Subsurface Characterization – *Déjà vu*

Victor Donald, P.E.
Geotechnical Service Line Director
Terracon Consultants, Inc.

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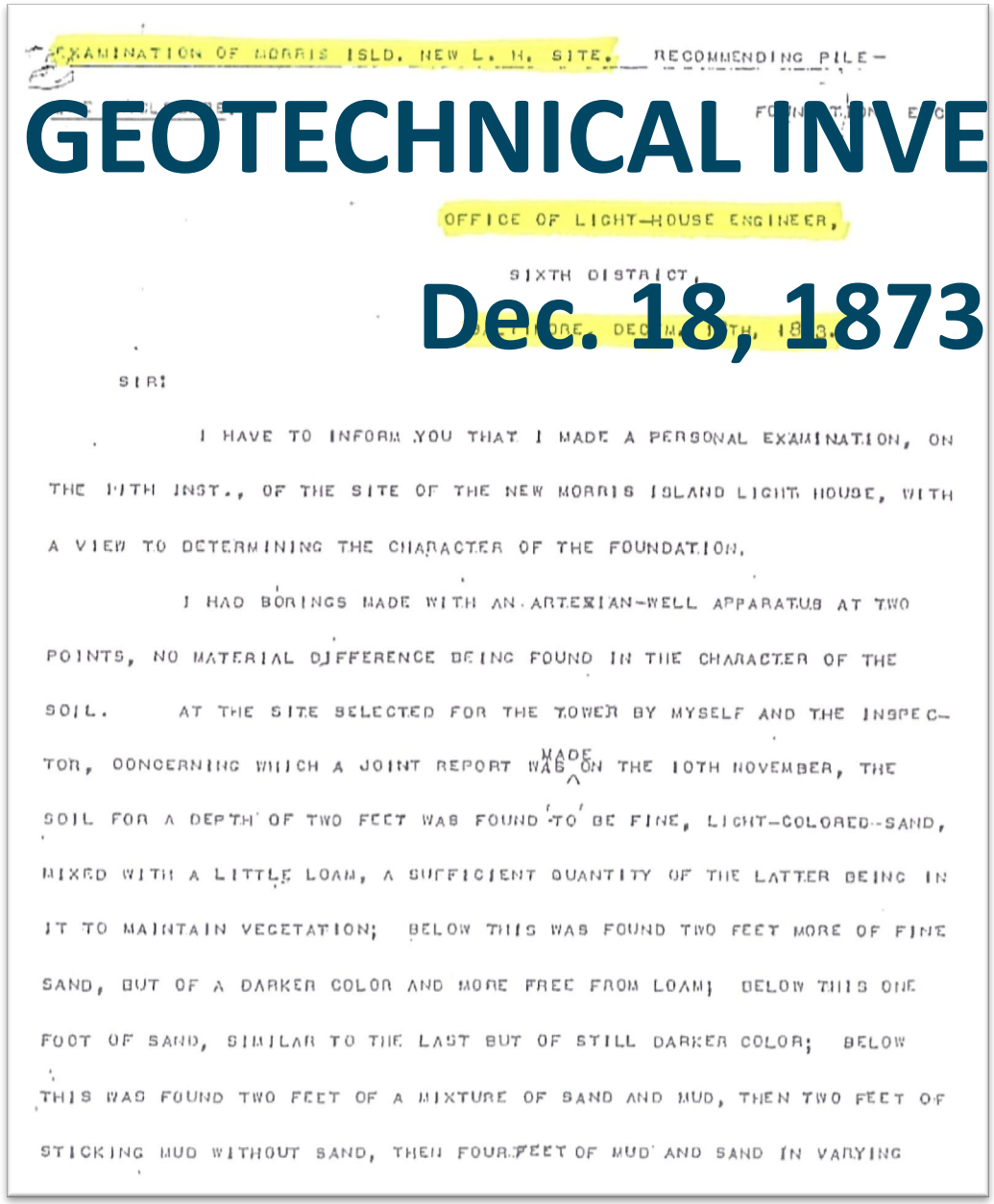
GEOTECHNICAL ENGINEERING

GEOTECHNICAL INVESTIGATIONS

Dec. 18, 1873



EXAMINATION OF MORRIS ISLD. NEW L. H. SITE. RECOMMENDING PILE-

OFFICE OF LIGHT-HOUSE ENGINEER,

SIXTH DISTRICT,

BALTIMORE, DECEMBER 18TH, 1873.

SIR:

I HAVE TO INFORM YOU THAT I MADE A PERSONAL EXAMINATION, ON THE 14TH INST., OF THE SITE OF THE NEW MORRIS ISLAND LIGHT HOUSE, WITH A VIEW TO DETERMINING THE CHARACTER OF THE FOUNDATION.

I HAD BORINGS MADE WITH AN ARTESIAN-WELL APPARATUS AT TWO POINTS, NO MATERIAL DIFFERENCE BEING FOUND IN THE CHARACTER OF THE SOIL. AT THE SITE SELECTED FOR THE TOWER BY MYSELF AND THE INSPECTOR, CONCERNING WHICH A JOINT REPORT WAS MADE ON THE 10TH NOVEMBER, THE SOIL FOR A DEPTH OF TWO FEET WAS FOUND TO BE FINE, LIGHT-COLORED SAND, MIXED WITH A LITTLE LOAM, A SUFFICIENT QUANTITY OF THE LATTER BEING IN IT TO MAINTAIN VEGETATION; BELOW THIS WAS FOUND TWO FEET MORE OF FINE SAND, BUT OF A DARKER COLOR AND MORE FREE FROM LOAM; BELOW THIS ONE FOOT OF SAND, SIMILAR TO THE LAST BUT OF STILL DARKER COLOR; BELOW THIS WAS FOUND TWO FEET OF A MIXTURE OF SAND AND MUD, THEN TWO FEET OF STICKING MUD WITHOUT SAND, THEN FOUR FEET OF MUD AND SAND IN VARYING

