

# The Challenges of Coordinating an Infrastructure Project in the Netherlands

**Eric van Wijland**

Volker InfraDesign, BIM coördinator

**Roy van Hattem**

Royal HaskoningDHV, Civil Engineer and Technician

# Introduction Eric van Wijland

- Eric van Wijland is a Building Information Modeling **(BIM) specialist** within Volker InfraDesign, the in-house design and engineering company for the infrastructure sector at VolkerWessels and owned by Van Hattum en Blankevoort.
- He started 7 years ago as a 3D draftsman and he coordinated the rollout of **Revit** software. After this successful integration, his next goal was to implement BIM within the organization and all of its projects. Currently, he supports the Design Team with the **implementation of BIM**. In his opinion, BIM stands for **Building Information Management**, so it is his challenge to provide the projects with the latest software and best practices, and to exchange tips and workflows/processes.
- He loves to dive deep into the software possibilities to find the **most effective solutions**. He is working on different projects simultaneously so he can give the design teams all the knowledge there is. He is also a member of Civil Infra Benelux, a team of high-end Revit software users whose goal is to get a Revit software standard for the Dutch infrastructure.
- <https://nl.linkedin.com/in/eric-van-wijland-1a627915>



**Volker InfraDesign**



# Introduction Roy van Hattem

- Roy van Hattem is a **structural designer / BIM consultant** within **Royal HaskoningDHV**. His responsibility as a structural designer is the **design** of fly-overs, bridges, tunnels, **sluices** and sound barriers. Most of the time he works as a lead designer. His opinion as a team leader is, that a well composed team and team spirit makes a difference within the project.
- He is involved with various **knowledge and expert groups** both internally and externally. Having worked within the Business Line Industry & Energy for several years his interest have shifted to infrastructure projects.
- His specialization within this field is the design of structural and economic design.
- He loves to dive deep into the **software possibilities** to find the most effective solutions. He is working on different projects simultaneously so he can give the design teams all the knowledge there is. He is also a member of Civil Infra Benelux, a team of high-end **Revit** software users whose goal is to get a Revit software standard for the Dutch infrastructure.
- <https://nl.linkedin.com/in/roy-van-hattem-5145ab31>





**CHALLENGE ACCEPTED**

# The journey



# Class summary

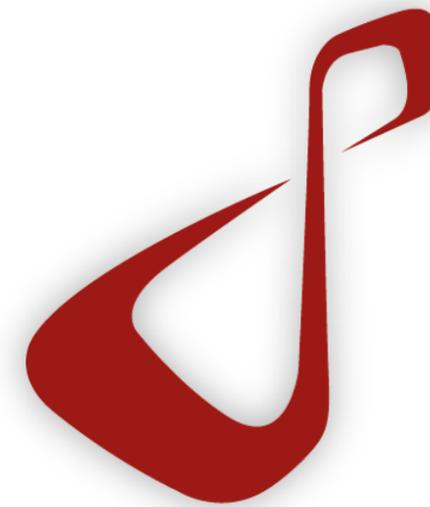
In this class we will show the difficulties and **challenges** of multidiscipline design-and-construct **infrastructure projects** in the **Netherlands** from a contractor's point of view: What is the best way to **set up** your project and design-team **organization**? How do you **manage** all your **data** and exchange, and how you can optimize your design workflow? During the design and construct phase there are **several challenges** you have to deal with, such as (building) architecture, civil design, subcontractors, reinforcement supplier, and so on. The main layout of the class will contain the **complete process**, from conceptual design to detailed design, including the construction phase. For every step, we will zoom in on the used **software**, and give some best **practices** and **optimizations** people can use in their own organizations. Examples will contain 3D rebar exchange with subcontractors, AutoCAD Civil 3D software and Revit software exchange, collaboration in Revit Structure software, Navisworks software model setup, 3D deliverables, and so on. This session features Revit Structure and AutoCAD Civil 3D.

# Key learning objectives

At the end of this class, you will be able to:

- organize a project from conceptual design to detailed design, including the construction phase
- manage your CAD data better with a DMS-like Vault
- combine and exchange designs from multiple disciplines
- optimize your own project

# What do we have in common?



**Civil Infra  
Benelux**  
werkgroep Revit



# Dutch Revit user group for infrastructure design



**Civil Infra  
Benelux**  
werkgroep Revit



Werkgroep

Werkgroep

Werkgroep

Werkgroep

Eventueel aanvulling kerngroepen vanuit werkgroepen

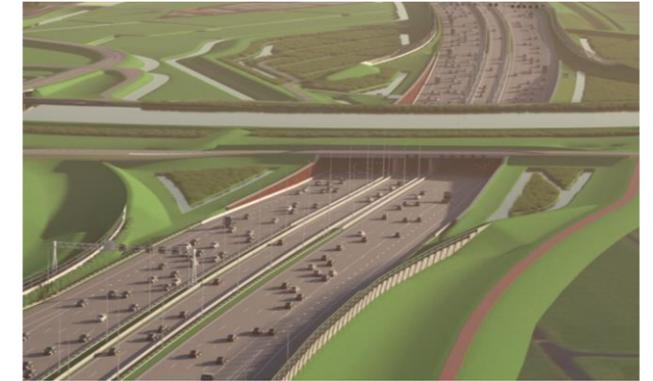


- Jordy Brouwers - Voorzitter
- Richard De Nier - Secretaris
- Remco Bastiaans - Penningmeester
- Cristian Otter
- Jeroen Tishauser - Civil 3D werkgroep
- Renzo van Rijswijk - Revit werkgroep
- Bart De Maesschalck
- Peter Ingels - Infraworks werkgroep
- Dick de Jongh

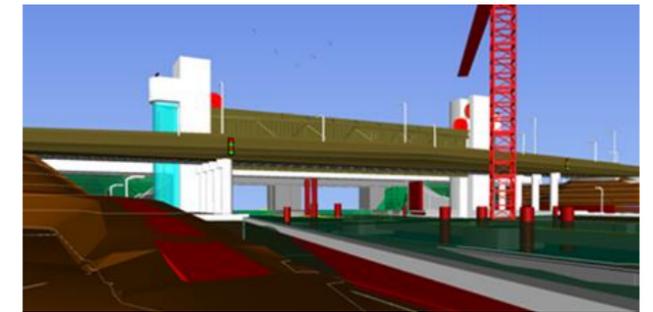
# Challenging projects in the Netherlands



1. *SAAOne* largest Aquaduct of Europe



2. *Embankment Limmel*



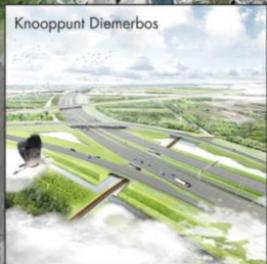
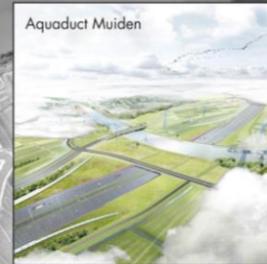
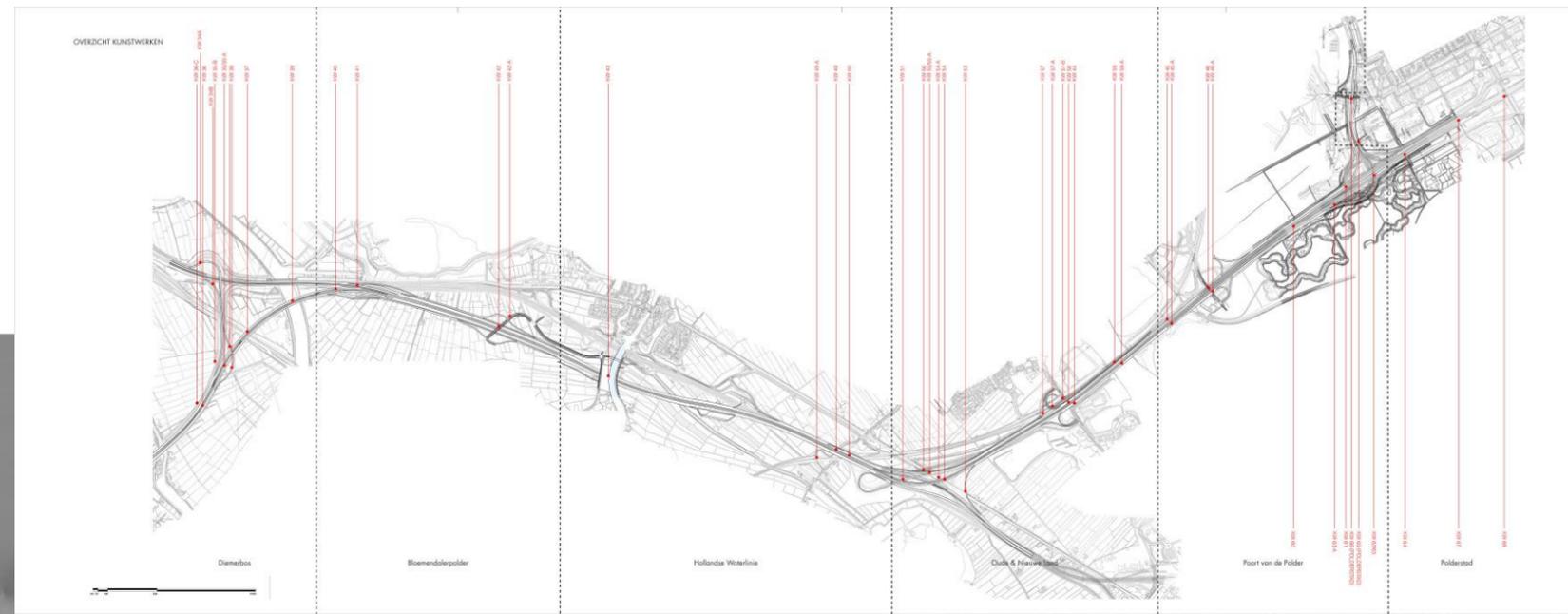
3. *Sea lock IJmuiden (main)* largest sea lock of the world



