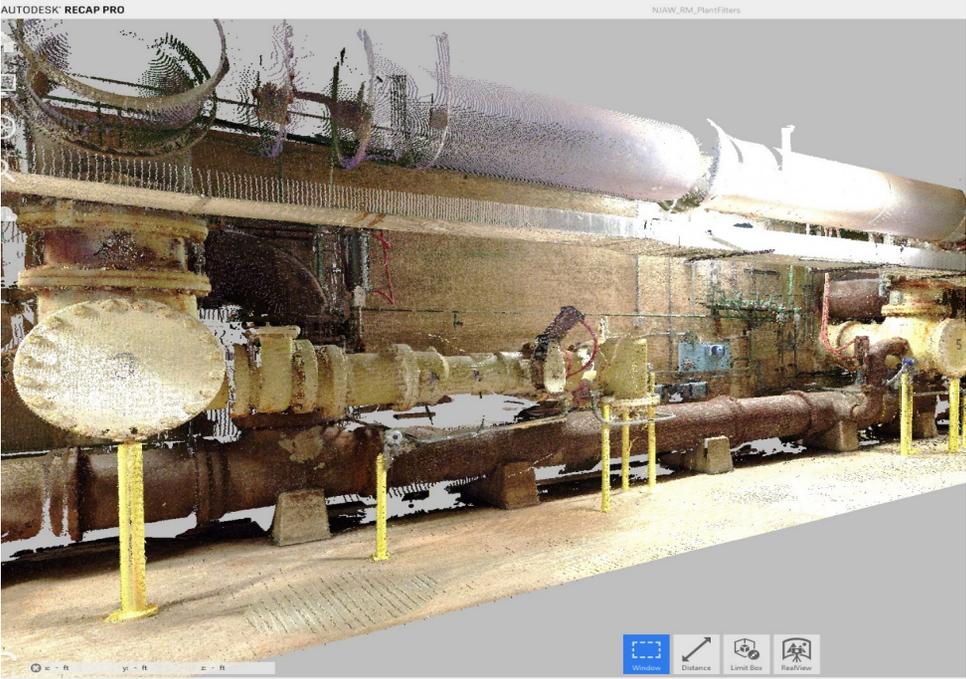
Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Digital Delivery					
Reality Capture		Model Based Design		Virtual Construction	Digital Asset Management
GIS					
Data Science & Analytics					
Information Management					

Digital Project Delivery

Reality Capture	Laser Scanning, UAV, Survey, LIDAR
Model Based Design	BIM, Parametric Modeling, Computational Design, Visualization
Virtual Construction	Prefabrication, 4D Modeling, 5D modeling, Clash Detection, Model Handover
Digital Asset Management	Operations & Maintenance Integration, Digital Twin
GIS	Geospatial Mapping, Geospatial Database Management and Analysis
Data Science & Analytics	Project Insights, Data Management, Analytics and Predictive Modeling
Information Management	Common Data Environments, Overall framework and Implementation of Information Flow

Laser Scanning

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



UAV Data Capture

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



Model Based Design: BIM Tools

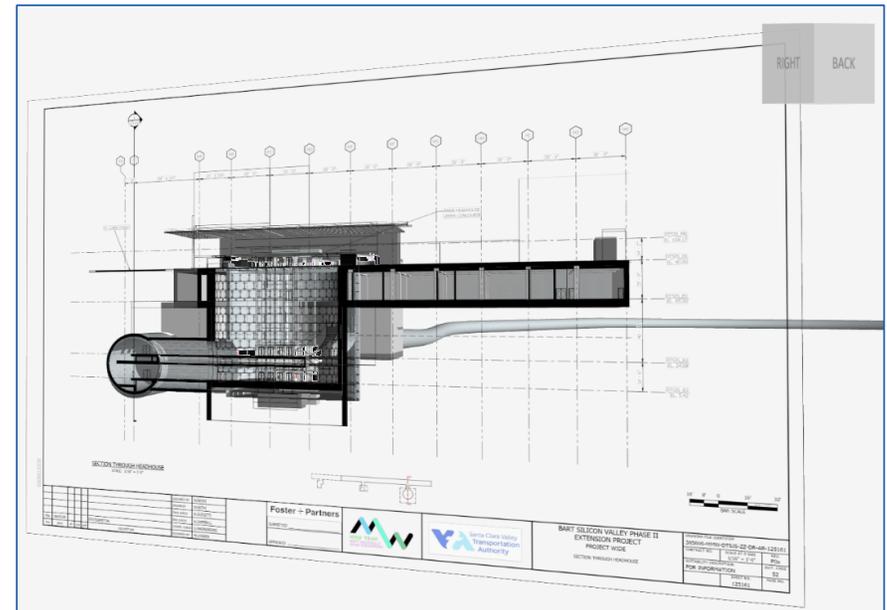
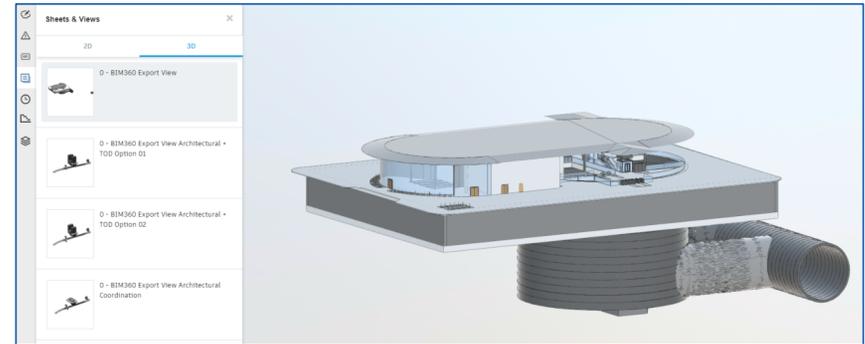


-  **AUTODESK®
REVIT®** → **Vertical Components** (Stations) - 3D Design, Construction & As-built (all disciplines)
-  **AUTODESK®
AUTOCAD® CIVIL 3D®** → **Horizontal Structures** (Civil, Track, Utilities)
-  **AUTODESK®
AUTOCAD®** → **Final 2D Deliverables** (Civil, Track, Utilities)
-  **AUTODESK®
NAVISWORKS®** → **3D – Design Coordination & Review**
4D – Construction Sequencing/Planning