146 Years

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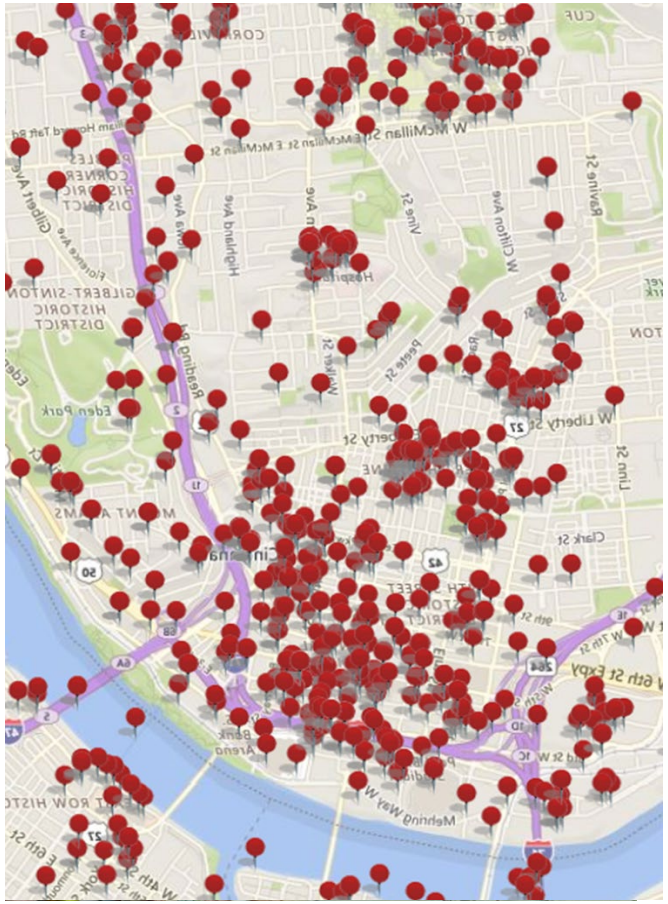
UNLIKE MARS…
We *HAVE* been here before.
…and here
…and here
…and here

WEALTH OF HISTORICAL DATA

VALUABLE HISTORICAL DATA



ACTIVATED FOR USE

IMPETUS FOR IMPROVED SITE CHARACTERIZATION

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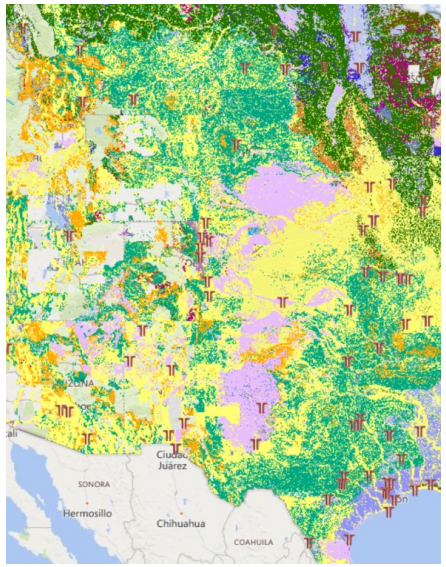

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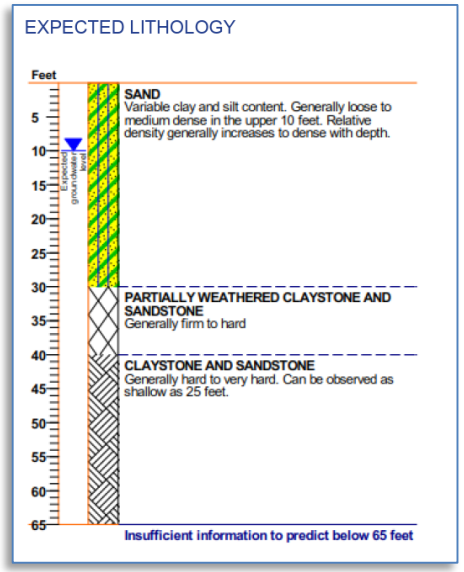

HISTORICAL DATA

PUBLIC DATA

LOCAL EXPERIENCE

CONCEPTUAL GEOTECHNICAL MODEL

A NEW APPROACH

- Expected Foundation
- Construction Issues
- Smart Exploration Plan

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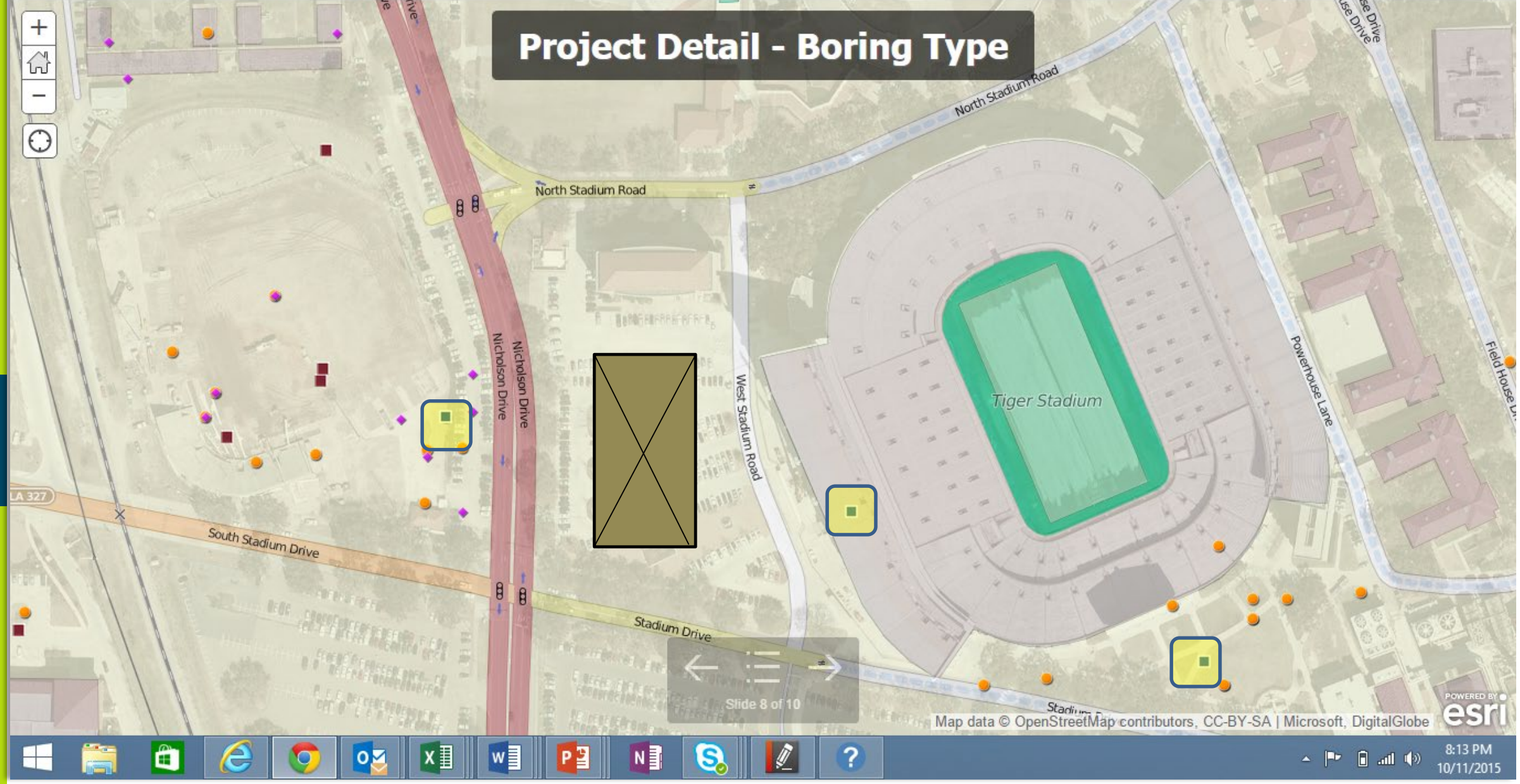
Project Detail - Boring Type