# SAAOne



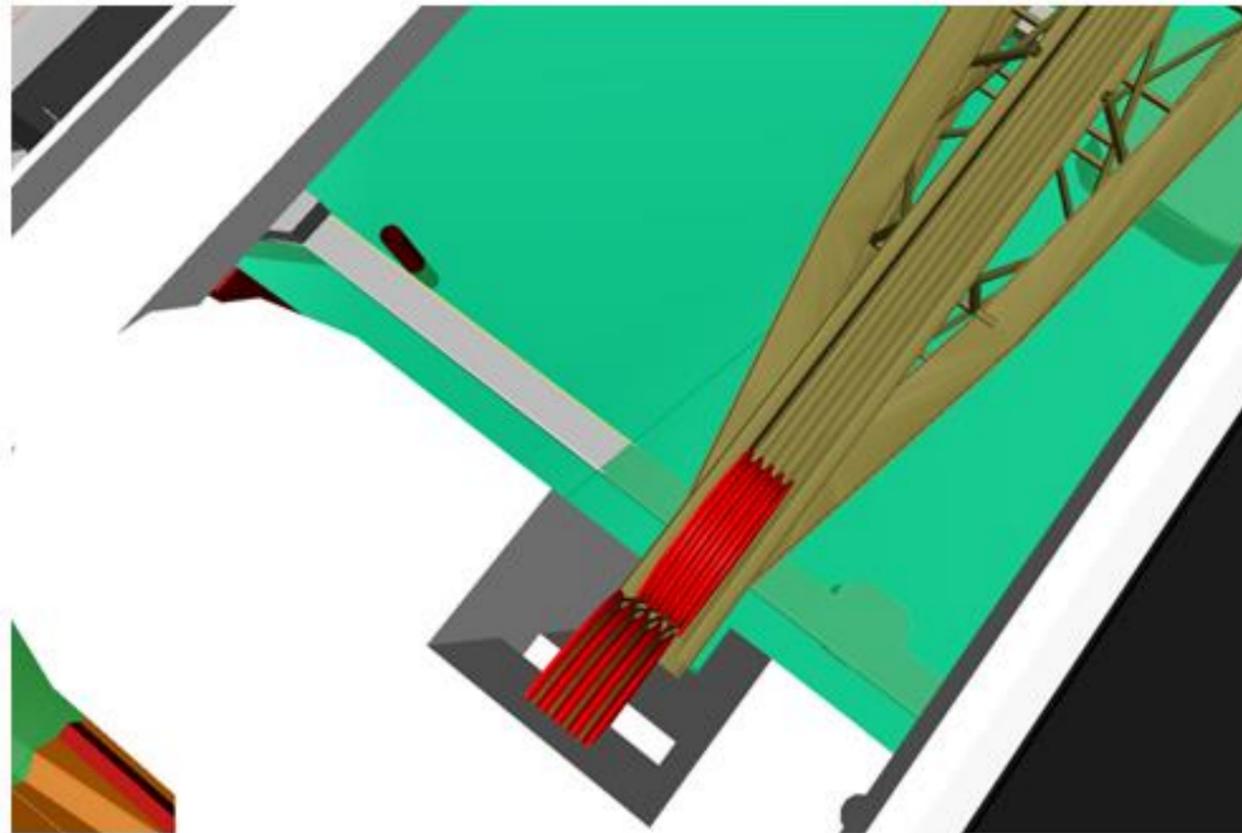
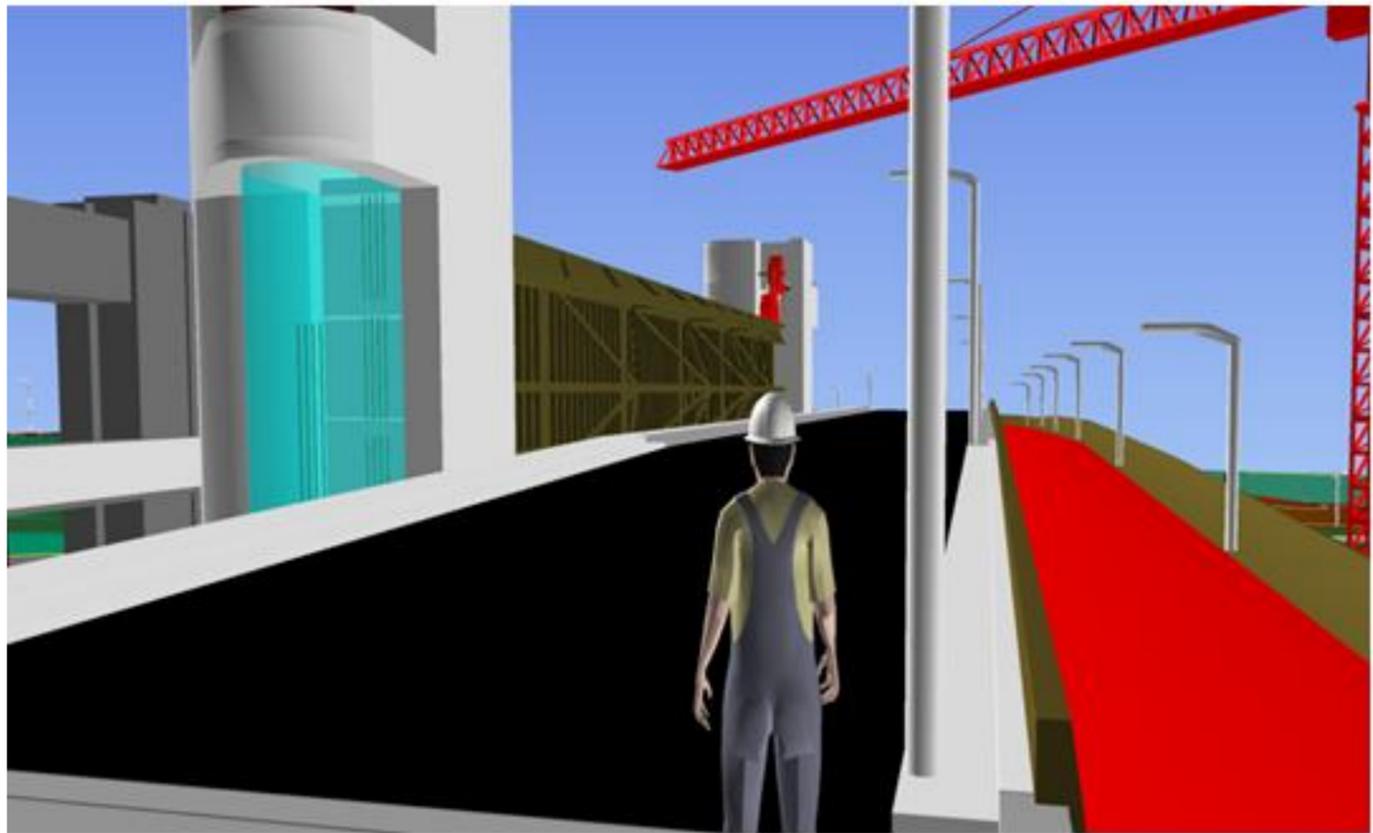
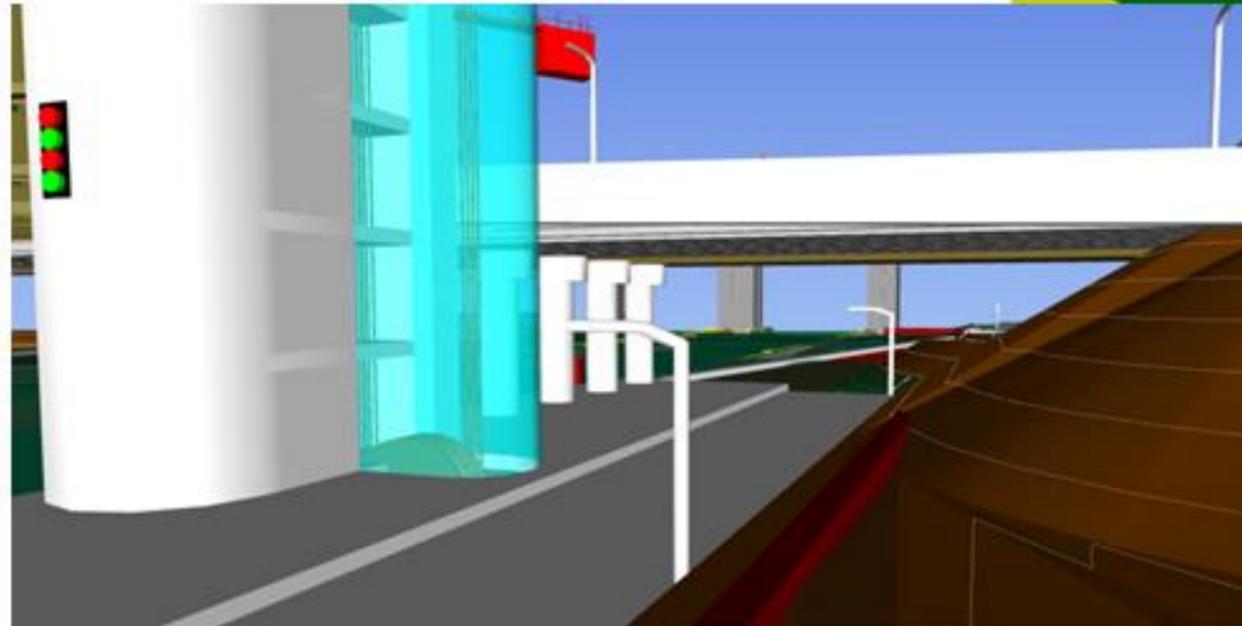
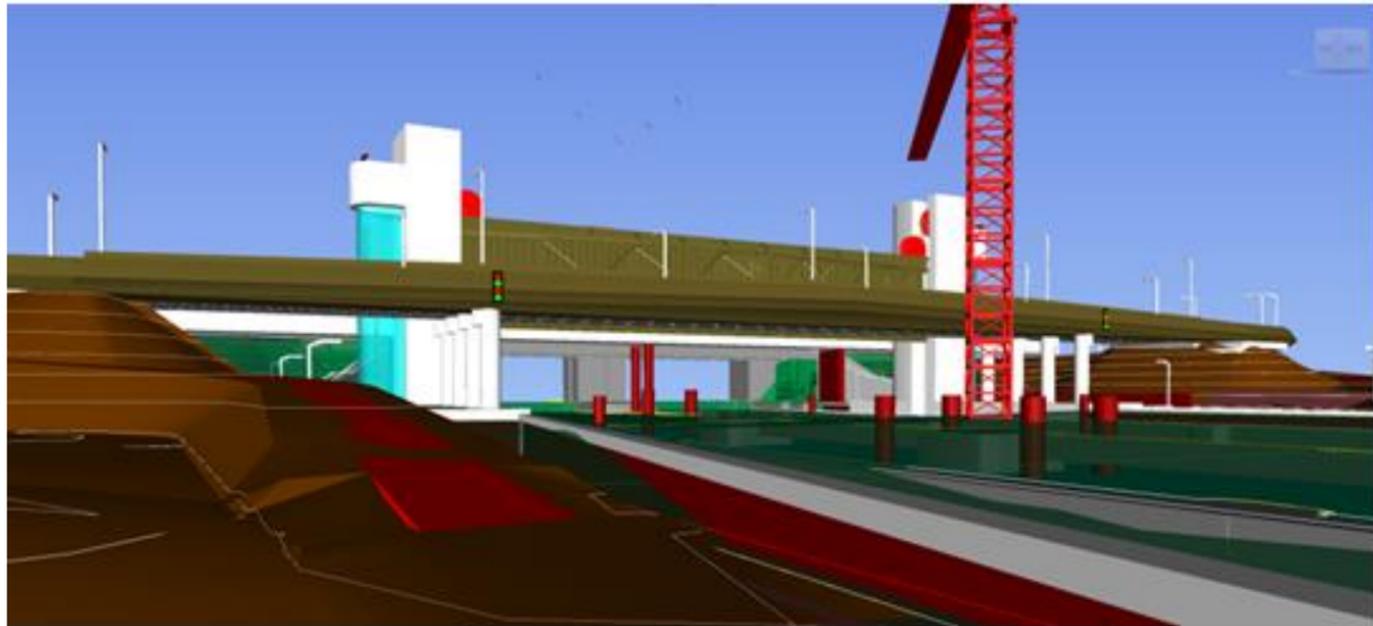
# SAAOne



