# You OdySea This: How BIM Shaped an Owner's Vision into a Working Construction Model

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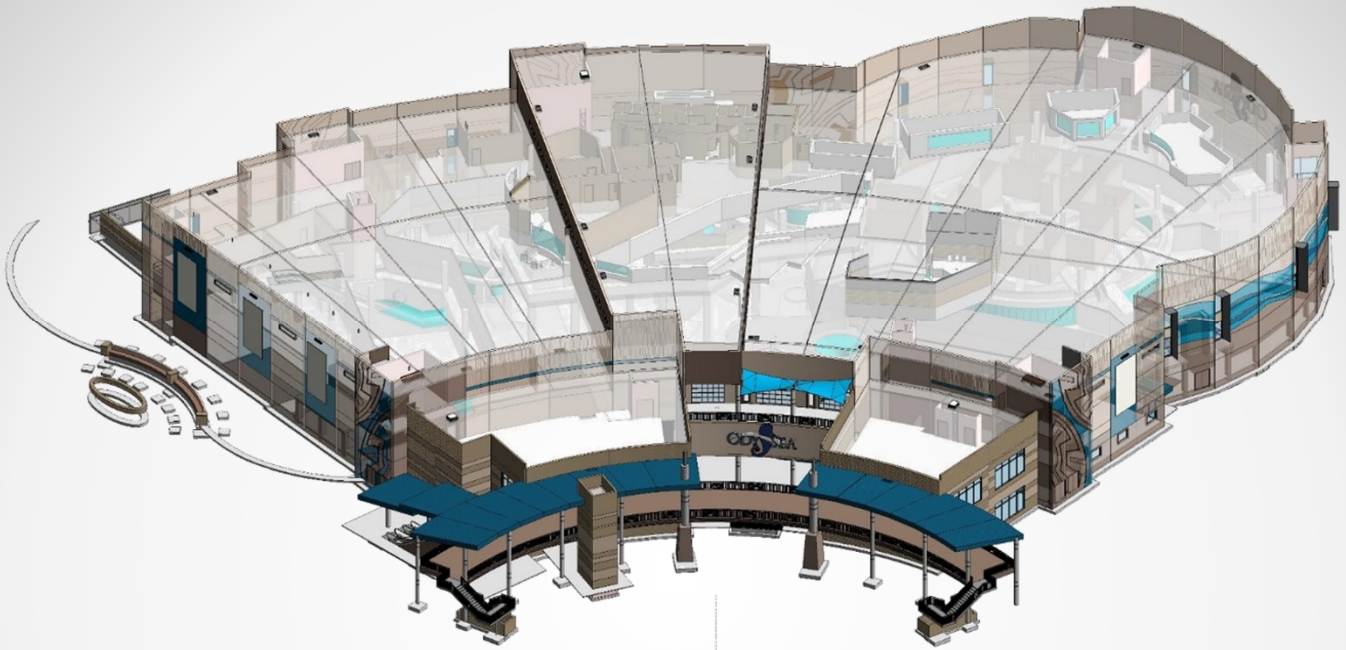
## Class Summary

Follow us as we work to show how BIM can transform an owners vision into a working construction model.

- Precon Collaboration
- Design Review Model
- Construction Model
- Takeaways


## Key Learning Objectives

- Innovative design-assist collaboration process between owner, architect, general contractors, and subcontractors.
- Use of multiple Autodesk software programs during preconstruction.
- Constructability drawings generated from the construction model.



# Project Quick Hits

- 48 Aquatic Exhibit
- 1,500,000 Gallons of Water
- 2,000,000lbs of Structural Steel
- 12,300cy of Concrete
- 42,000 LF of Piping
- 300 Life Support Pumps
- 5,500sqft of Acrylic Viewing Window
- 30 Different Footing Elevations
- 121 Different Column Heights
- 700+ Different Beam Configurations

# Why Design-Assist?

- Value and Constructability Efficiency
- Reduction in Design Errors
- Faster Project Delivery
- Better Control of Cost

# Key Contributors

| Design Team | Construction Team | Trade Team | Operations Team |
| --- | --- | --- | --- |
| • Architect<br>• Engineers<br>• Consultants | • Precon Personnel<br>• Project Manager<br>• Superintendents<br>• BIM Department | • Sub-contractors<br>• Suppliers<br>• Fabricators | • Owners<br>• Facility Managers<br>• Operators |

# BIM Kick-Off Meeting

***Kick-Off Meeting Questionnaire***

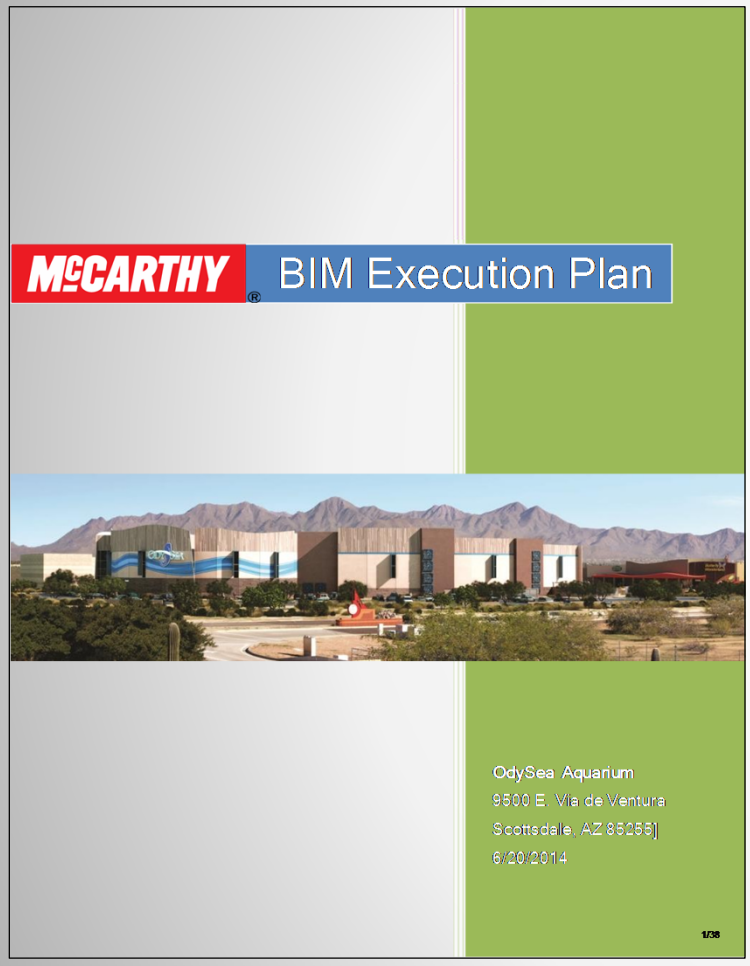
| | |
|---|---|
| **Project Name** | --- |
| **Project Number** | --- |
| **Conference #** | --- |
| **Subject** | BIM Kick-Off Meeting |
| **Date / Time** | Month Day, Year @ Time |
| **Location** | --- |
| **Attendees** | Owner: ---<br>Architect: ---<br>General Contractor: ---<br>Mechanical Engineer: --- |