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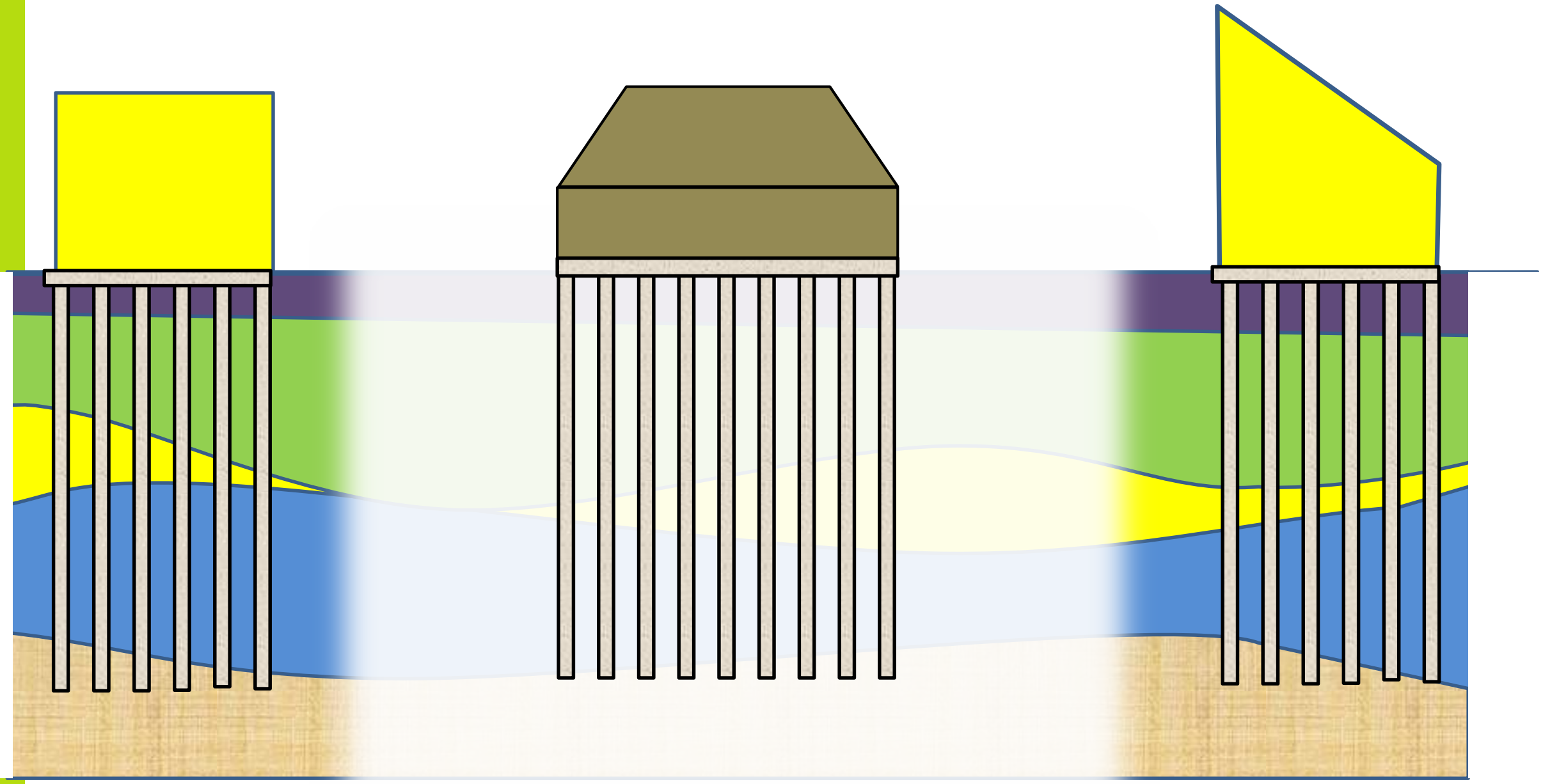

Déjà vu

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Contact

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Innovations in Preconstruction to Improve Collaboration

Kelsey Stein, National Preconstruction Technology Manager
Catherine Rose, Director of Innovation & Knowledge Sharing
Skanska