# SAAone (detailed design)

- Design team > 150 people
- Membership design CAD team
  - 2 Model Managers (BIM-Coordinator)
  - 5> teams = 24 3D Designers for structures
- Software
  - Autodesk Navisworks model      Model management
  - Autodesk Revit model      Concrete design / Sound barriers / Technical road systems
  - Autodesk Civil3D model      Road and Ground design
  - Autodesk Inventor model      Railings, Steel design, Formworks
  - Autodesk AutoCAD      Remaining items
  - Autodesk 3DSMax      Road and Ground visualisation
  - Bentley MX      Road design
  - Tekla      Precast Girders
  - Allplan      Reinforcement
- Goal / Value added
  - One integrated design
  - Clash Detection
  - Model coded in accordance with SE-system (PBS-encoding)
  - Model used in interface and integrated design session

# Embankment Limmel



# Embankment Limmel (conceptual design)

- Membership design CAD team
  - 1 Model Manager (BIM-Coordinator)
  - 1 Designer Concrete Constructions lock
  - 1 Designer Steel Constructions lock gate and movement work
  - 1 Designer Roads and Ground
- Source Models
  - Autodesk Navisworks model      Model Management
  - Autodesk Revit model      Concrete design / Terrain facilities
  - Autodesk Civil3D model      Road and Ground design
  - Autodesk Inventor      Lock gate and movement work
- Goal / Value added
  - One integrated design
  - Clash Detection
  - Model used in interface and integrated design session

# Sea lock IJmuiden



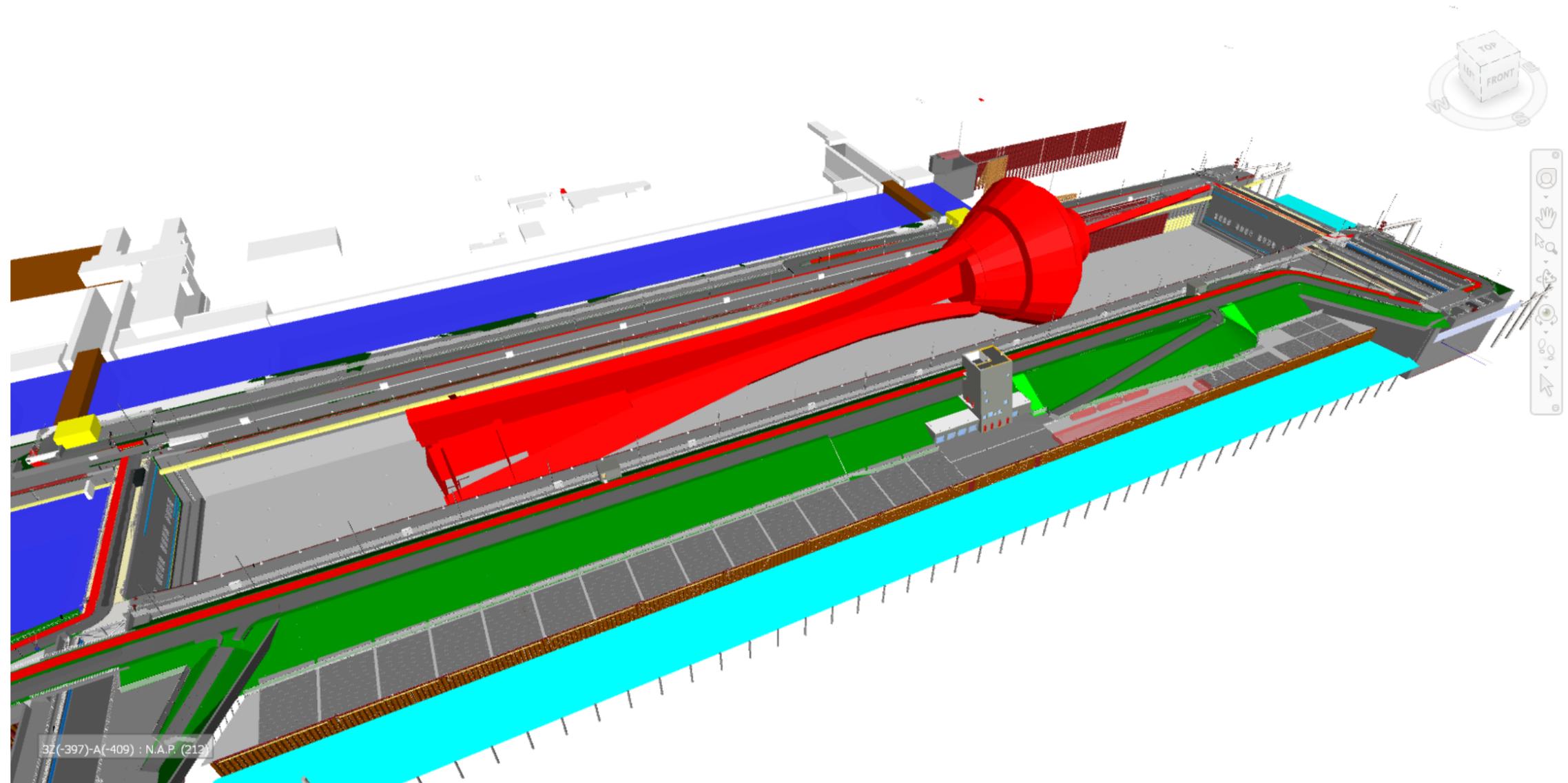
# Sea lock IJmuiden (detailed design)

- Membership design CAD team
    - 1 Model Manager + 1 Model Manager assistant (BIM-Coordinator)
    - 5 Designers Concrete Constructions lock
    - 1 Designer building pits
    - 3 Designer Steel Constructions lock gate and movement work
    - 2 Designers Roads and Ground
    - 3 Designers cable and ducts
    - 3 Designers temporary structures
    - 10 Designers reinforcement
    - 1 Designer phasing
    - 3 Designers Guidance and Fender Structures
    - 4 Designers Control and Workshop Buildings
  - Goal / Value added
    - One integrated design
    - Clash Detection
    - Model coded in accordance with SE-system(PBS-encoding)
    - Model used in interface and integrated design session
  - Source Models
    - Autodesk Navisworks model
    - Autodesk Revit model
    - Autodesk Civil3D model
    - VOSS (vanOord) model
    - Autodesk Inventor model
    - Autodesk AutoCad
    - Solidworks
    - Allplan
- Model Management  
Concrete design and Phasing  
Road and Ground design  
Soil Design  
Lock gate and movement work  
Multiple applications  
Foundation  
Reinforcement