Model Based Design – Viewing Tools

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

- **BIM 360 Viewer**
 - Individual models shared on a regular basis
 - Navisworks federated models for the individual assets and Project wide
 - Used in the asset coordination meetings
 - Visible to all design team members



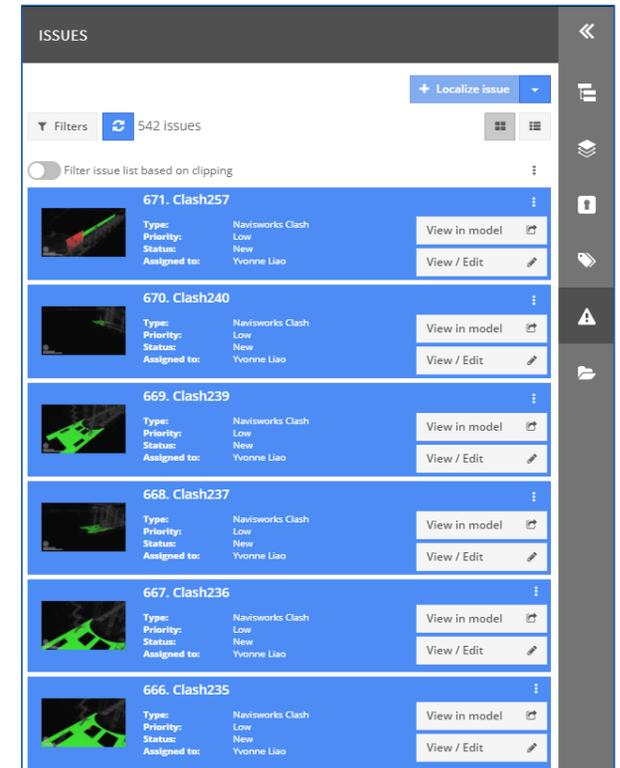
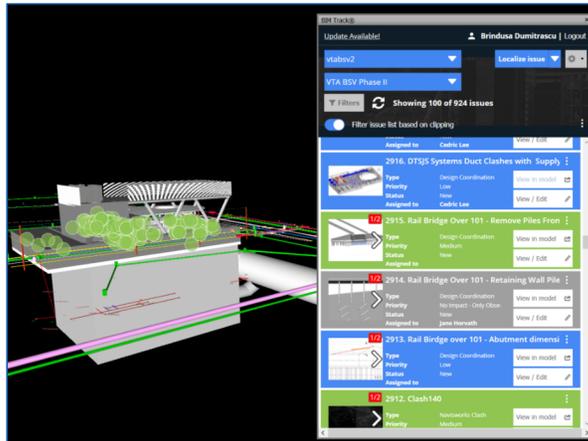
All images copyright: Santa Clara Valley Transportation Authority (VTA)

Model Based Design – Review & Comments

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture			Model Based Design	Virtual Construction	Digital Asset Management

BIM Track

- Issue tracking (not just clashes)
- Integrates with main design software
- Accessible online for non-technical staff
- Record and monitor issues
- Bridge the gap between 2D and 3D teams with hyper-modelling
- All parties access

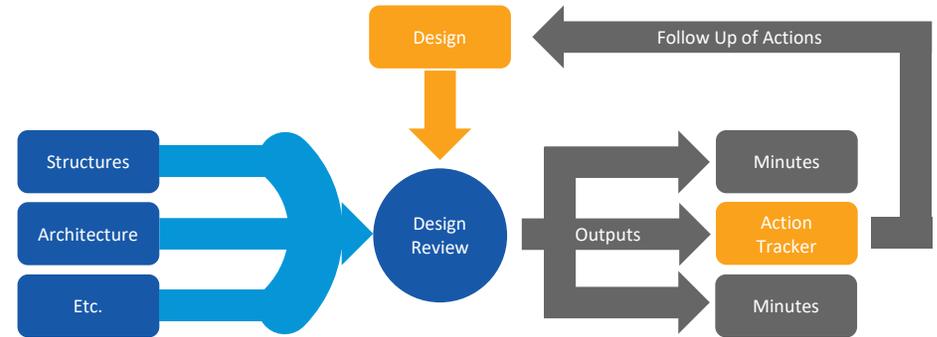


Model Based Design – Collaborative Meetings



Integrated Engineering Sessions

- Discuss and resolve issues that arise during design development
- Present and discuss complete or partially complete elements of the design
- Held on a regular basis, usually weekly
 - General overview
 - Specific workgroups
- **Model based suitable**

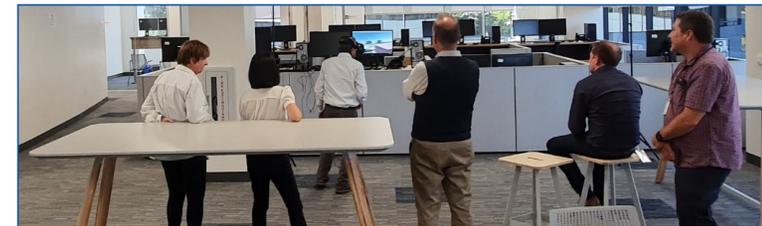
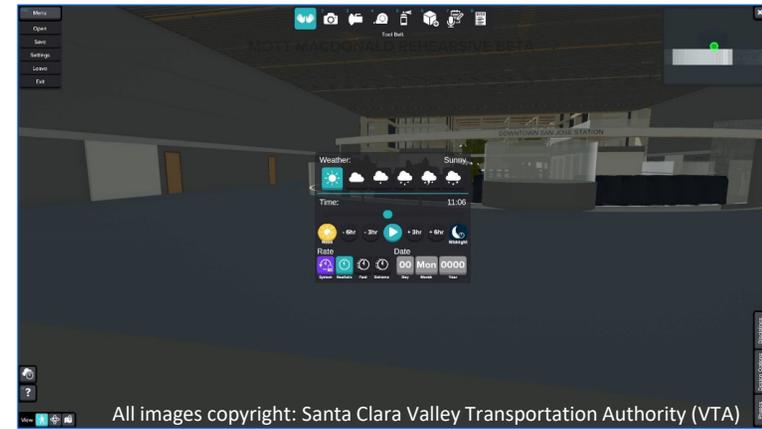