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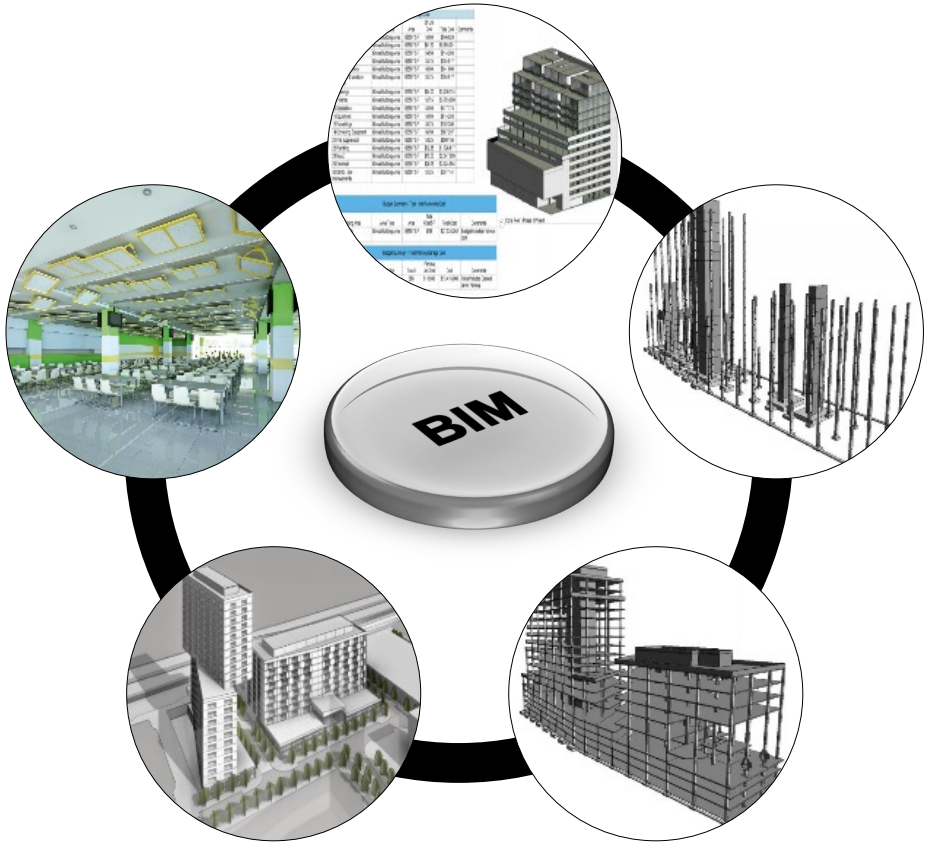
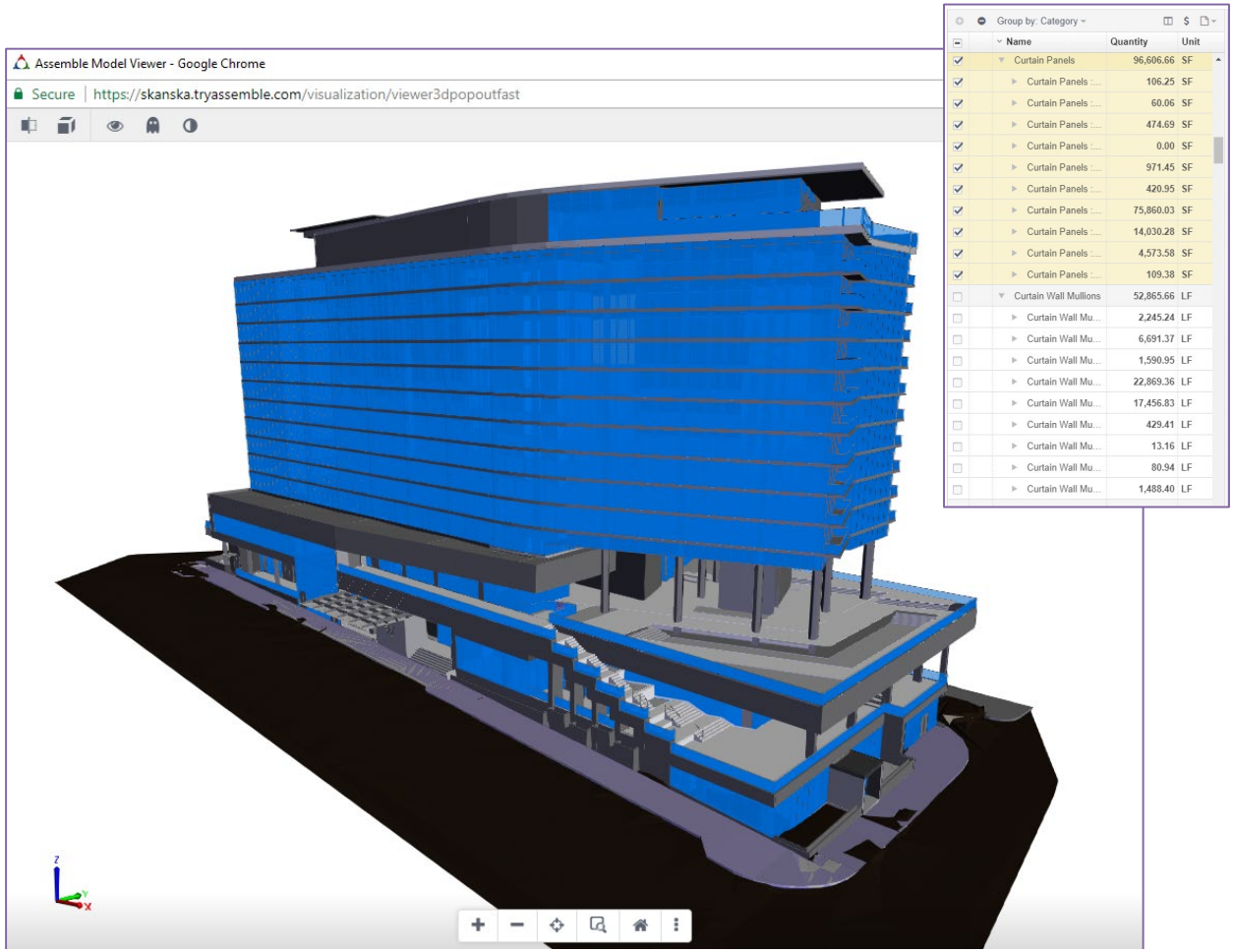
Project Background: Why Do We Need This?



- Without industry standards for models, current practice is to receive static, disconnected copies of the designer's Revit models, making it difficult to collaborate.
- We sought to capture and disseminate proven practices to establish a collaborative workflow for using BIM tools.

Benefits of Implementing Model Based Estimating

- Less quantity takeoff time
- Better estimating visualization
- Better understanding of design, changes, options
- Time flexibility to focus on value engineering and cost changes
- Early cost estimation to support decision-making