# Sea lock IJmuiden



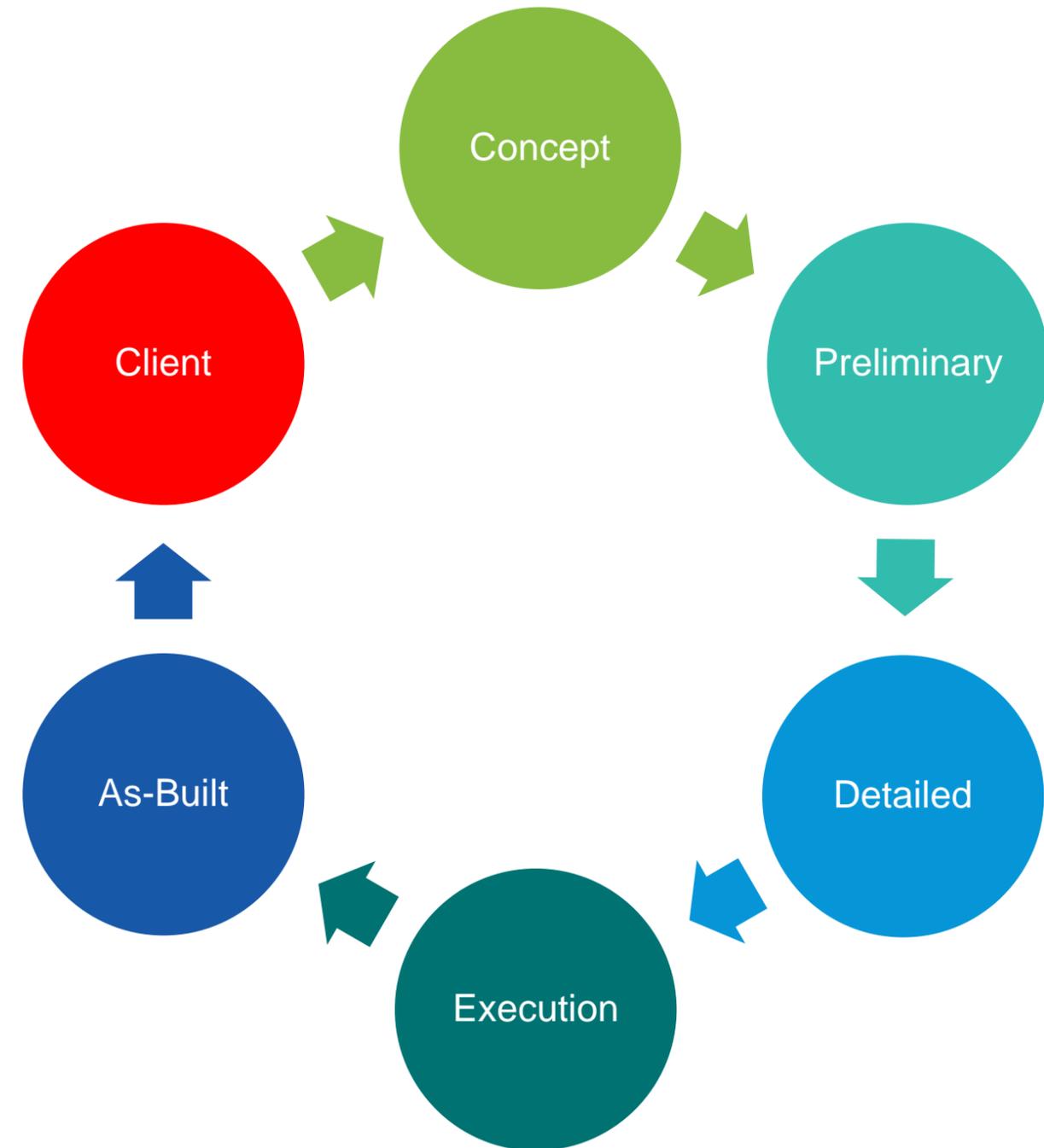
# Stratosphere Las Vegas vs Sea Lock IJmuiden



# Index

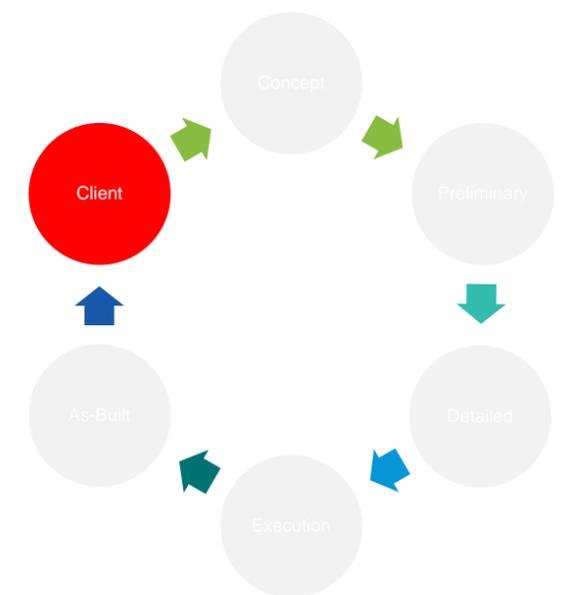


- Client (RWS)
- Conceptual design
- Preliminary design
- Detailed design
- Execution design (construction Design)
- As-built
- Maintenance



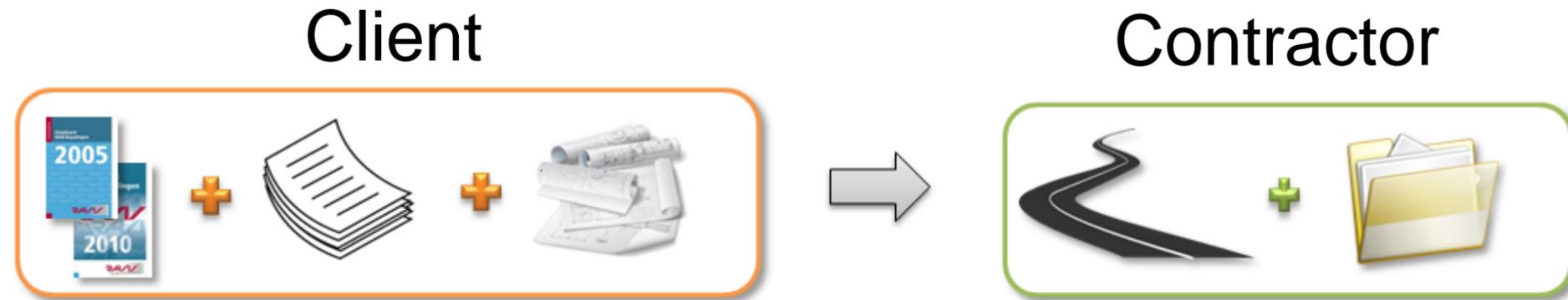
# The requirements by the client

- DBFM(O) contract (**D**esign, **B**uild, **F**inance, **M**aintain & **O**perate)
- The client **delivers the contract digitally** to the contractor through the **System Engineering Software Platform** (Relatics)
- Object **structure is decomposed** in a System Breakdown Structure (SBS) by the client
- The contractor uses the **SBS as a basis to break it down** to an object structure which is more operational for the contractor (**PBS**)
- SBS used as **backbone** in the project information



# The requirements by the client

The past



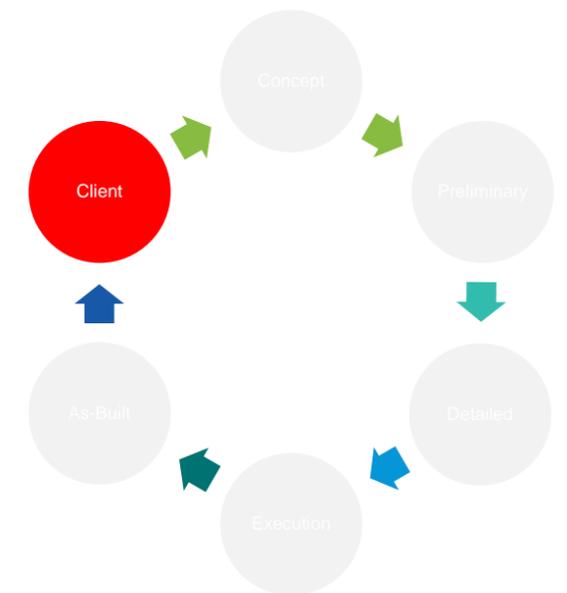
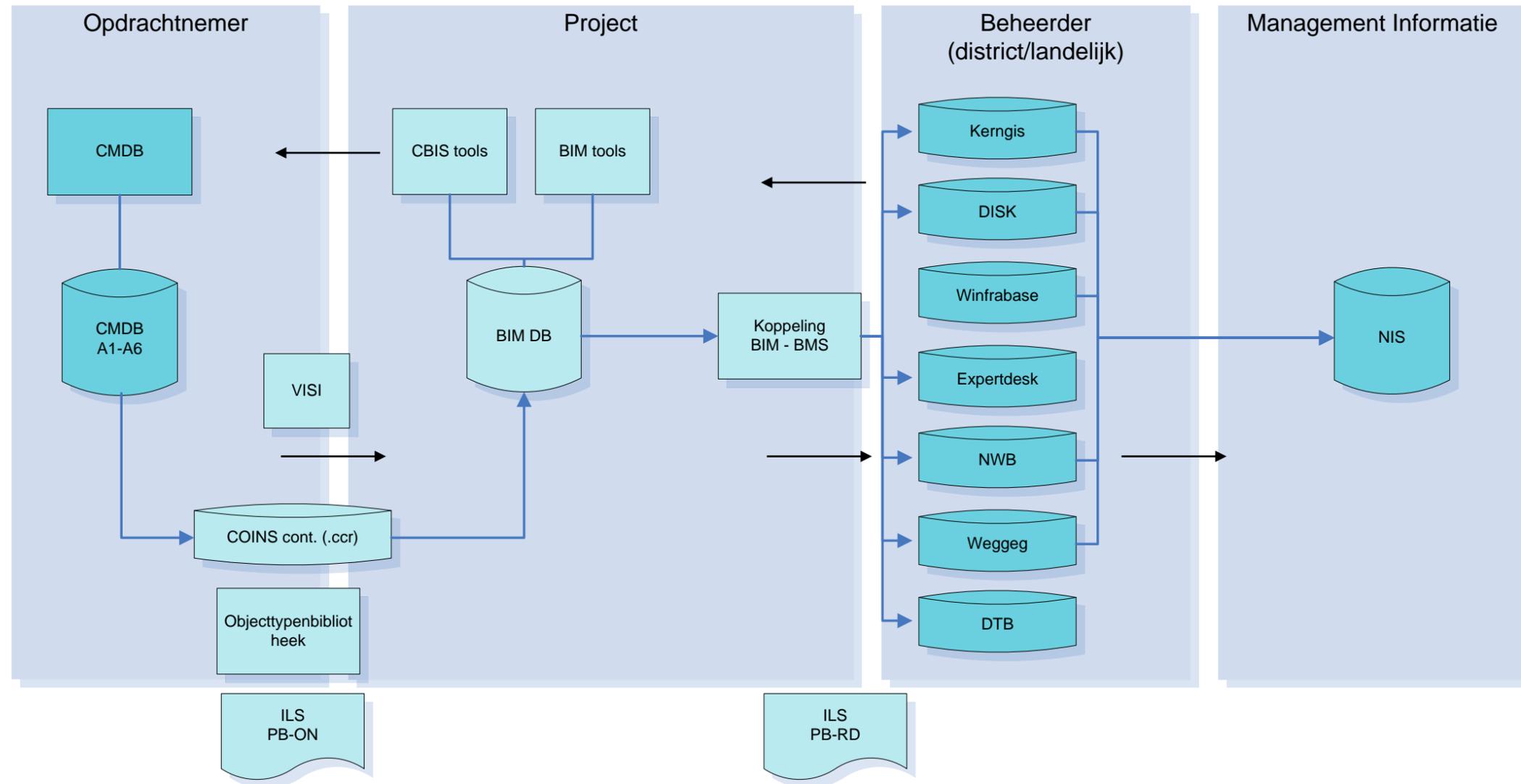
The present