| Contact Information | |
|---|---|
| Project Managers<br>(add others as required):<br>a. Architect<br>email:<br>telephone:<br>b. Structural<br>email:<br>telephone:<br>c. Mechanical<br>email:<br>telephone:<br>d. Electrical<br>email:<br>telephone:<br>e. Contractor<br>email:<br>telephone: | a.<br><br>b.<br><br>c.<br><br>d.<br><br>e. |
| BIM Leads or Managers<br>(add others as required):<br>a. Architect<br>email:<br>telephone:<br>b. Structural<br>email:<br>telephone:<br>c. Mechanical<br>email:<br>telephone:<br>d. Electrical<br>email:<br>telephone:<br>e. Contractor<br>email:<br>telephone: | a.<br><br>b.<br><br>c.<br><br>d.<br><br>e. |

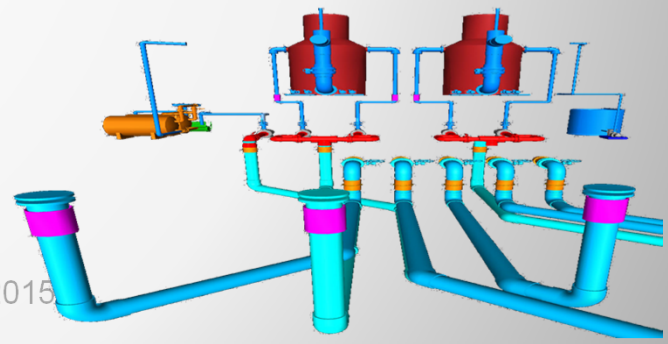
**Discussion Topics**

1. Key Contacts – (fill out contact information on page 1)
2. Team capabilities – (identify each team member's BIM capabilities)
3. Project Program, Milestones and Key Dates – (deliverables and scope)
4. Key Project Requirements – (key project requirements)
5. BIM Goals and Objectives – (how and why BIM will be used on the project)
6. BIM Uses – (identify potential uses during Precon and Construction)
7. BIM Execution
    a. Modelling Scope – (each discipline identifies what elements to be modeled)
    b. Model Schedule – (what model elements are required, and when)
    c. LOD Definitions – (what level of development is required)
8. Collaborative Workflow – (flow of information between all trades)
    a. *Model Exchange:* (how models are shared/uploaded)
    b. *Coordination:* Clash Detection and Resolution)
    c. *Communication:* Meeting Schedules, Screen sharing, RFI's
9. Software and other IT – (required technology infrastructure)
10. Model Structure – (map out what 'The Model' looks like)
11. Structured Information
    a. *Coordinates and Control Models*
    b. *Naming Conventions*
    c. *Materials*
12. Quality Assurance – (how to maintain a high standard of models and data consistency)

# BIM Execution Plan (BxP)




- Project Participants
- Milestone Schedule
- Model Creation
- Model Origin
- Meeting Procedures
- Technology Requirements
- Training and Support
- Model Standards
- Close-Out Deliverables
- Scope of Work



# Workgroup Meetings

McCARTHY

***Workgroup Meeting Notes***

| | |
|---|---|
| **Project Name** | — |
| **Project Number** | — |
| **Conference #** | — |
| **Subject** | Design-Assist Workgroup Meeting |
| **Date / Time** | Month Day, Year @ Time |
| **Location** | — |
| **Attendees** | Owner: —<br>Architect: —<br>General Contractor: —<br>Mechanical Engineer: — |

**Current Status Update**

- –
- –
- –

**Outstanding Information Requirements**

- –
- –
- –

**General Information**

- –
- –
- –

**New Trend Items**

- –
- –
- –

**Old Action Items**

- –
- –
- –

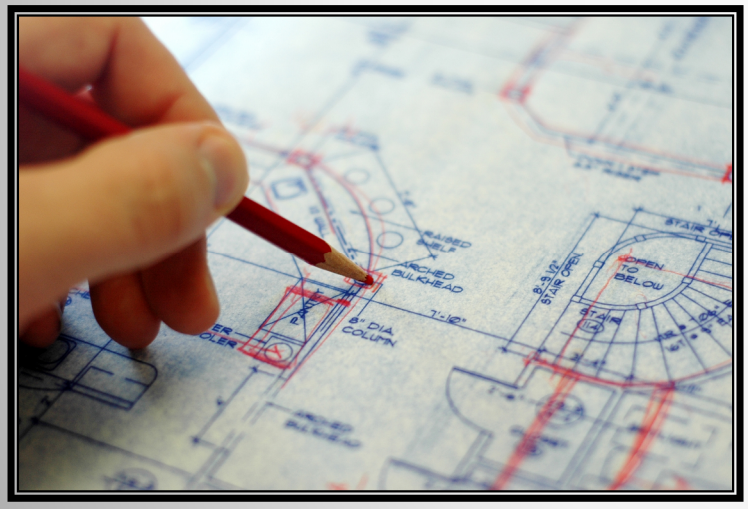
**New Action Items**

- –
- –
- –

**The minutes above reflect decisions and agreements made collectively at this meeting. All attendees are to review these minutes carefully and are to be prepared to answer any questions at the next meeting. All corrections and/or additions to these minutes must be sent in writing within 72 hours of receipt or the minutes will stand as recorded.**