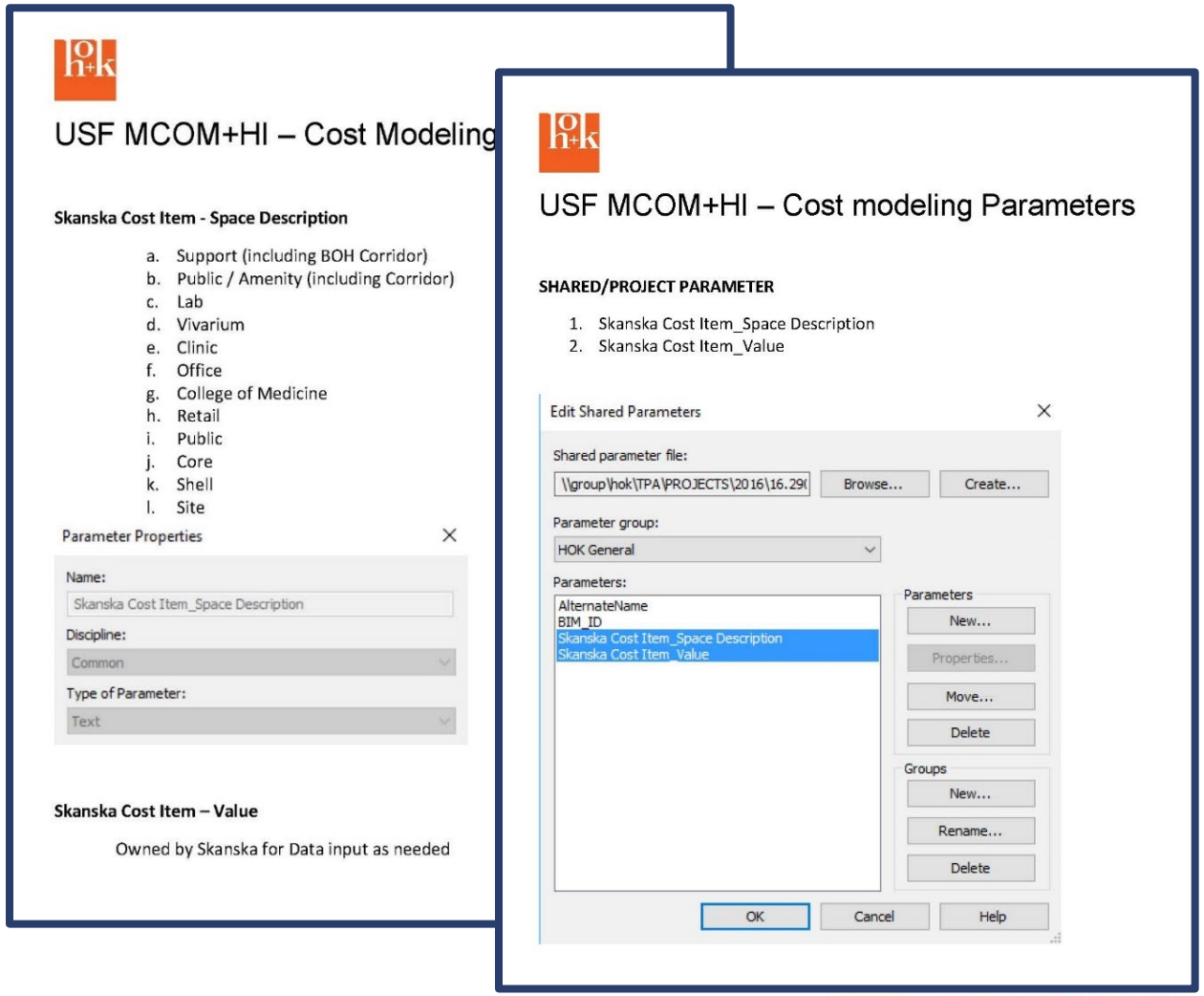


Collaborative Tools

- Revit and Assemble for Takeoff
- Revit and Assemble for Estimating (Target Value Design)
- Real-time Rendering for Visualizing Data

Collaboration with Designers

- **Department Parameters**
- **Cost Parameters**



St Pete Pier

https://skanska.tryassemble.com/projects/392#views/8332

Apps | BIM 360 Document | St Pete Pier | BIM 360 Document

assemble

St Pete Pier

1 Selected · 163.07 SF | Inspect | Change Visibility

3D - ALL

Share

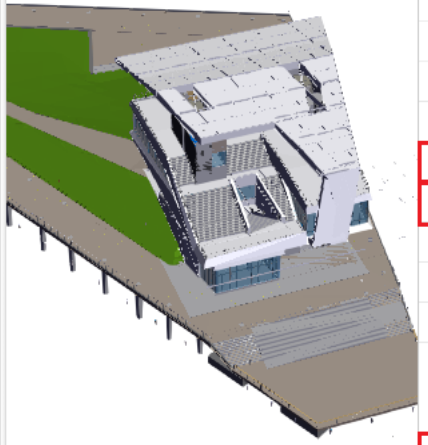
Model Tree

- 51166 Pier Park_ Pier Deck Central_v2... (V2)
  - Electrical Equipment (1)
  - Floors (235)
  - Generic Models (25)
  - Handrails (83)
  - Lighting Fixtures (19)
  - Mass (6)
  - Plumbing Fixtures (1)
  - Railings (238)
  - Ramps (2)
  - Site (576)
  - Stairs (6)
  - Structural Columns (477)
  - Structural Foundations (4)
  - Top Rails (238)
  - Topography (2)
  - Walls (92)
- 51166 Pier Park_PB_Central_v16 (V1)
  - Air Terminals (13)
  - Casework (51)
  - Ceilings (35)
  - Columns (5)
  - Curtain Panels (683)
  - Curtain Wall Mullions (1351)
  - Data Devices (2)
  - Doors (46)
  - Duct Fittings (2)

Visibility Settings

Group by: Category | Columns | $ Estimate | Import/Export

Name	Quantity	Unit	Start_Date	End_Date	Duration	Skanska Unit...	Skanska Unit
Walls : Basic Wall : 10 IN LG	2,102.29	SF	2018-10-11	2019-03-29	118	100	SF
Walls : Basic Wall : CIP - 10"	18,404.38	SF				100	SF
1014161	163.07	SF	2018-10-11	2019-03-29	118	100	SF
1014478	40.85	SF	2018-10-11	2019-03-29	118	100	SF
1014504	190.12	SF	2018-10-11	2019-03-29	118	100	SF
1028045	151.99	SF	2018-10-11	2019-03-29	118	100	SF
1269232	226.13	SF	2018-10-11	2019-03-29	118	100	SF
1323102	41.36	SF	2018-10-11	2019-03-29	118	100	SF
1346947	149.03	SF	2018-09-25	2019-01-02	77	100	SF
1347596	287.88	SF	2018-09-25	2019-01-02	77	100	SF
1392939	106.30	SF	2018-09-25	2019-01-02	77	100	SF
1397762	205.62	SF	2018-09-25	2019-01-02	77	100	SF
1398609	143.50	SF	2018-09-25	2019-01-02	77	100	SF
1398696	70.30	SF	2018-09-25	2019-01-02	77	100	SF
1398907	120.94	SF	2018-09-25	2019-01-02	77	100	SF
1446391	23.90	SF	2018-10-12	2018-10-25	12	100	SF
1446392	19.27	SF	2018-10-12	2018-10-25	12	100	SF
1446440	36.43	SF	2018-10-12	2018-10-25	12	100	SF
1446441	32.12	SF	2018-10-12	2018-10-25	12	100	SF
1448310	28.43	SF	2018-10-12	2018-10-25	12	100	SF
1454169	60.18	SF	2018-10-11	2019-03-29	118	100	SF
1482503	184.18	SF	2018-10-11	2019-03-29	118	100	SF
1653889	219.86	SF	2019-05-02	2019-05-08	5	100	SF
1657097	48.84	SF	2019-05-02	2019-05-08	5	100	SF