The future

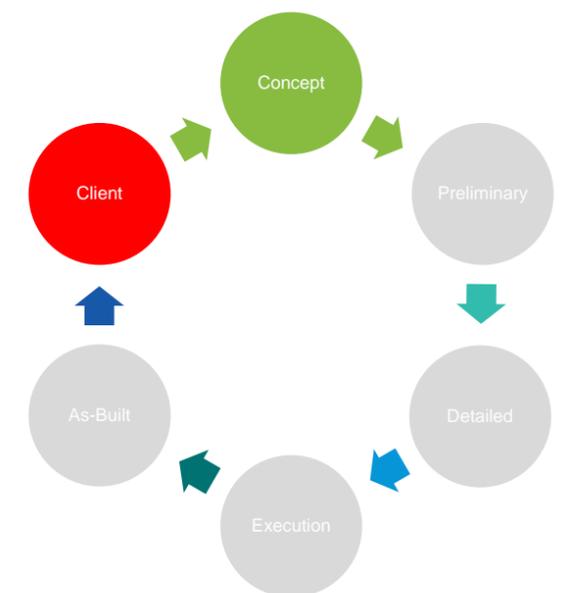


# The requirements by the client

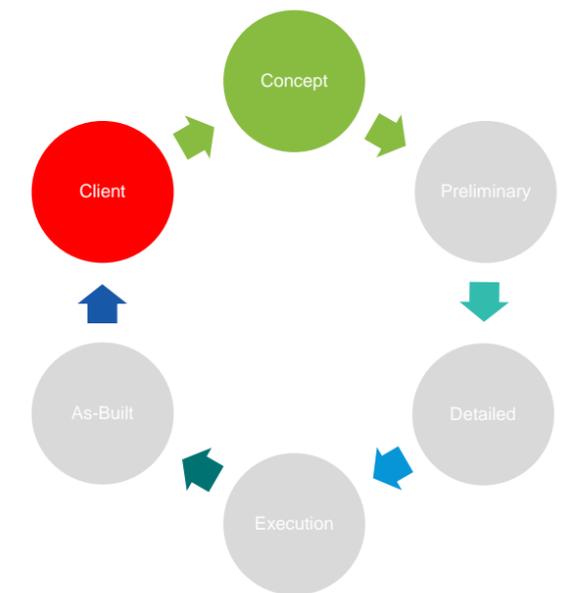


# Conceptual design Phase

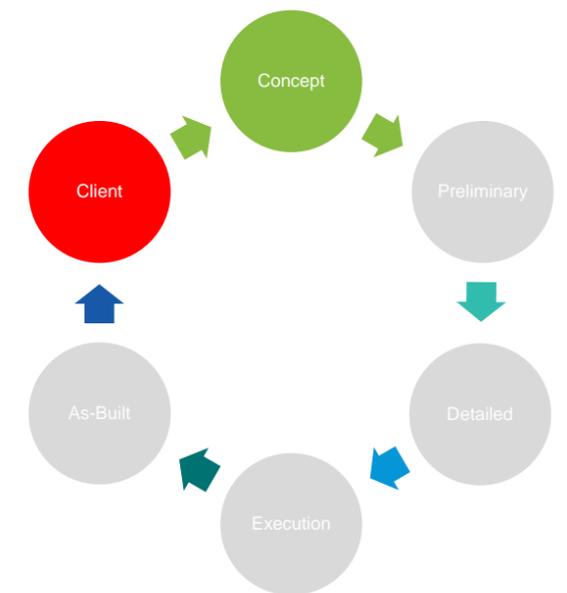
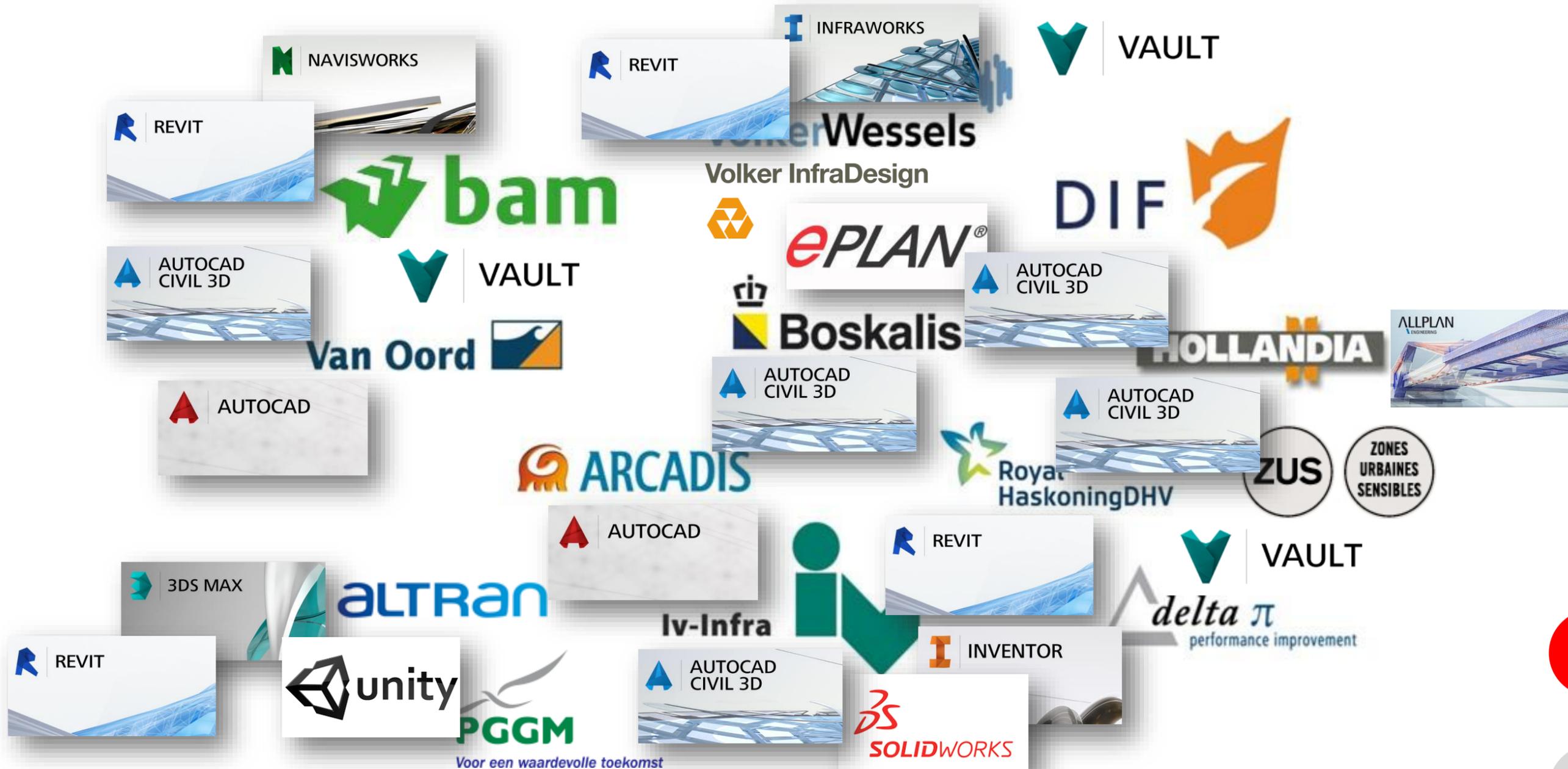
- The Alliance
- The organisation of the Alliance
- The requirements by the client (DBFM)
- How do we realize the design?
- How do we calculate the price?
- End of tender