*Next meeting is tentatively scheduled for Month Day, Year*

# Constructability Review



**SCOPE & CONSTRUCTABILITY REVIEW COMMENTS**
**Odysea Aquarium**

**Shell Package - August 27, 2014**

| Item | Dwg # / Spec # | Description | Cost Impact Y / N | Comments | Comment By | Date of Comment | Revision Due Date or "N/A" | Actual Date of Revision | Incorporated Y / N | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **1.0 - General** | | | | | | | | | | |
| | General | Architectural, Structural and Plumbing need to show pump pit and plumbing detail within carousel | | | DM | 10/13/14 | | 12/8/14 | No | *spacenhave been provided and called out for sump pit, but no details have been provided |
| G 1 | G-030-034 | Item 1 in Legend needs sheet number for detail called out. | | | CD | 9/29/14 | | 12/8/14 | No | |
| G 2 | G-030-034 | Item 4 in Legend - Detail 12 called out on Sheet G-040 missing | | | CD | 9/29/14 | | 12/8/14 | Y | |
| G 3 | G-030-034 | Item 5 in Legend - UL Design No. D902, is not detail 2/G-040 as listed | | | CD | 9/29/14 | | 12/8/14 | Y | |
| G 4 | G-040 | Missing Detail 12 per legend on G-030-034 | | | CD | 9/29/14 | | 12/8/14 | Y | |
| G 4 | G-040 | Add UL detail for sleeve for future build out package | | | | | | 12/8/14 | No | |
| **2.0 - Architectural** | | | | | | | | | | |
| A 1 | A-100.1, A-101.1, A-103 | Missing tank and biofilter labels | | | CD | 10/1/14 | | 12/8/14 | No | |
| A 2 | A-101 & A-101.1 | Drawings show the same information but labeled different | | | CD | 9/29/14 | | 12/8/14 | No | Multiple section call outs empty, missing dimensions and coordinates similar to 1st floor plan |
| A 3 | A-110 | B1 8" x 8"x 16" too small for plumbing pipe chases | | | JM | 10/13/14 | | 12/8/14 | No | |
| A 4 | A-110 | Detaill callout for escalator 1 should be 2/A-424, not 1/A-425 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 5 | A-110,A-120, A-412 | Detail callout for escalator 3 should be 4/A-424, not 3/A-425 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 6 | A-111 | Detail callout for tank 40 escalator is on page A-424, not A-425 | | | CD | 10/1/14 | | 12/8/14 | Y | *Note:escalator 2 has been shortened |
| A 7 | A-112, A-122 | Biofilter callout 6/A-447 should be 7/A-447 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 8 | A-112, A-122 | Biofilter callout 5/A-447 should be 6/A-447 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 9 | A-112, A-122 | Biofilter callout 4/A-447 should be 5/A-447 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 10 | A-121 | Tank 40 escalator callout 2/A-426 missing detail | | | CD | 10/1/14 | | 12/8/14 | No | Call out empty |
| A 11 | A-121 | Elevator 4 callout incorrect, should be 2/A-431 | | | CD | 10/1/14 | | 12/8/14 | No | |
| A 12 | A-131 | Missing tank 40 escalator detail 5/A-425 | | | CD | 10/1/14 | | 12/8/14 | Y | |
| A 13 | A-170 | Detail 2/A-521 on gridline 7H does not match connection | | | CD | 10/1/14 | | 12/8/14 | No | Missing gridlines |
| A 14 | A-171, A-314, A-315, A-316, A-425 | Missing Details and Page 531 | | | CD | 10/1/14 | | 12/8/14 | Y | |