Assemble Properties

Model Properties

Instance | Type

Rebar Cover - Exterior Face	Exterior - #3 to #5
Rebar Cover - Interior Face	Interior (slabs, walls, joists) - #3 to
Rebar Cover - Other Faces	Interior (slabs, walls, joists) - #3 to
Structural	☑
Structural Usage	Bearing
Text	
BOUND VERT	
BOUNT HORIZ	
Duration	118
End_Date	2019-03-29
REINF HORIZONTAL	
REINF VERTICAL	
REMARKS	
Skanska Cost Item_Space Description	
Skanska Unit	SF
Skanska Unit Cost	100
Start_Date	2018-10-11
TYPE	

Cancel | Save

COLLABORATION

Benefits of Visualizing Data

Benefits to Operations

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BREAK

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Software & Data Ecosystems

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Closeout Digital Data Protocols

Mark Mathias
Vice President, PlanCycle Division of SE Blueprint

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Closeout Digital Data Protocols

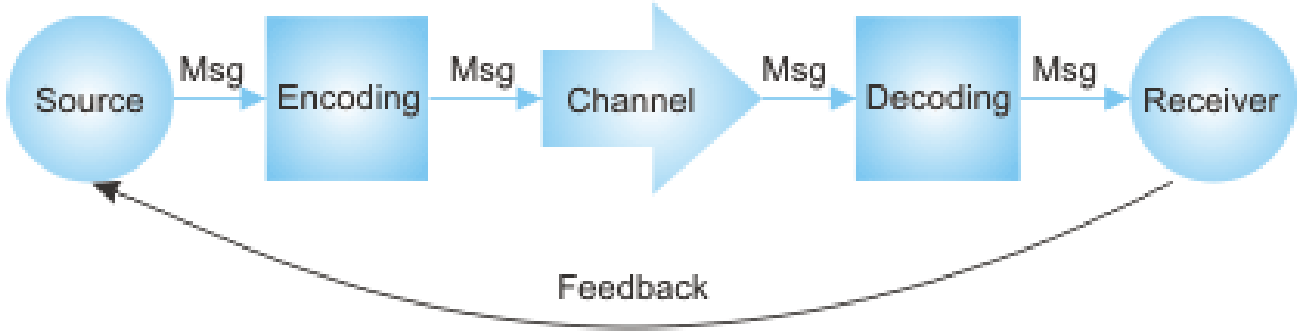
- Many project closeouts today are requiring digital handovers, but will the information last as long as the buildings?
- Electronic data is not Archival
  - CD / DVD / USB Drive
  - PDF files are not Archival

Closeout Digital Data Protocols

- The Portable Document Format (PDF) was created in the early 1990's by Adobe Systems as a *proprietary format*.
- Adobe released it as a an *open standard* format in 2008
  - Under the control of International Standards Organization
  - ISO 32000-1
  - 6 versions of PDF release since 2008 as *open standard*

Closeout Digital Data Protocols

- Encoding & Decoding
  - Authoring Software vs. Read Software



- Interoperability Issues

Closeout Digital Data Protocols

- Standards
  - Hybrid Communication Workflows
  - Sustainable Practices

- PDF/UA “Universally Accessible”
  - ISO 14289
  - Specifications for opening files
  - Tagging Metadata

Closeout Digital Data Protocols

- Digital Preservation
  - *Open Standard*
  - Best Practices
    - Formatting Standards
    - Redundancy
    - Interoperability / Refreshing to New Standards

- Everyone needs a Plan!

Closeout Digital Data Protocols

- Formatting for Facility Management Application
  - *Open Standard*
  - File Naming (PM vs. FM)
    - CSI Codes
  - PDF/UA (Best Practices)
  - Search Options (OCR, Asset Tagging, Keyword)
  - Eliminate Mega Multipage PDF files w/ Bookmarks

Closeout Digital Data Protocols

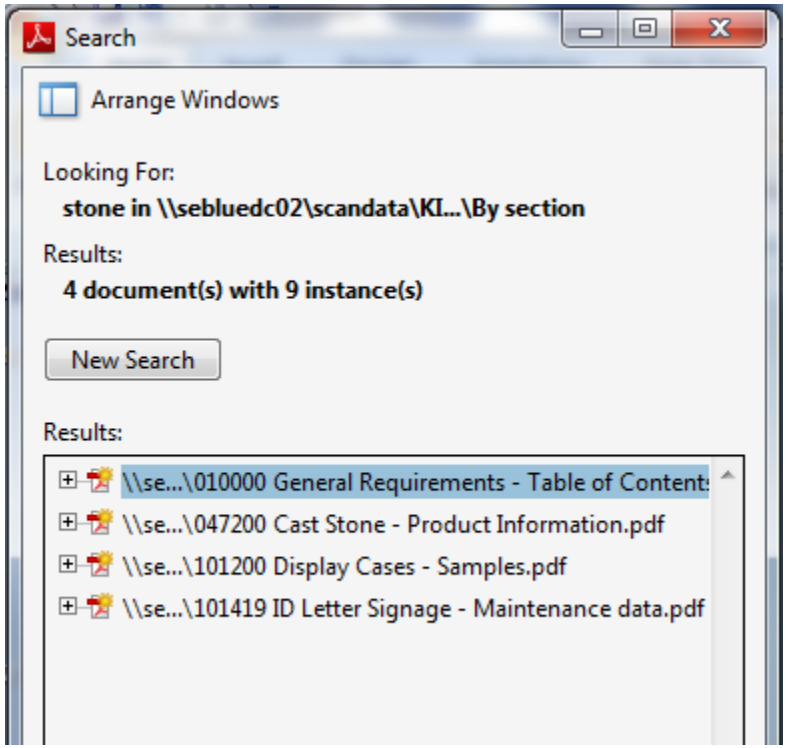
AIA® Document G201™ – 2013

Project Digital Data Protocol Form

ARTICLE 3 TRANSMISSION AND USE OF DIGITAL DATA

Digital Data	Digital Data Format	Transmission Method	Authorized Uses	Note
§ 3.1.5 Contractor's submittals				
Product data				
Submitted by Contractor	PDF	CM-EDMS	FR	
Returned by Architect	PDF	CM-EDMS+CC	R+CO	1
Shop drawings				
Submitted by Contractor	PDF	CM-EDMS	FR	
Returned by Architect	PDF	CM-EDMS+CC	R+CO	1
§ 3.1.6 Subcontractor's submittals				
Product data				
Submitted by Subcontractor	PDF	CM-EDMS	FR	
Returned by Contractor	PDF	CM-EDMS+CC	R+CO	1
Shop drawings				
Submitted by Subcontractor	PDF	CM-EDMS	FR	
Returned by Contractor	PDF	CM-EDMS+CC	R+CO	1

Closeout Digital Data Protocols



- Formatted Facility Management Data
  - *Open Standard*
  - Searchable
  - "Universally Accessible"
- What's Your Data Preservation Plan?