Model Based Design – Virtual Reality (VR)

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



www.Rehearsive.io



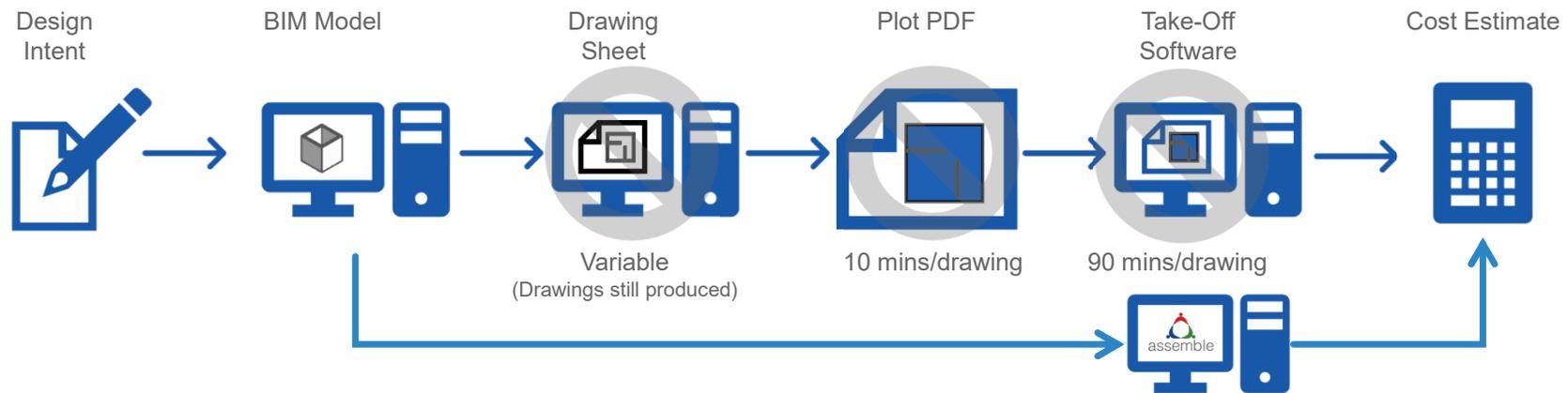
Model Based Design – Visualization

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



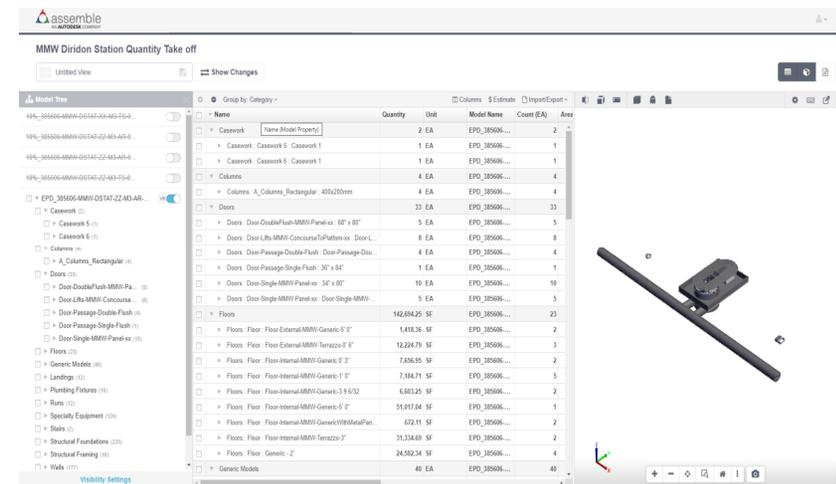
All images copyright: Santa Clara Valley Transportation Authority (VTA)

Model Based Design – Quantity Take Off



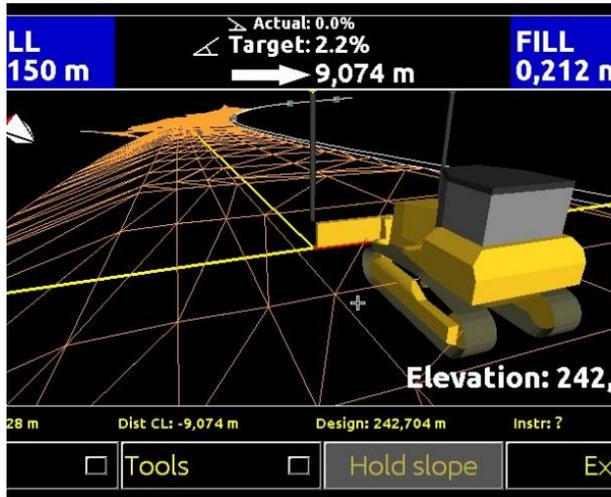
Autodesk Assemble Quantity Take-Off Process:

- Models can be directly imported for material take-off
- Accurate extraction of areas and volumes
 - No tracing or calibration of scales required
 - Eliminates requirement of specific 1ft PDF drawing plots
 - Less opportunity for design intent to be misunderstood
 - Time and cost savings

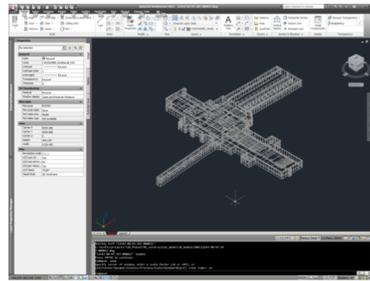


Automated Machine Guidance (AMG)

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

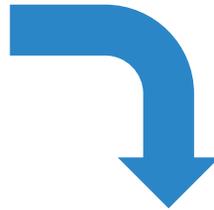


4D Modeling

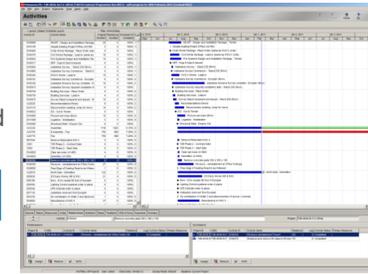
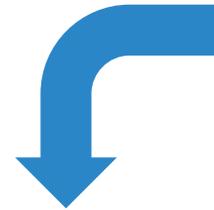