**Issue Types:**
A - Clarify
B - Conflict with other documents
C - Constructability
S - Scope Change
VA - Value Analysis

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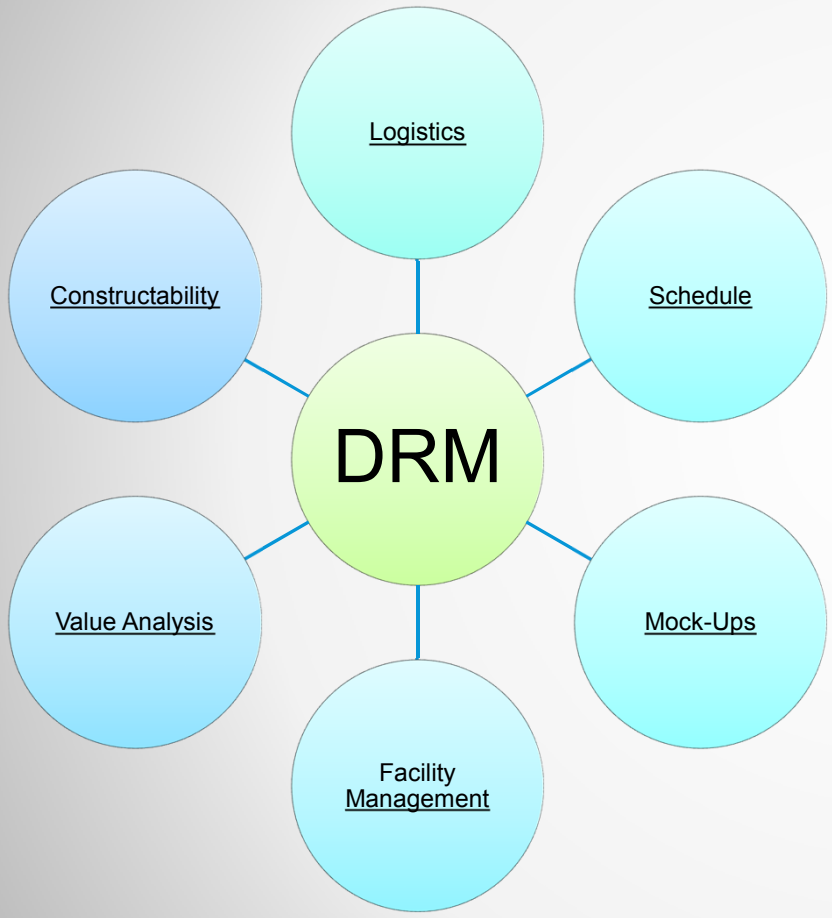
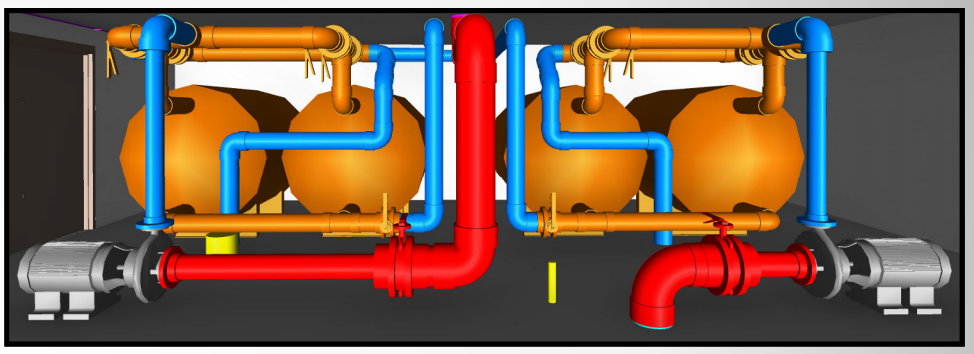
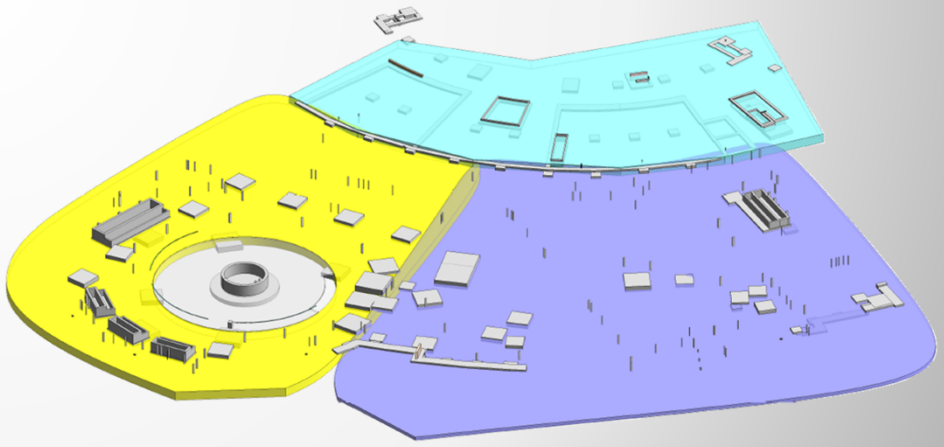
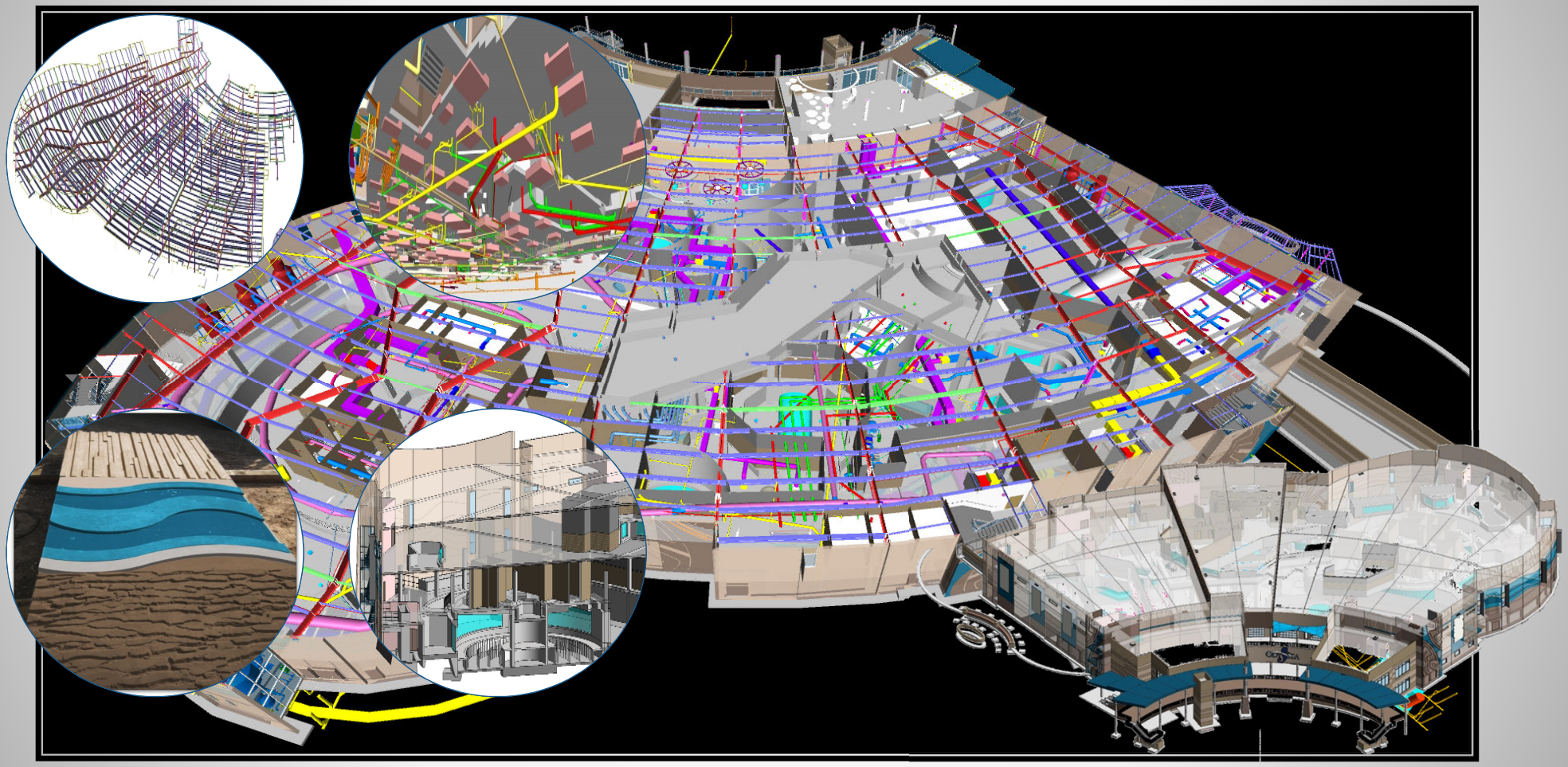
# Design Review Model (DRM)