Contact

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Unleashing the Internet of Things and the Future of Intelligent Buildings

Tom Sorrell, RCDD, InfraGard, LEED BD+C, NICET, CHC
Principal
CMTA Technology Solutions

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Unleashing IoT and the Future of Intelligent Buildings

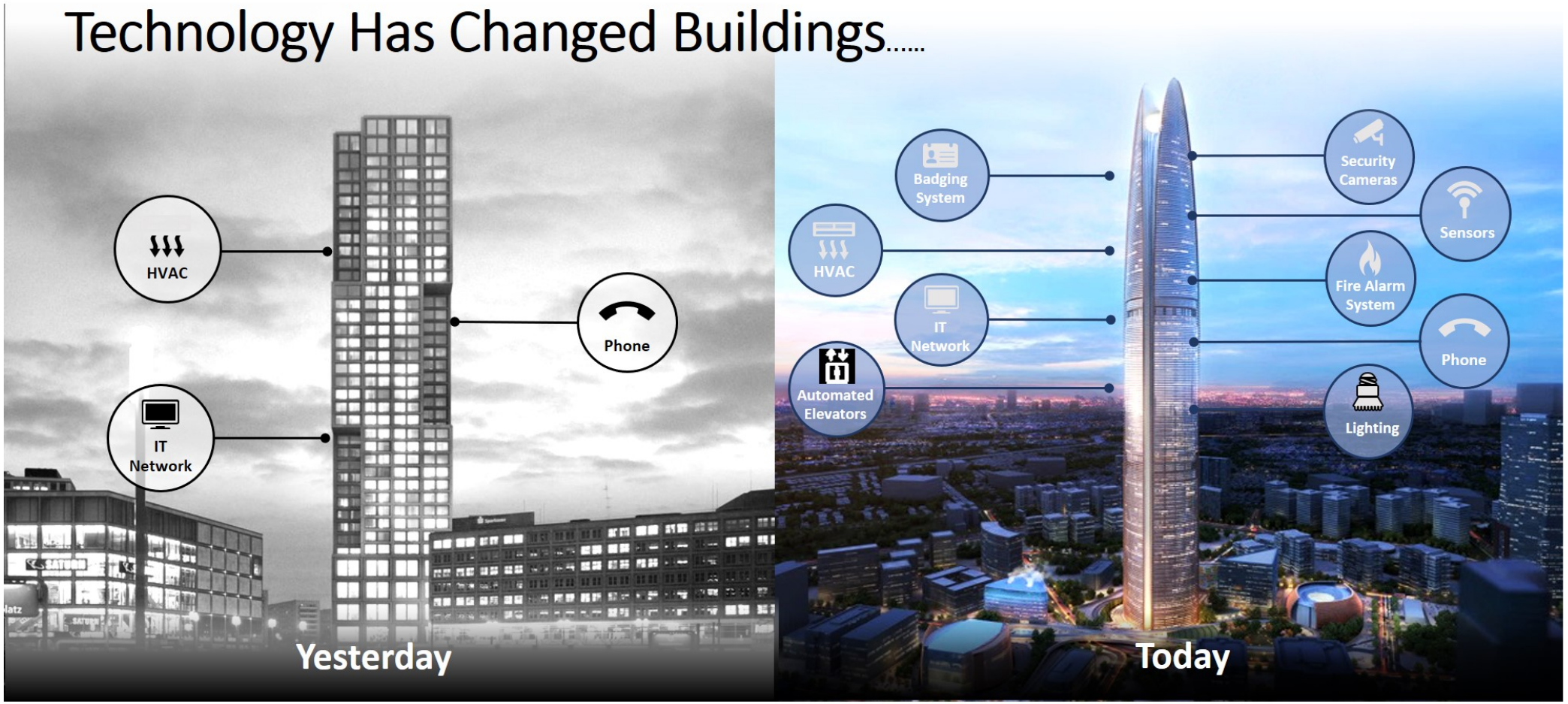
"Predicting rain doesn't count; building arks does."

-Warren Buffett

"If I had asked people what they wanted, they would have said faster horses."

- Henry Ford

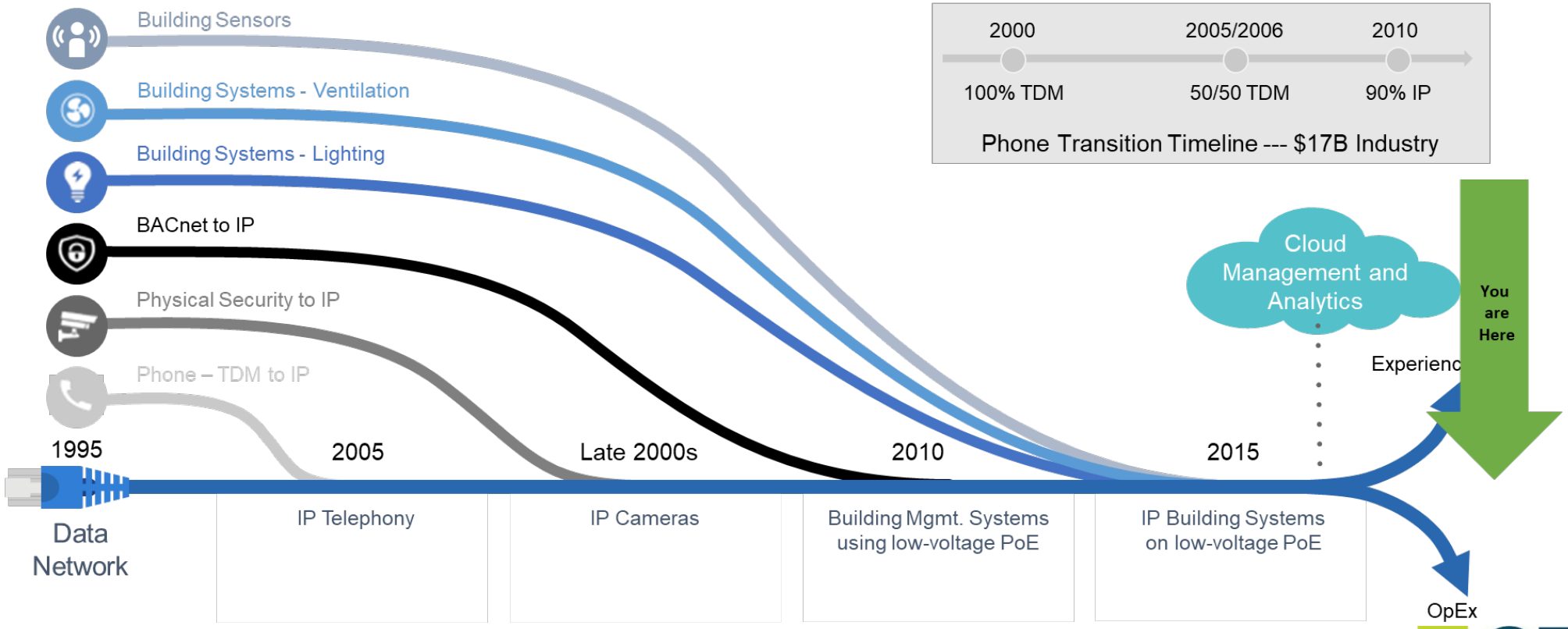
Unleashing IoT and the Future of Intelligent Buildings