Multiple 3D Models

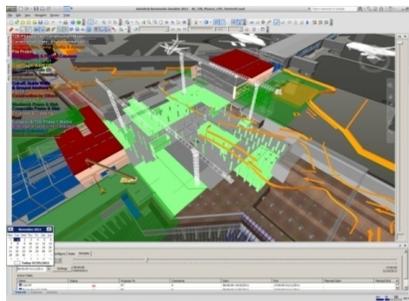
Reference Link



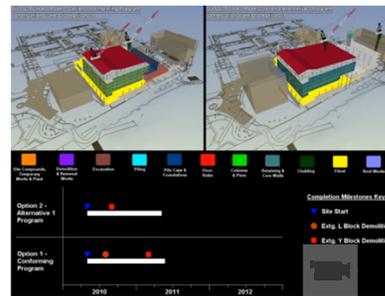
Dynamic Synchronised Link



Construction Schedule(s)



Construction Sequencing



Side-by-side Comparisons



Public Outreach

4D Modeling: Benefits

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

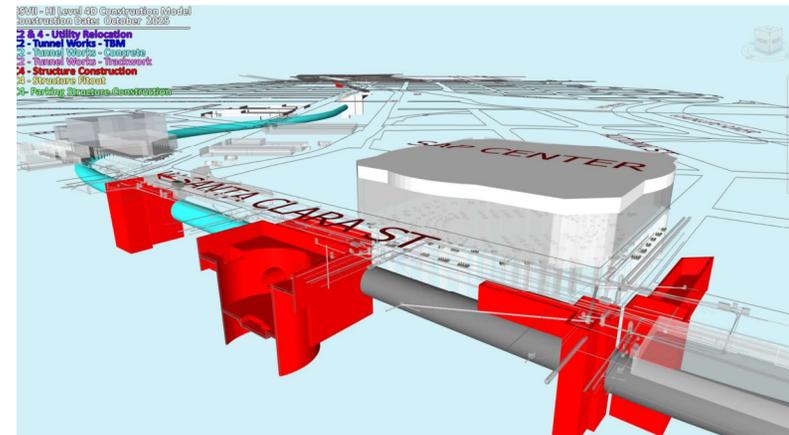
Holistic view of the project construction sequencing

Interface management between multiple DB contract packages

Construction schedule validation and optimization

Stakeholder communication and outreach

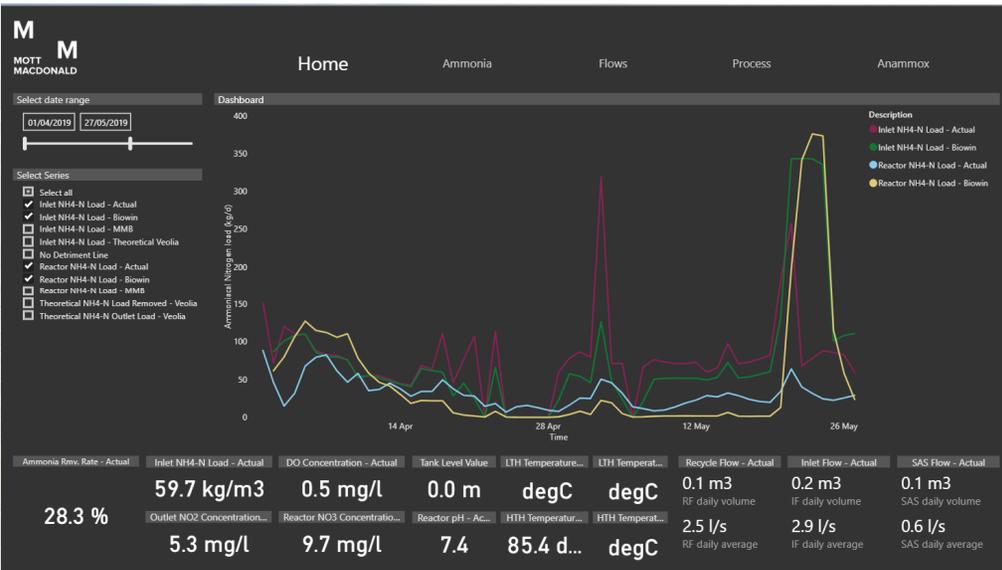
Construction impacts visualizations



All images copyright: Santa Clara Valley Transportation Authority (VTA)