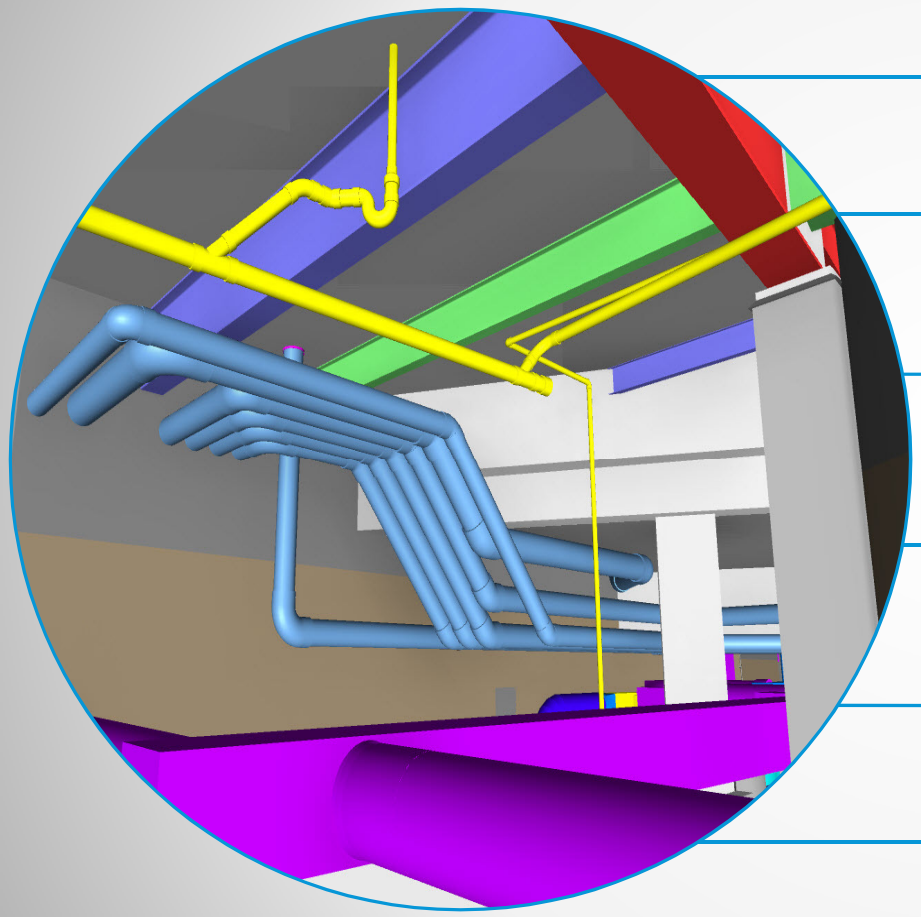





# Design Review Model : Creation

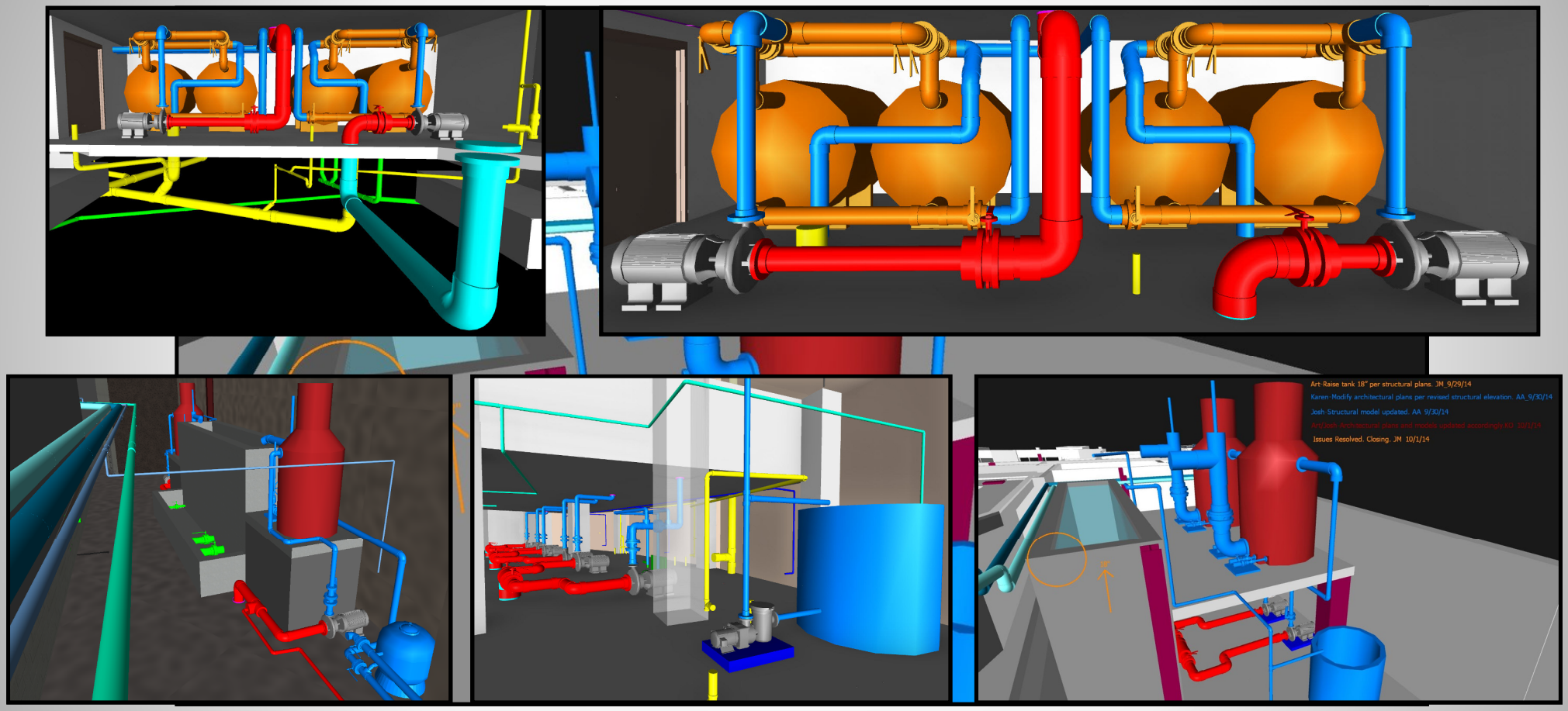


# Autodesk Software



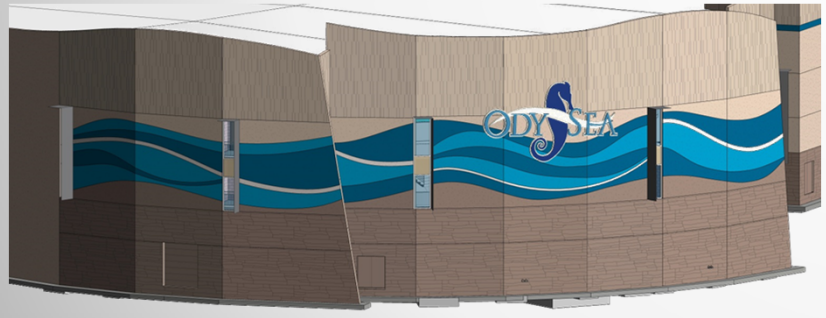
- Navisworks
- Revit
- AutoCAD MEP
- BIM 360 Glue & Field
- Autodesk Point Layout
- Revit Collaborate