Demand for new customer experiences and workforce innovation mandate improved efficiencies

Unleashing IoT and the Future of Intelligent Buildings

IP Convergence for Digital Building Technologies



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Unleashing IoT and the Future of Intelligent Buildings

Generation Z'ers

Born after 1995 - World Population – 32% in 2019

This generation entered the workforce in 2016

66% think technology makes anything possible

80% display emotional distress if separated from devices

90% would be upset if they had to give up the Internet

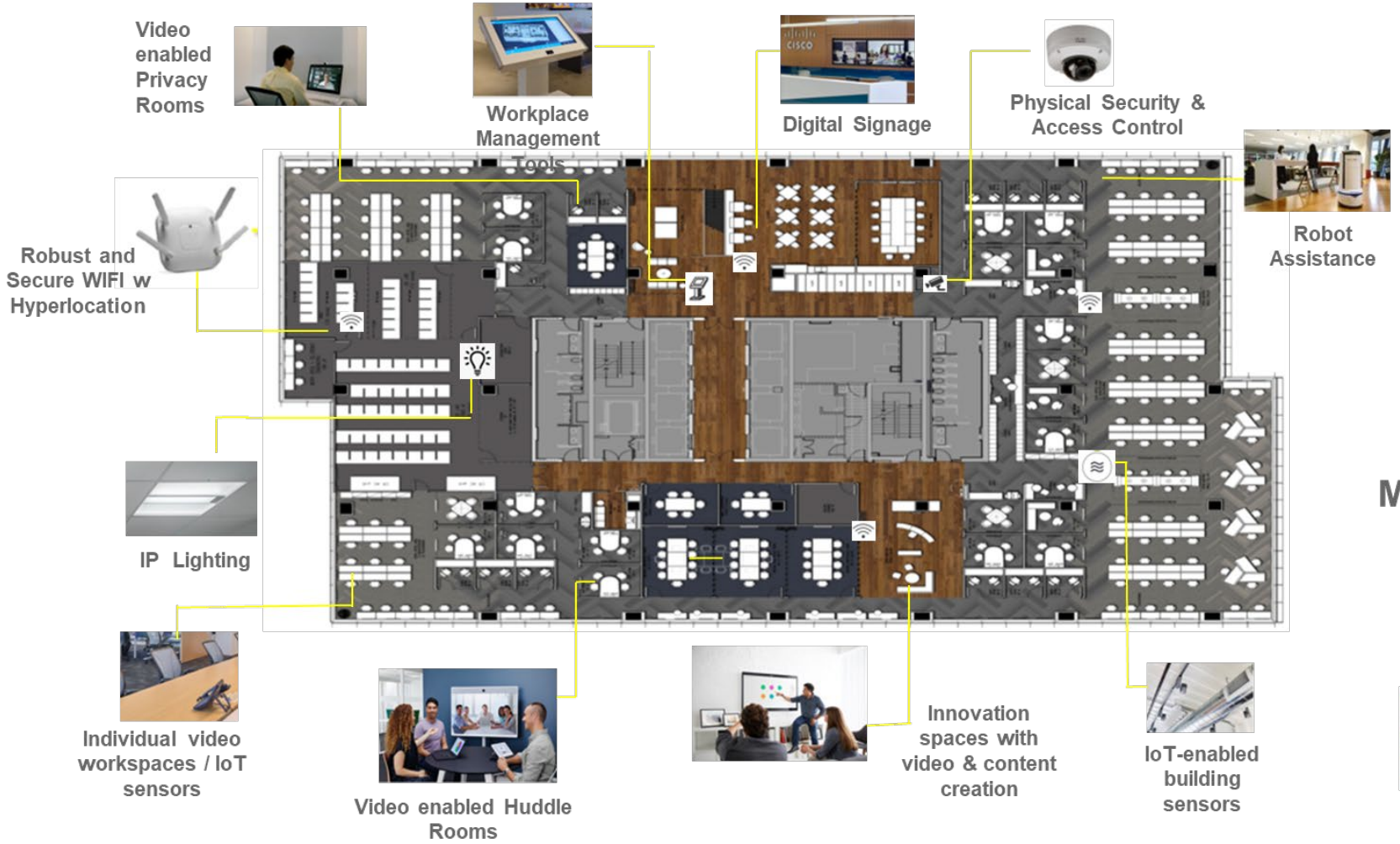
51% still want to communicate to managers in person

60% want to have an impact on the world at work

Source: Luis Suau, Cisco Presentation Orlando 2019

Unleashing IoT and the Future of Intelligent Buildings

Technology is the enabler……



Employee Services

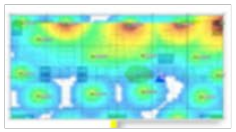
Collaboration Workspaces

Working from Anywhere / Connecting to the Workplace

Secure Mobility Solutions

Management Services

Space and Environment Management



Workspace Utilisation Analytics

Unleashing IoT and the Future of Intelligent Buildings

Unleashing IoT and the Future of Intelligent Buildings

Questions that need to be asked . . .

- What is this thing?
- Who is responsible for it?
- What access does it need?
- Is it doing what it should be doing?

Importance of *STANDARDS!*

Unleashing IoT and the Future of Intelligent Buildings

Building Management Systems

Three Principles

1 / **Secure**

BMS visible to IT and secured to prevent exploits on Enterprise infrastructure

2 / **Efficient**

Converged infrastructure for IT & BMS applications over the enterprise fabric

3 / **Intelligent**

Analytics combined with automation reduces time spent on troubleshooting

Contact

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