Digital Asset Management

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



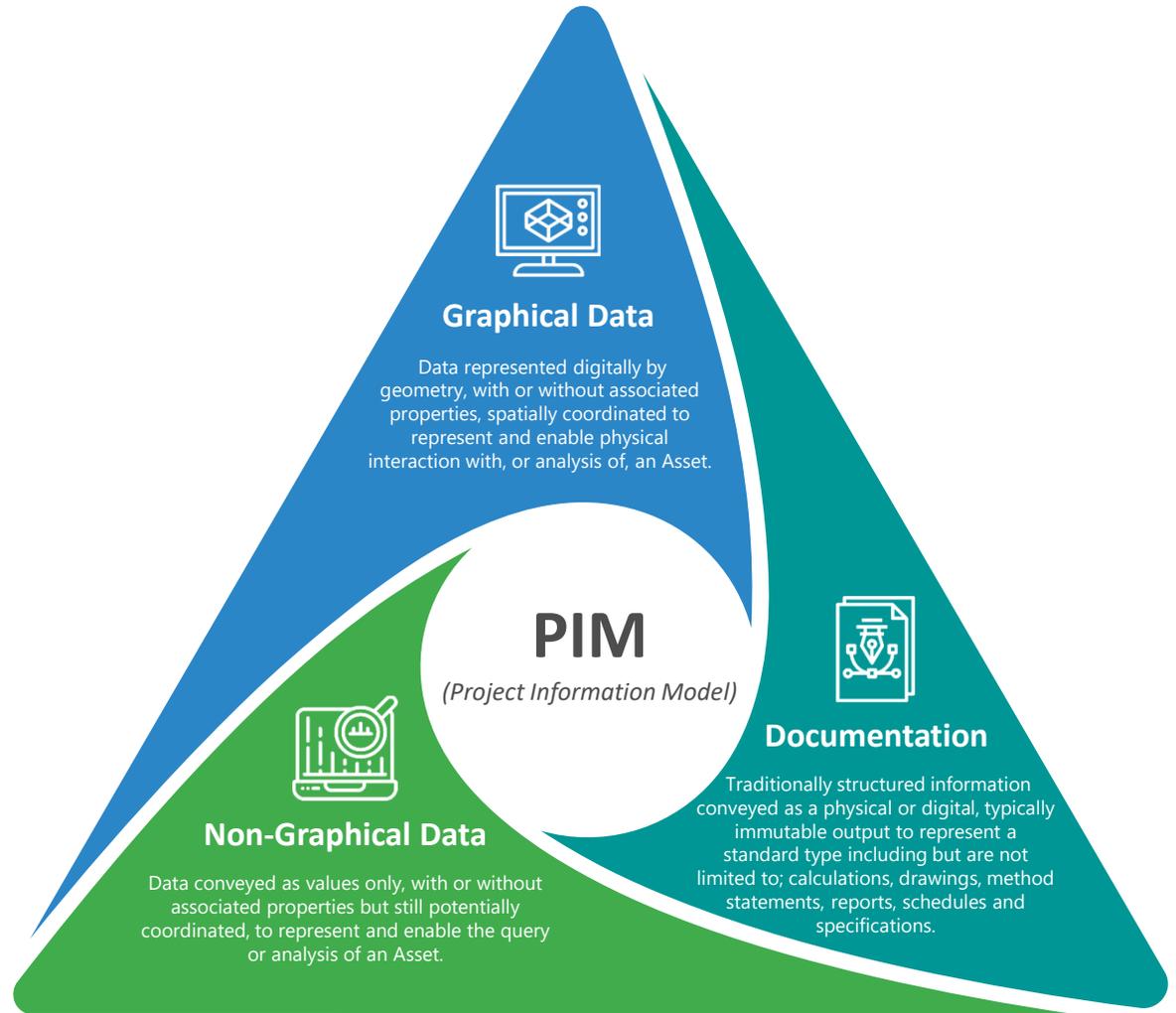
Information Management

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

Graphical Data
BIM models, drawings, GIS

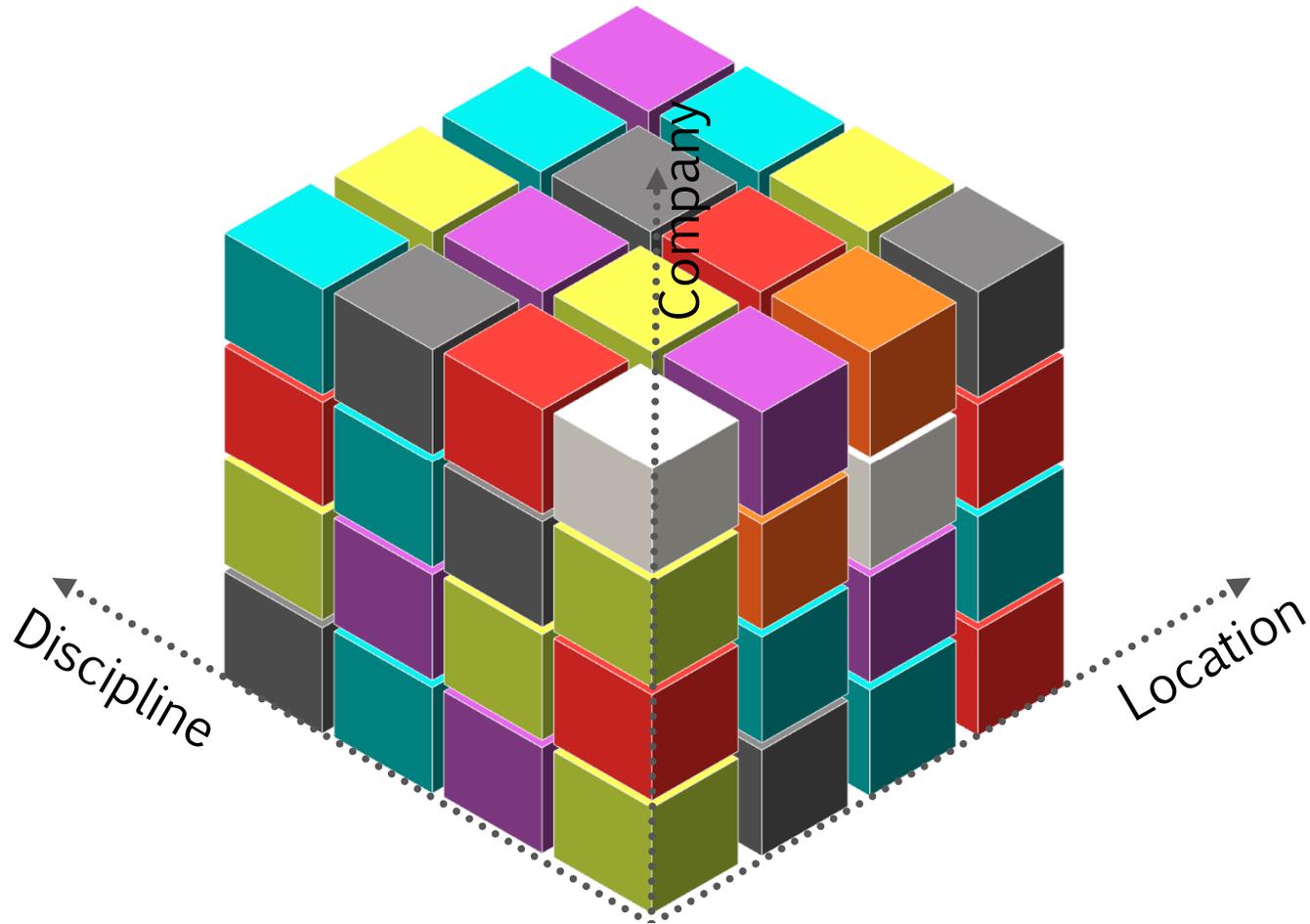
Non-graphical Data
Data, costs, volume quantities, materials, concrete mix, steel grade