# DRM / CM Model Collaboration



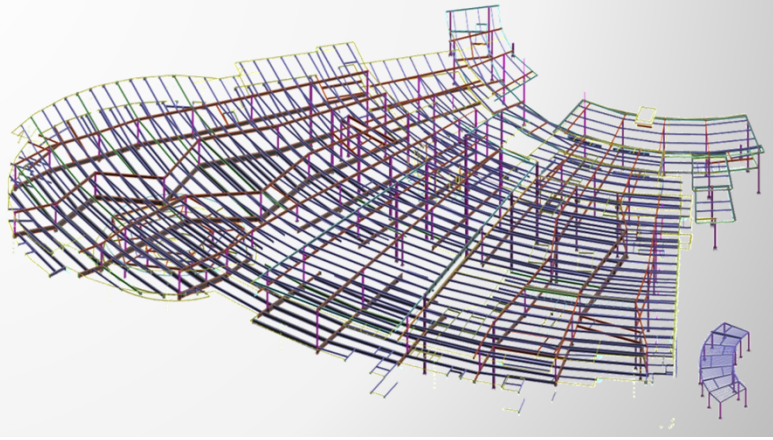
## Design Review Model

- Continuously Evolving
- Constructability
- Value Analysis
- Facility Management

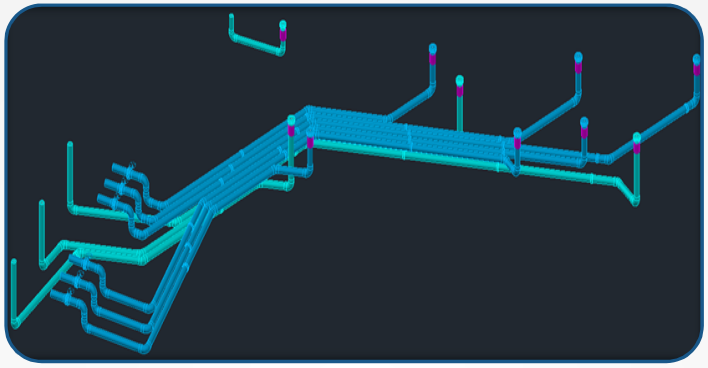


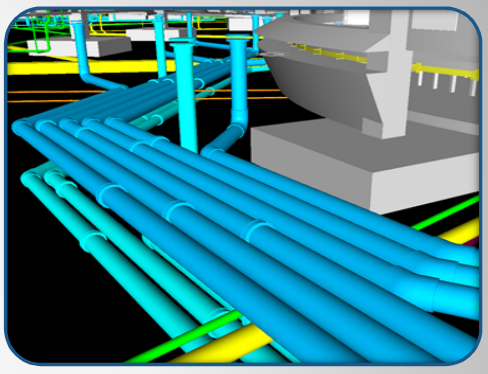

## Construction Model

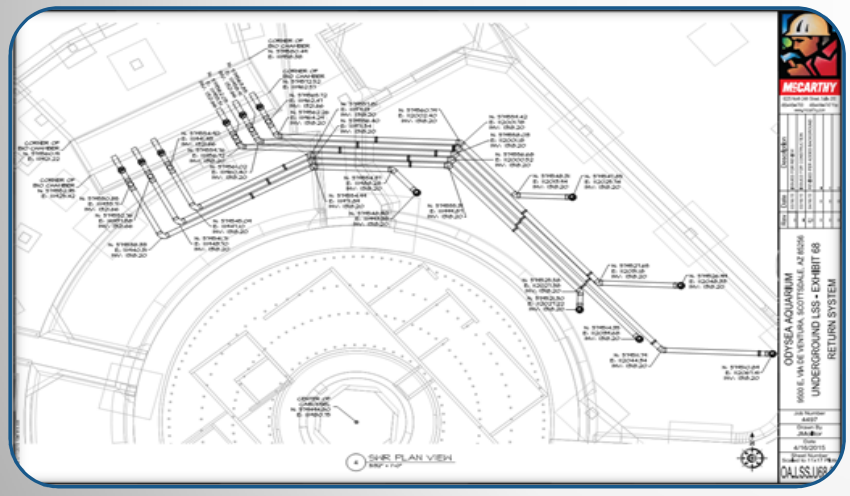
- Record Model
- Fabrication Drawings
- Field Constructability Drawings
- As-Built Documentation