# The Alliance



# Design Software



# Organisation OPENIJ

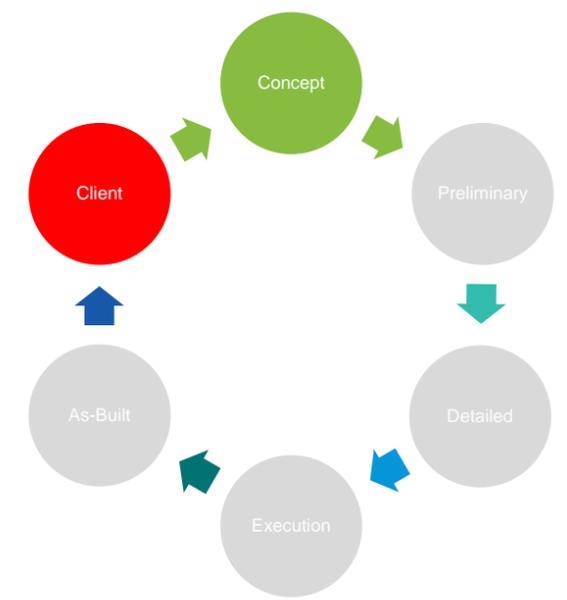
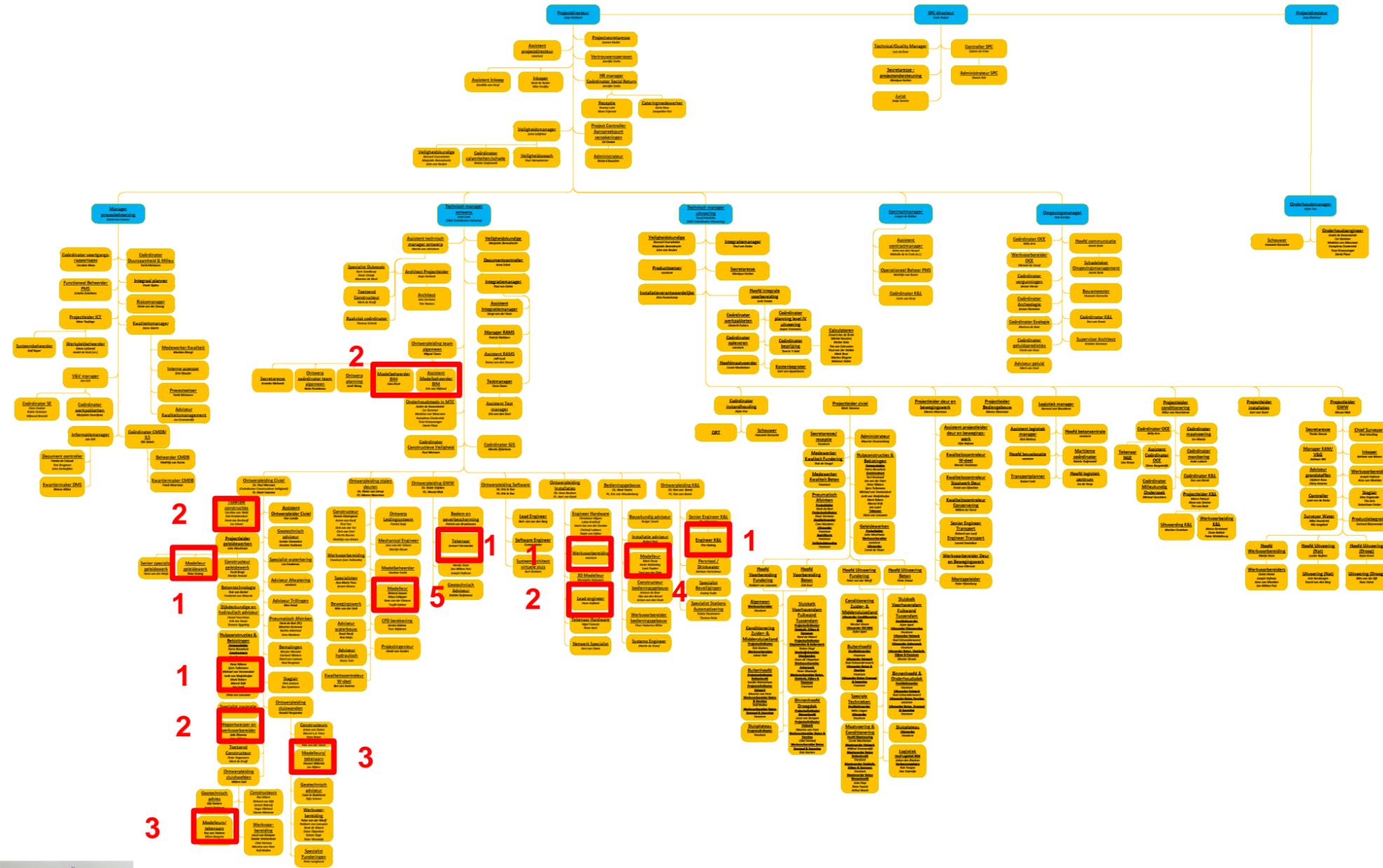


Member of  
CAD team

Organisatieschema  
EPC contractfase

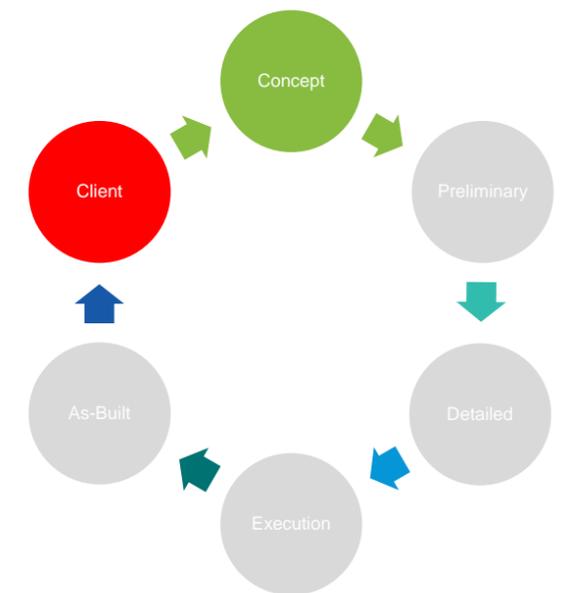
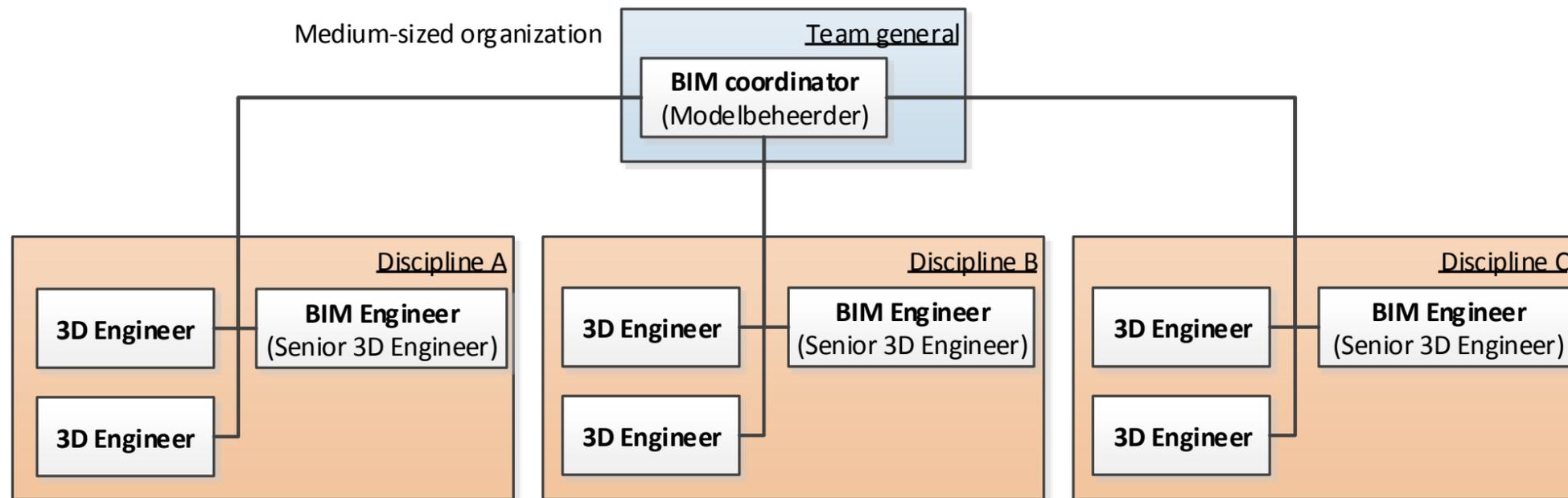
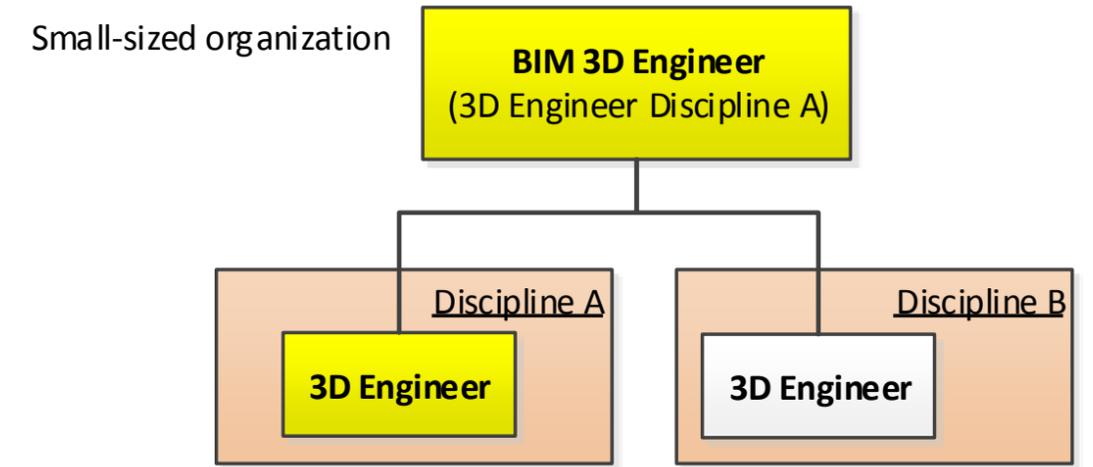
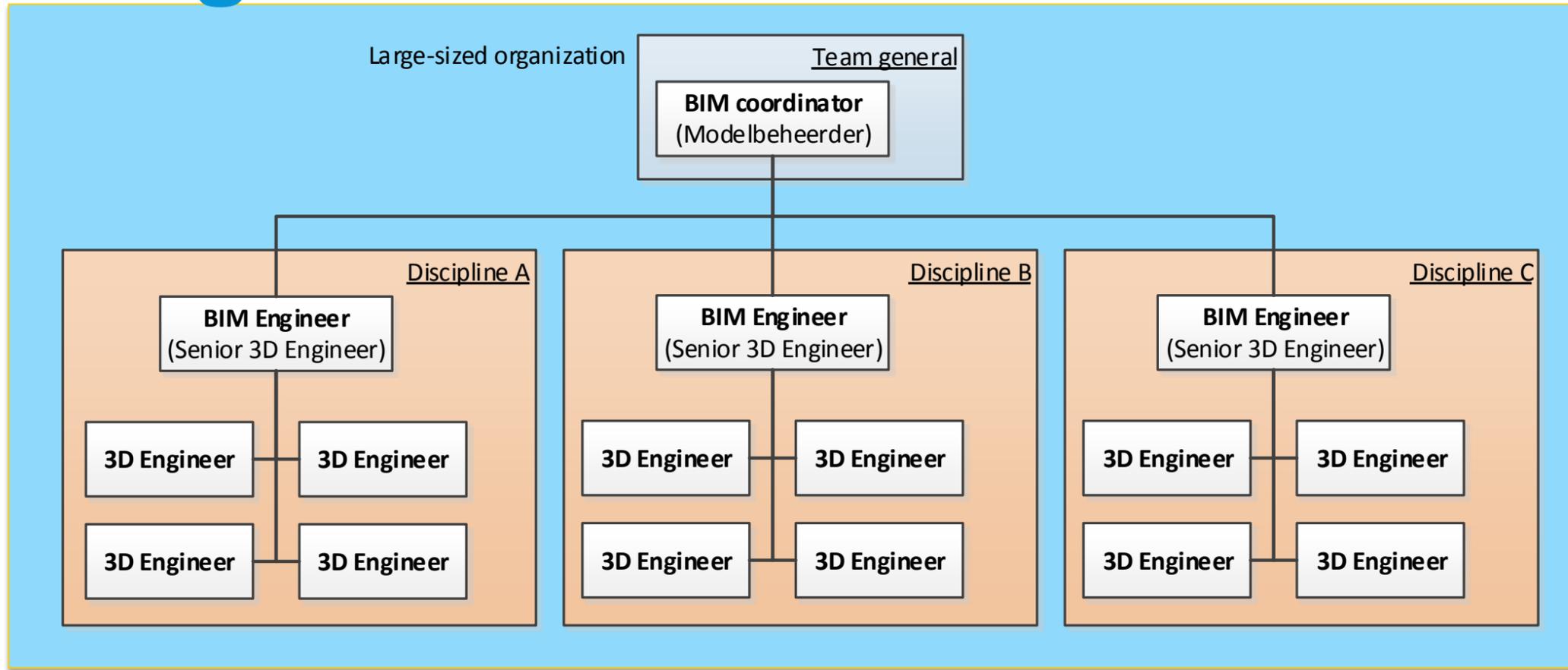
Organisatieschema  
SPC contractfase