Documentation
Reports, calculations, schedules, specifications, office files



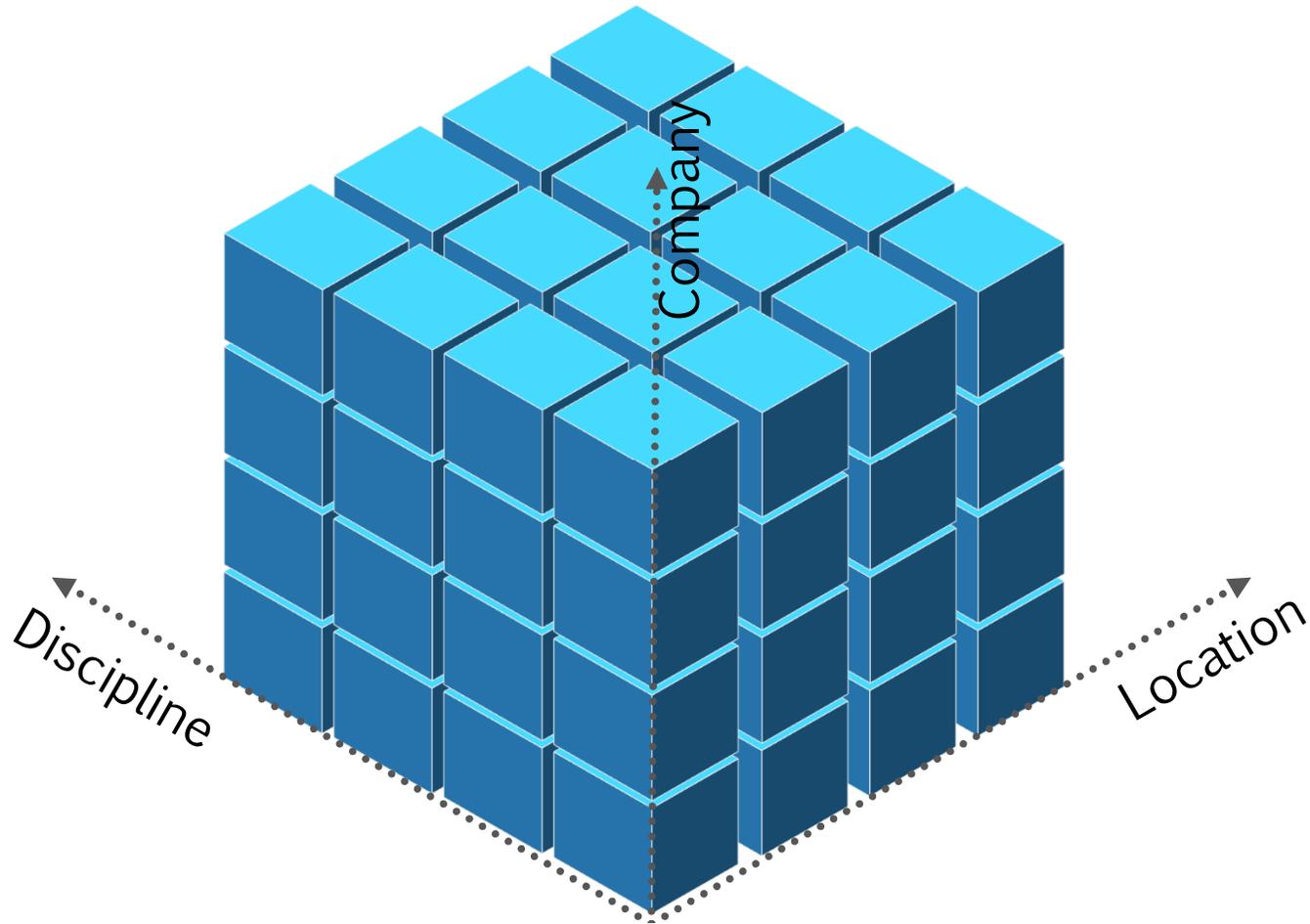
Information Management

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



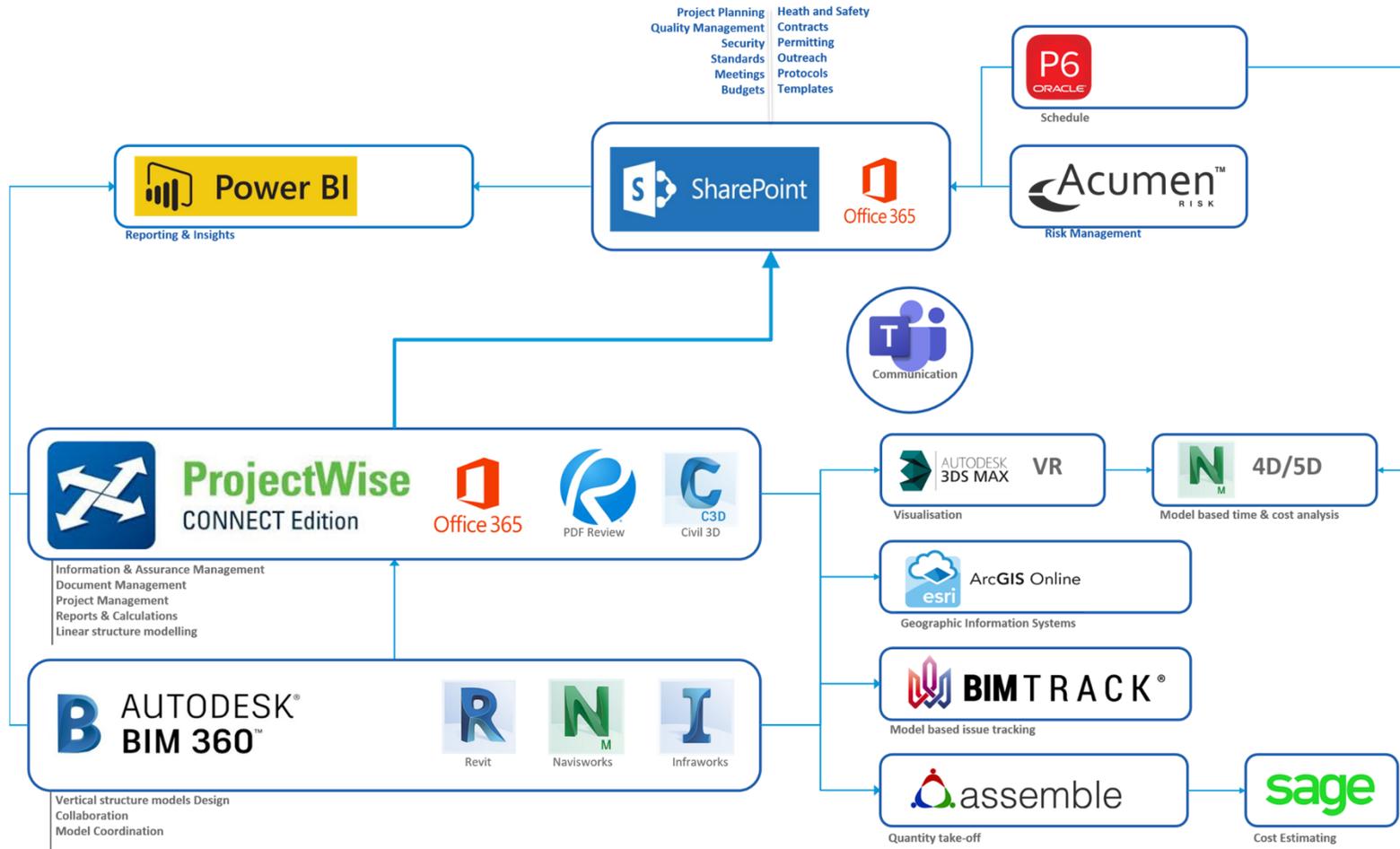