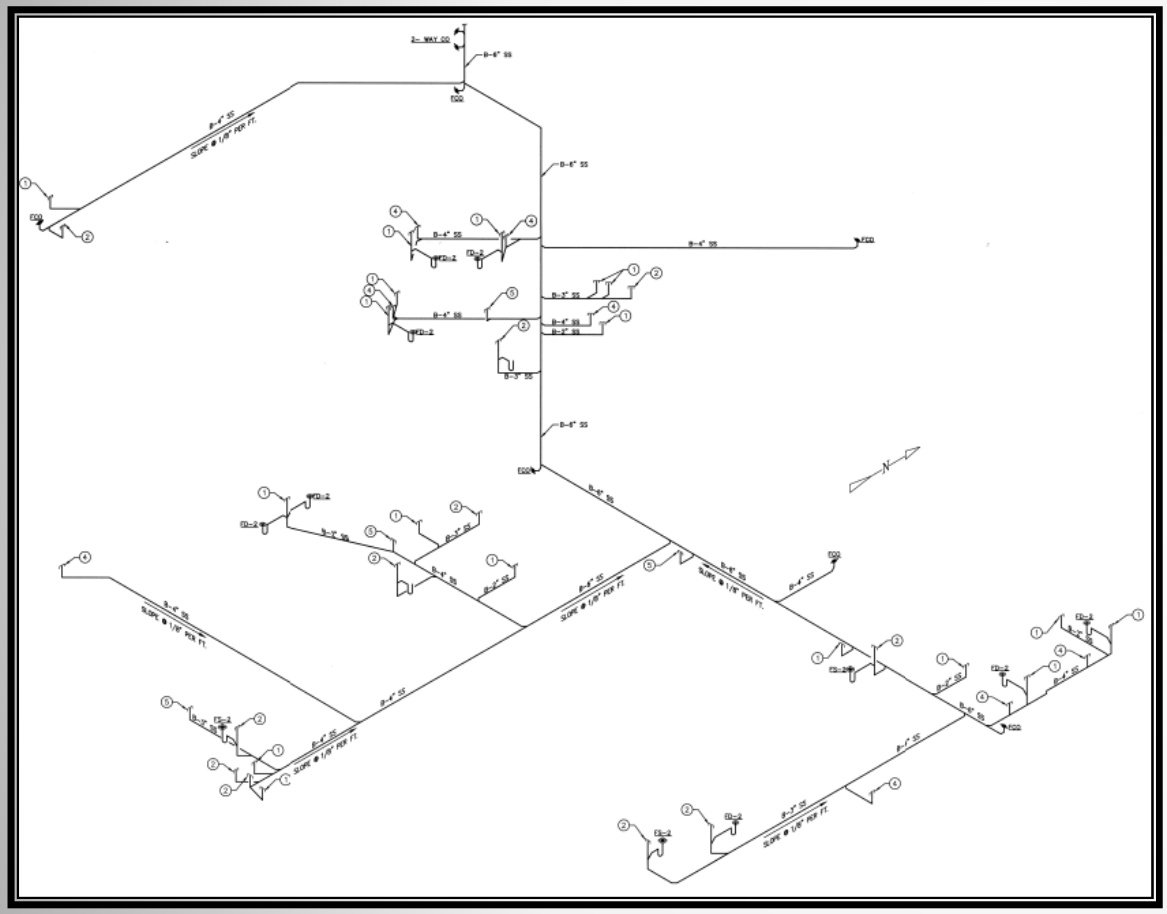
# BIM Collaboration to Install

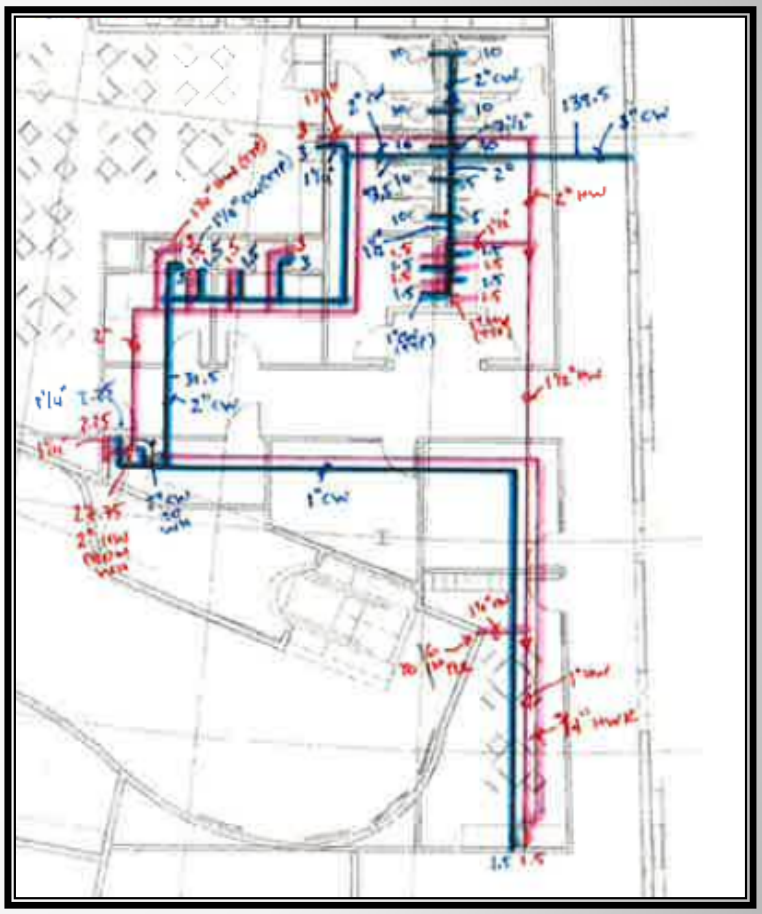




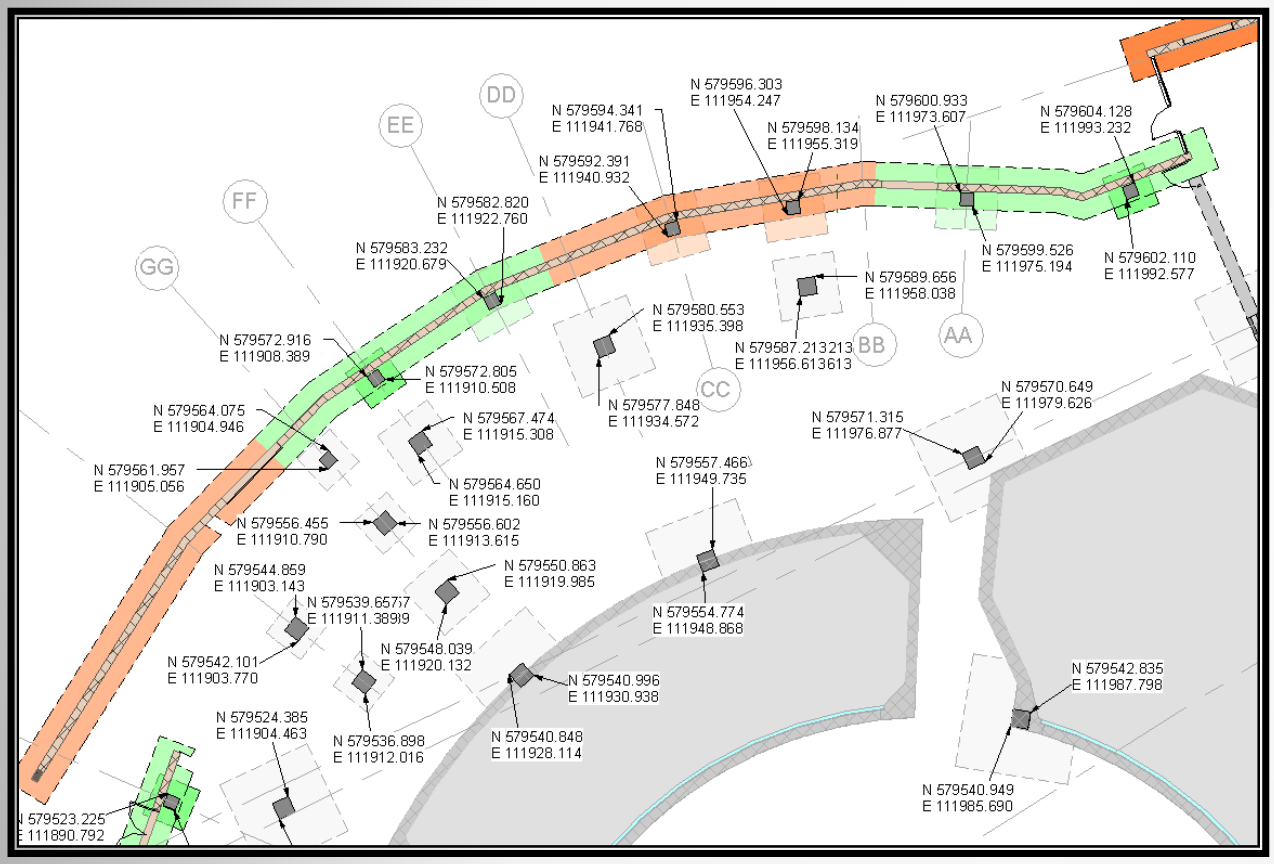


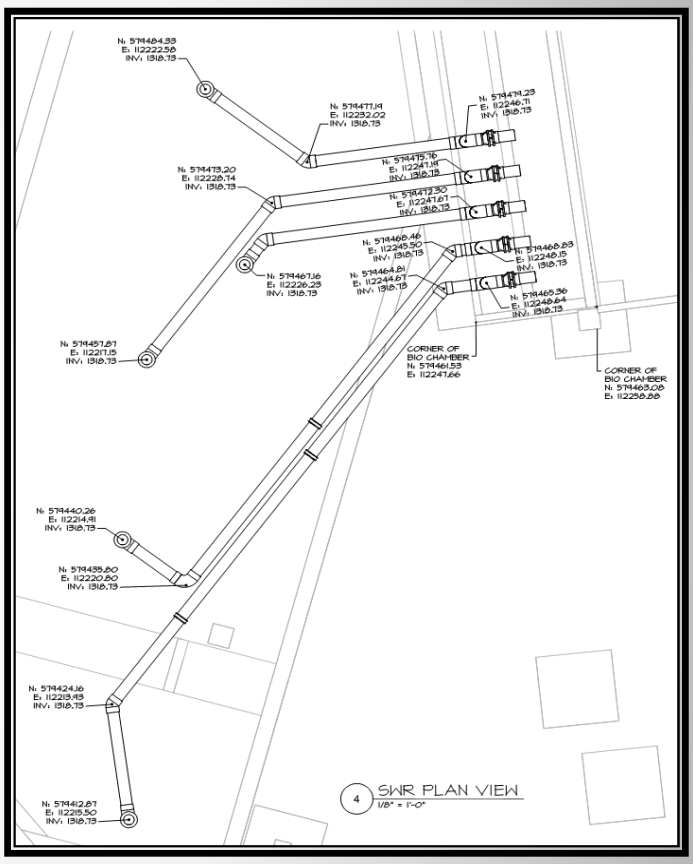

# BIM Collaboration to Install





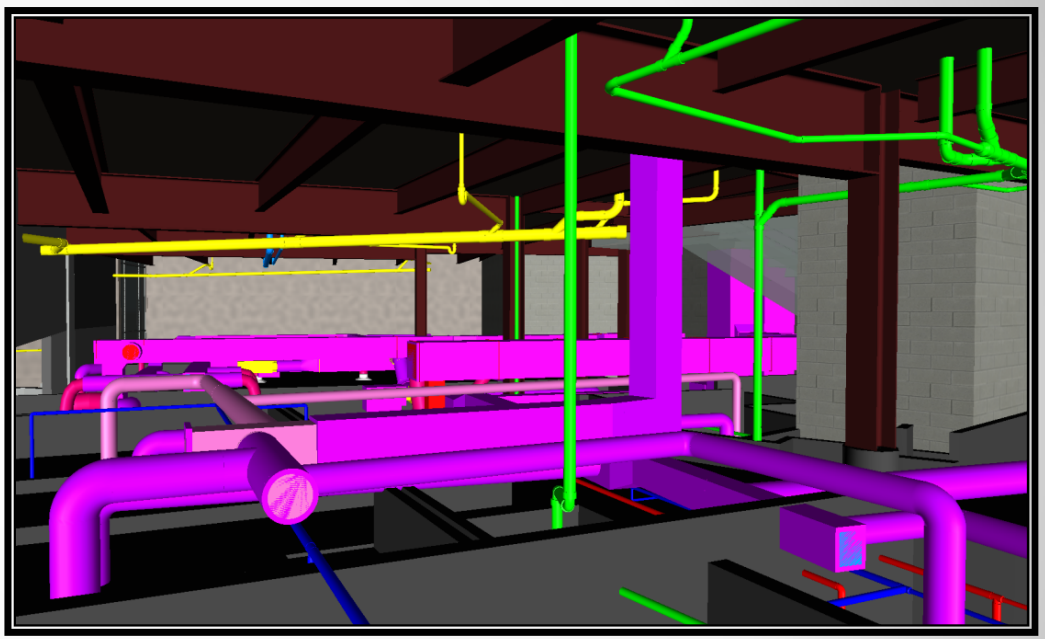
# BIM Collaboration to Layout



# Process Takeaways / Lessons Learned

- Workgroup Meeting Advantage
- Collocate with Designers
- Team Building Activities
- Field Layout Plan



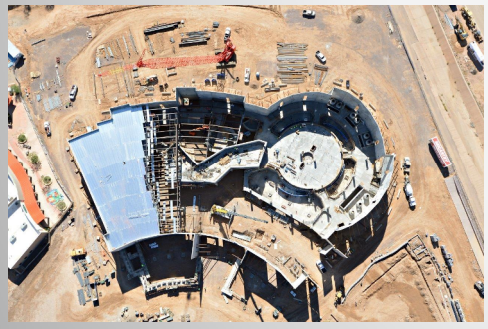
# Recent Project Aerials









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