Organisatieschema  
MTC contractfase

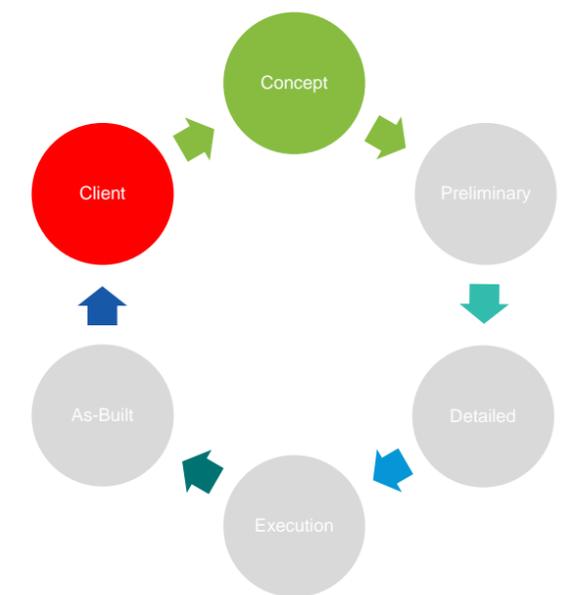


Open  
MTC

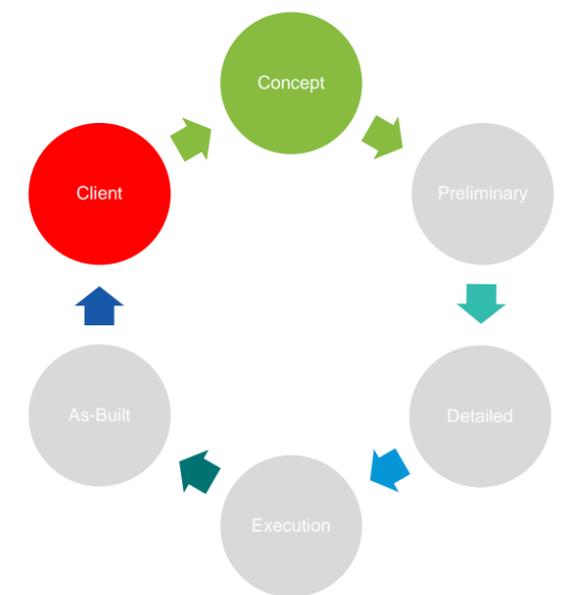
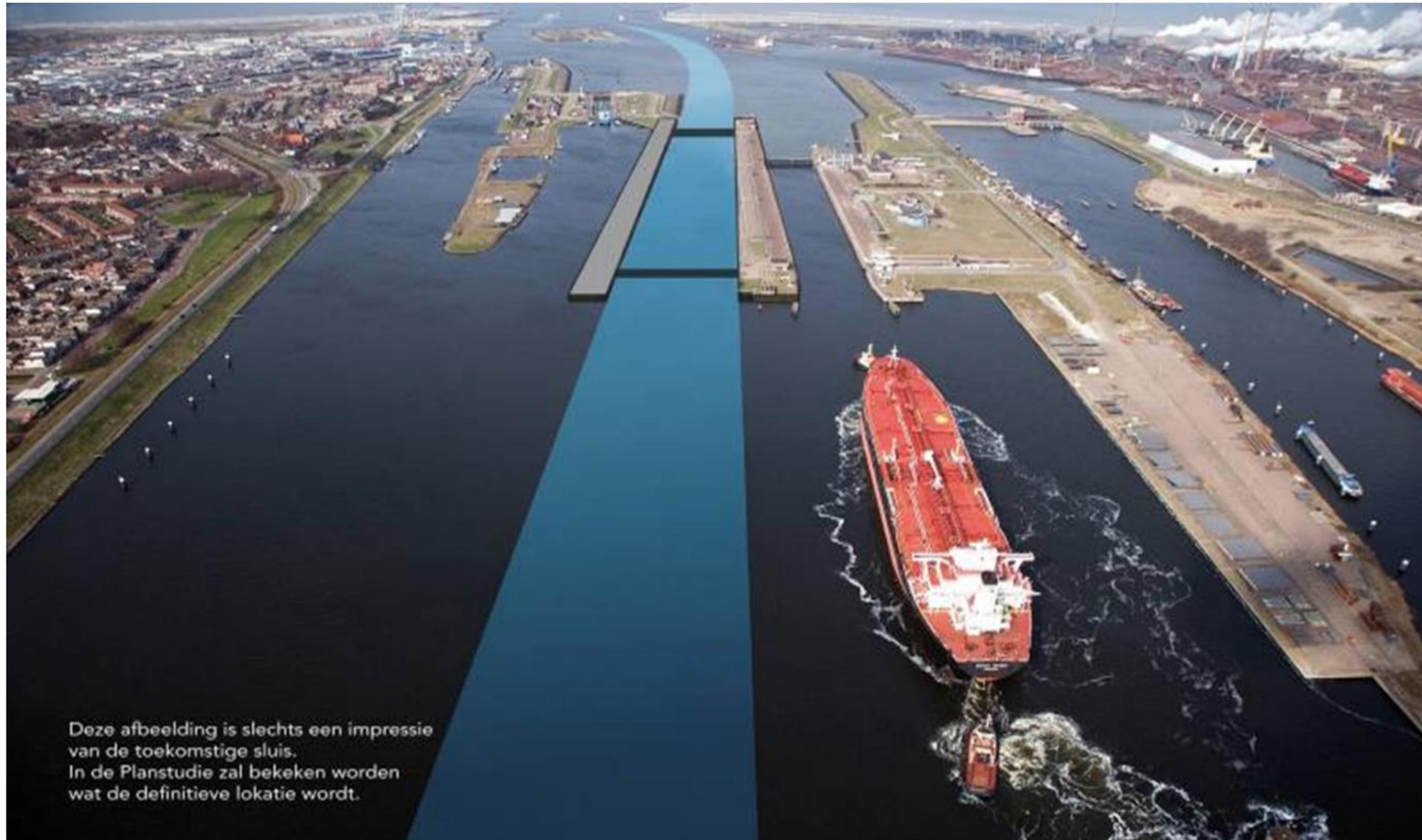
# Organisation OPENIJ



# Existing situation – sea lock IJmuiden

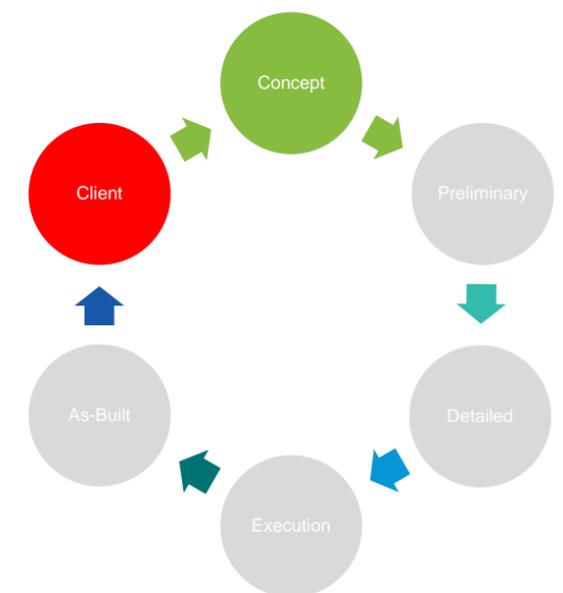


# Conceptual design by the client



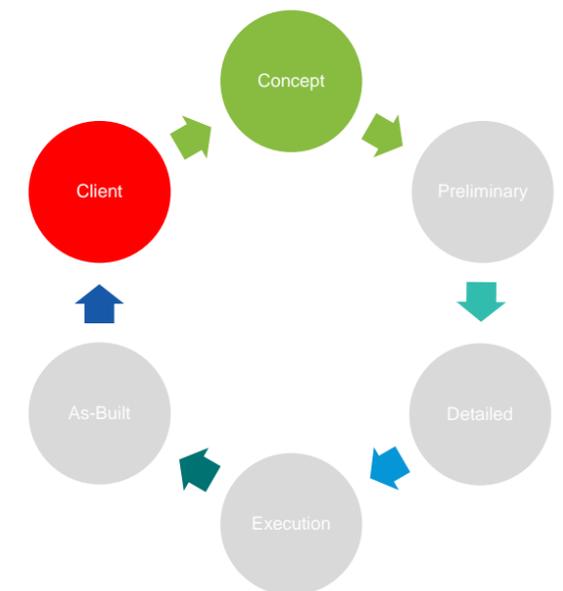
# The contractor OPENIJ

- **Contractor relates all information** (requirements, verifications, documents, geography and geometry) to the **SBS**
- All project output required according to the **Information Delivery Manual** (ILS part of the contract) delivered as BIM
- **BIM deliveries** (sharing) in open-standard format COINS
- COINS containers containing all object related information