Information Management

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



Information Management – Digital Ecosystem

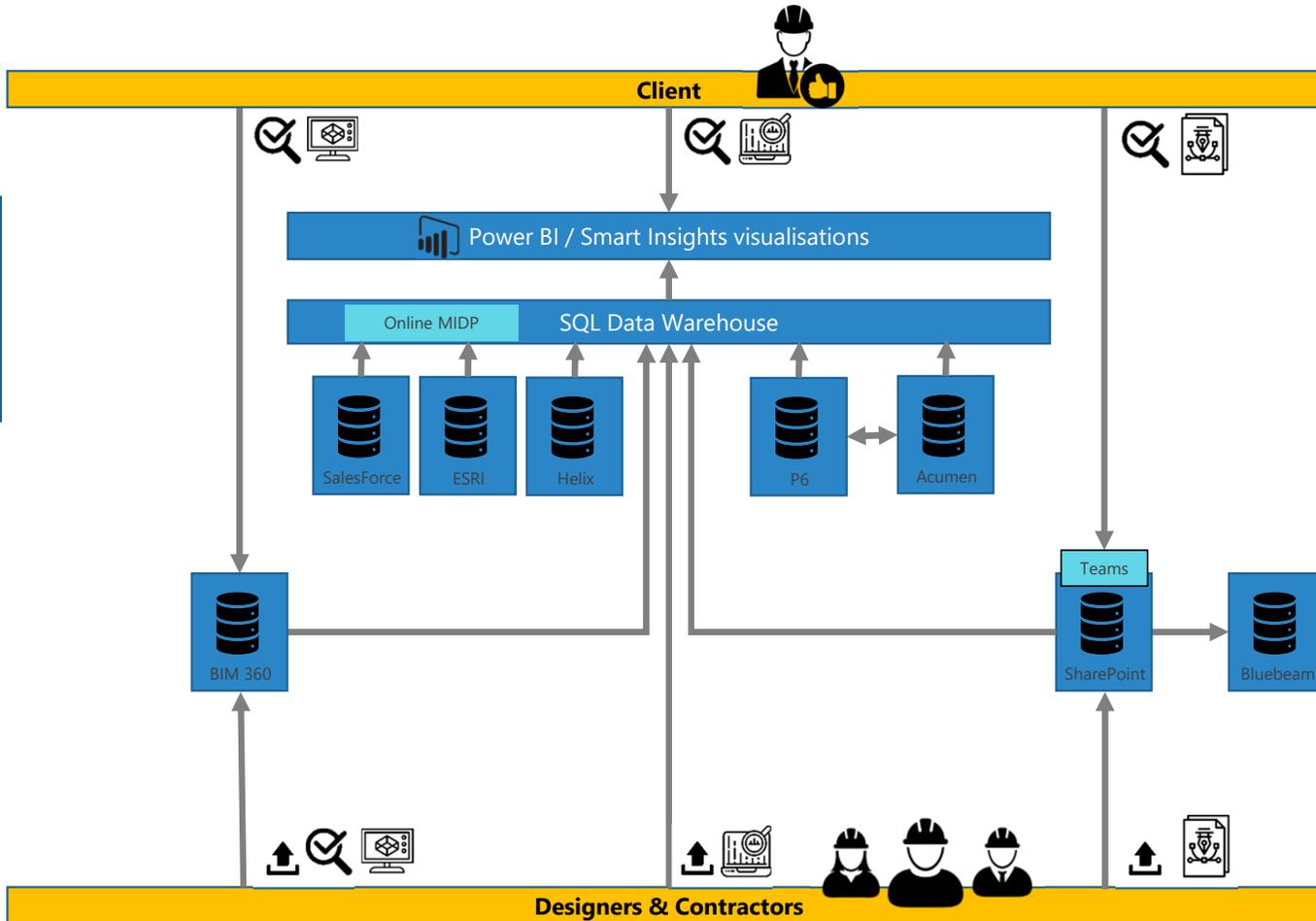
Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management



Information Management

Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

- Graphical
- Non-graphical
- Documentation



Information Management: Data Insights

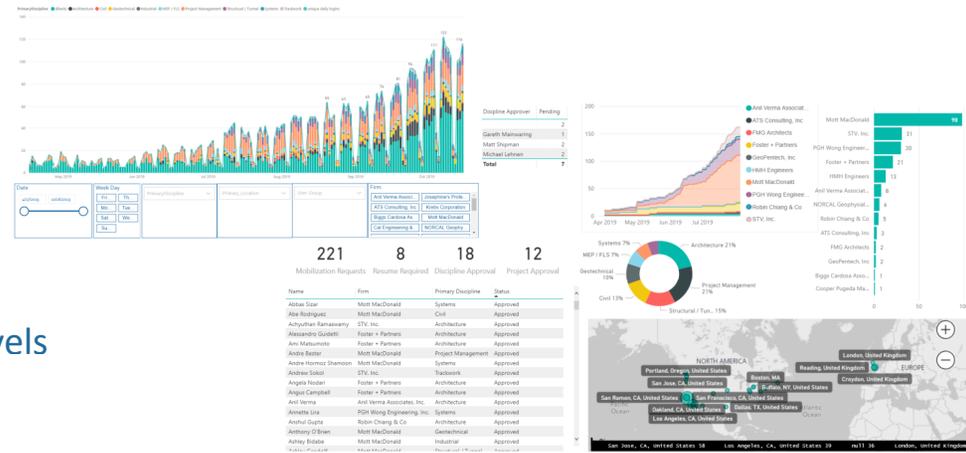


Design Reporting & Insights

- Tracking as-built information through to models
- Monitor and report QC of Civil 3D and Revit models
- Visualize data from BIM 360 and ProjectWise
- Geotechnical – GIS dashboard for boreholes and water levels

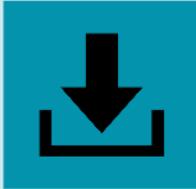
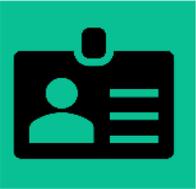
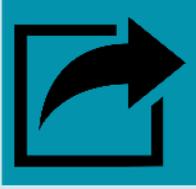
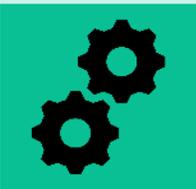
Management Reporting & Insights

- Budget reporting
- Management performance reporting
- Earned value reporting



Information Management: Power Apps

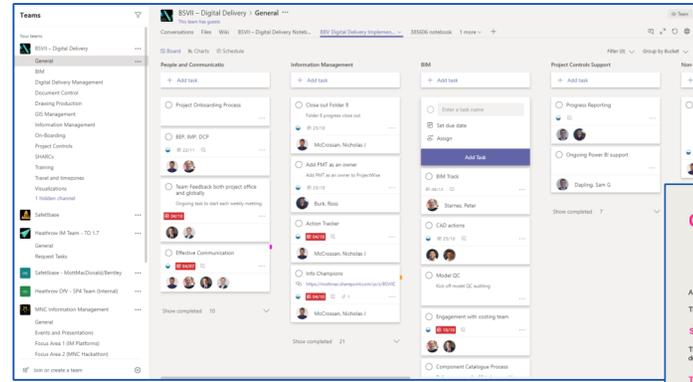
Existing Conditions	Procurement	Planning	Design	Construction	Asset Management
Reality Capture	Model Based Design			Virtual Construction	Digital Asset Management

Mobilization	Document Control	BIM	Additional Tools			
 New Starter	 Incoming Information	 Submit Model Review Checklist	 Route Plan	 Project Flythrough	 Guest Log	 Action Tracker
 Discipline Approver	 Outgoing Information	 BIM Coordinator / Manager Review	 Key Documents	 Dashboards	 Key Communications	 Modify Mobilization Requests
 Project Approver	 Document Register		 Join Yammer	 Observation Log	 Project Directory	 Raise RFC

Information Management: Communication



- MS Teams
- Newsletters
- On-Boarding Sessions
- Project Meetings
- On-Going Feedback
- Milestone Survey - Lessons Learnt



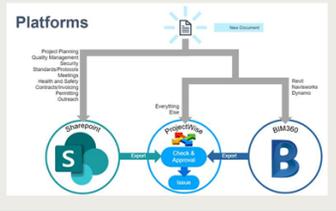
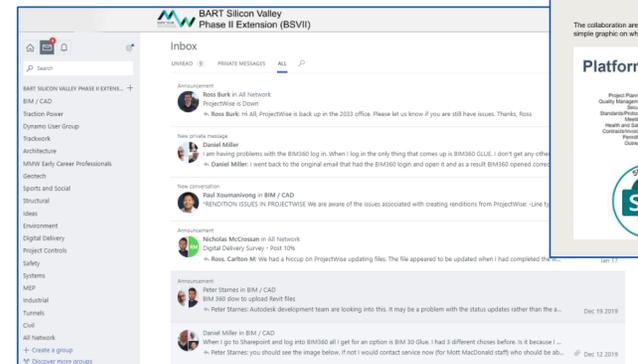
Collaboration Areas

SharePoint:
 The [Working Files](#) library on SharePoint is continually being used by the team to collaborate on documents. Multiple people can be in the same document at once.

Teams:
 Additionally, we have a project [Teams](#) site for collaboration purposes broken down by asset. This is a great way to communicate to different team members and store files for collaboration purposes. Similar to the Working Files library in SharePoint, multiple people can be in a document at once.

Note: when files are placed onto the Teams site, the files are being stored in the GEC SharePoint site in the background.

The collaboration areas listed above aren't meant to be the final storage place for documents. Below is a simple graphic on where to officially store documents once collaboration has finished.



1

Clear information delivery plan

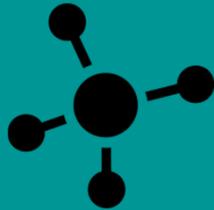
Clear delivery milestones, MIDP and common coding strategy



2

Connected Data Environment

Effectively manage information across project



3

Clear information requirements

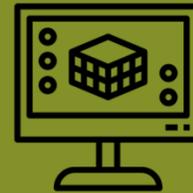
Information standards and exchange protocols



4

Leveraging 3D graphical data

3D BIM models, GIS and visualization technology



5

Putting PEOPLE at the heart of everything

Project knowledge retained with client



Questions?



SVTC & VTA INVITES YOU TO A FREE ONLINE
MENTOR PROTEGE WORKSHOP SERIES



WORKSHOP TOPIC #2
Digital Delivery
Noon May 6, 2021

Presenter: Jay Mezher, Mott-McDonald,
Vice President | Digital Delivery Practice Leader

This program is part of a holistic effort to help small and minority enterprises grow their businesses in Silicon Valley and the broader Bay Area, as part of VTA's BART Phase II.