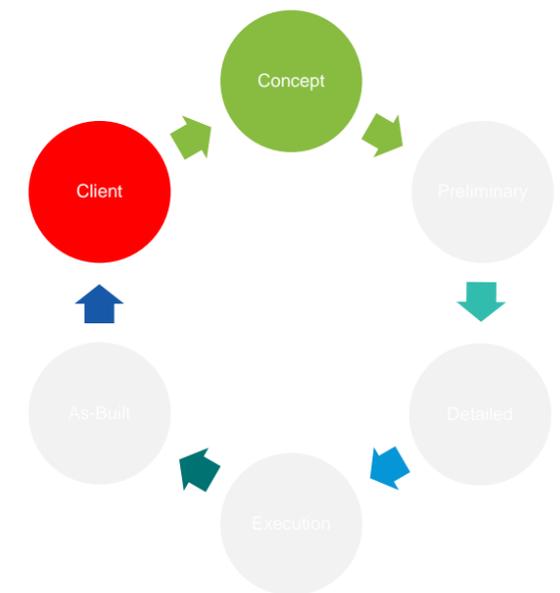
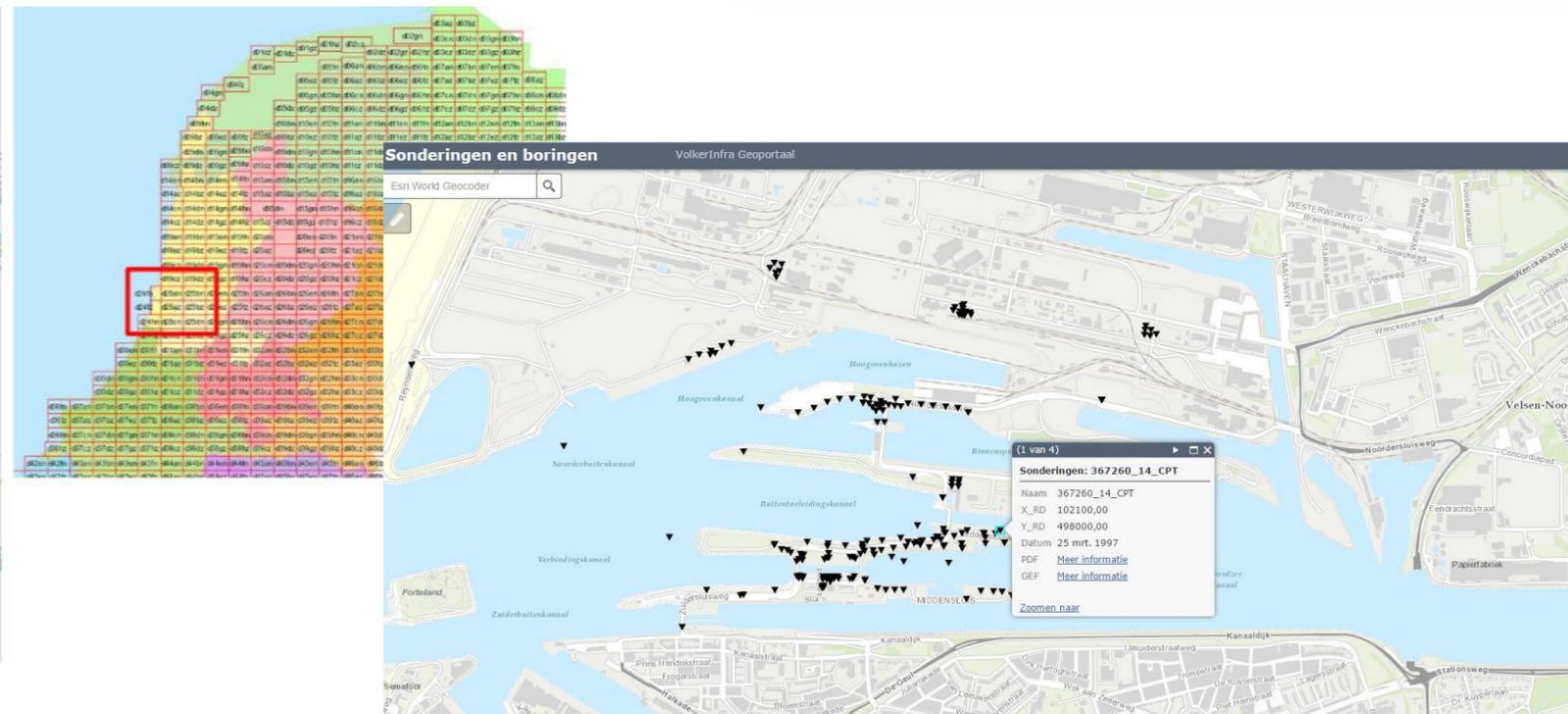
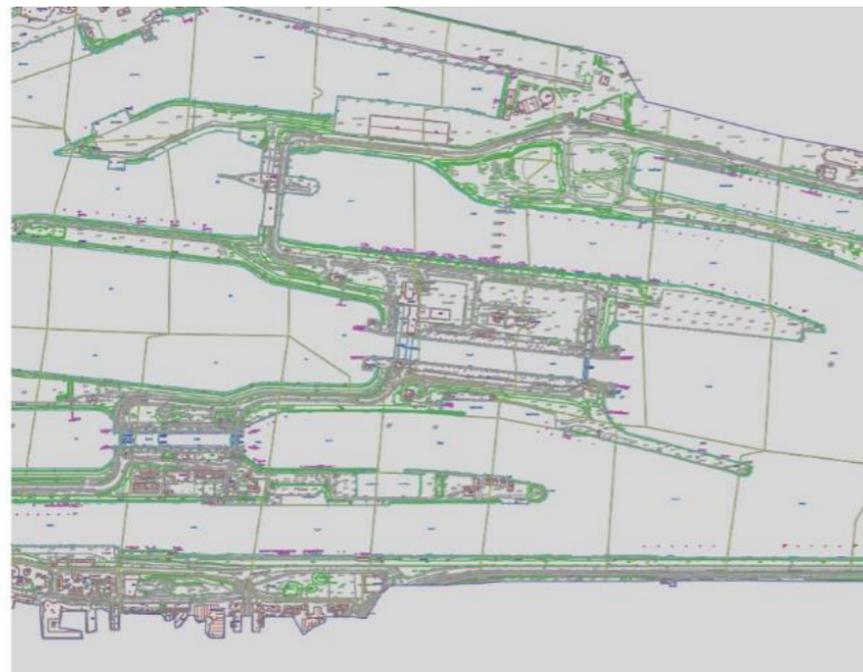
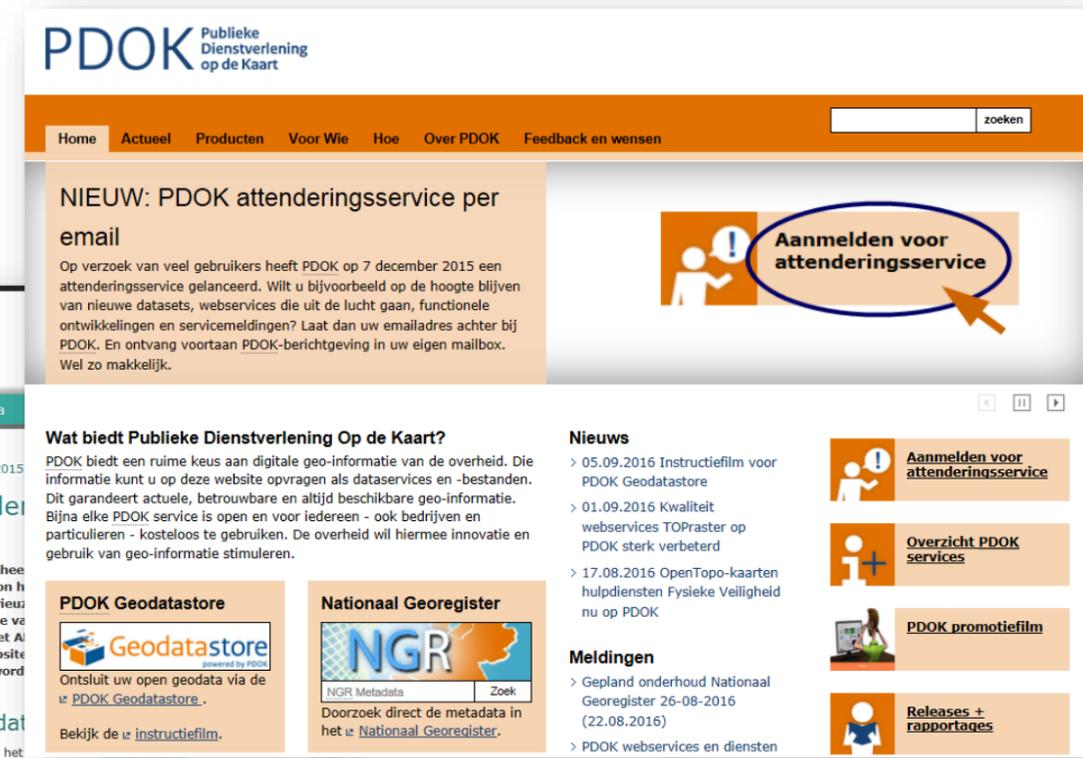
# The contractor OPENIJ

- DBFM – contract
- Designing lock within the borders and the contract
- Length gully 500 meters (between the stop lines)
  - Width gully 65-70 meters ( between the chamber walls )
  - Deep gully - 17.75 meters NAP
  - Construction of the lock and control process
  - Maintaining primary water
  - Maintaining existing Noordersluis and Middensluis
  - Minimal disruption waterway traffic and road traffic
  - Minimal disruption environment
  - Funding for the design, construction and maintenance
  - 26 years maintenance of the lock ( and channels )
  - EMVI-criteria
- Maximum price € 515.000.000 (\$ 575.000.000)



# Collecting existing data (public and company)

- AHN
- CPT's from all the parties
- Previous ground investigations
- PDOK maps



# Infraworks 360

Collect the data in Infraworks360 and share them with your team



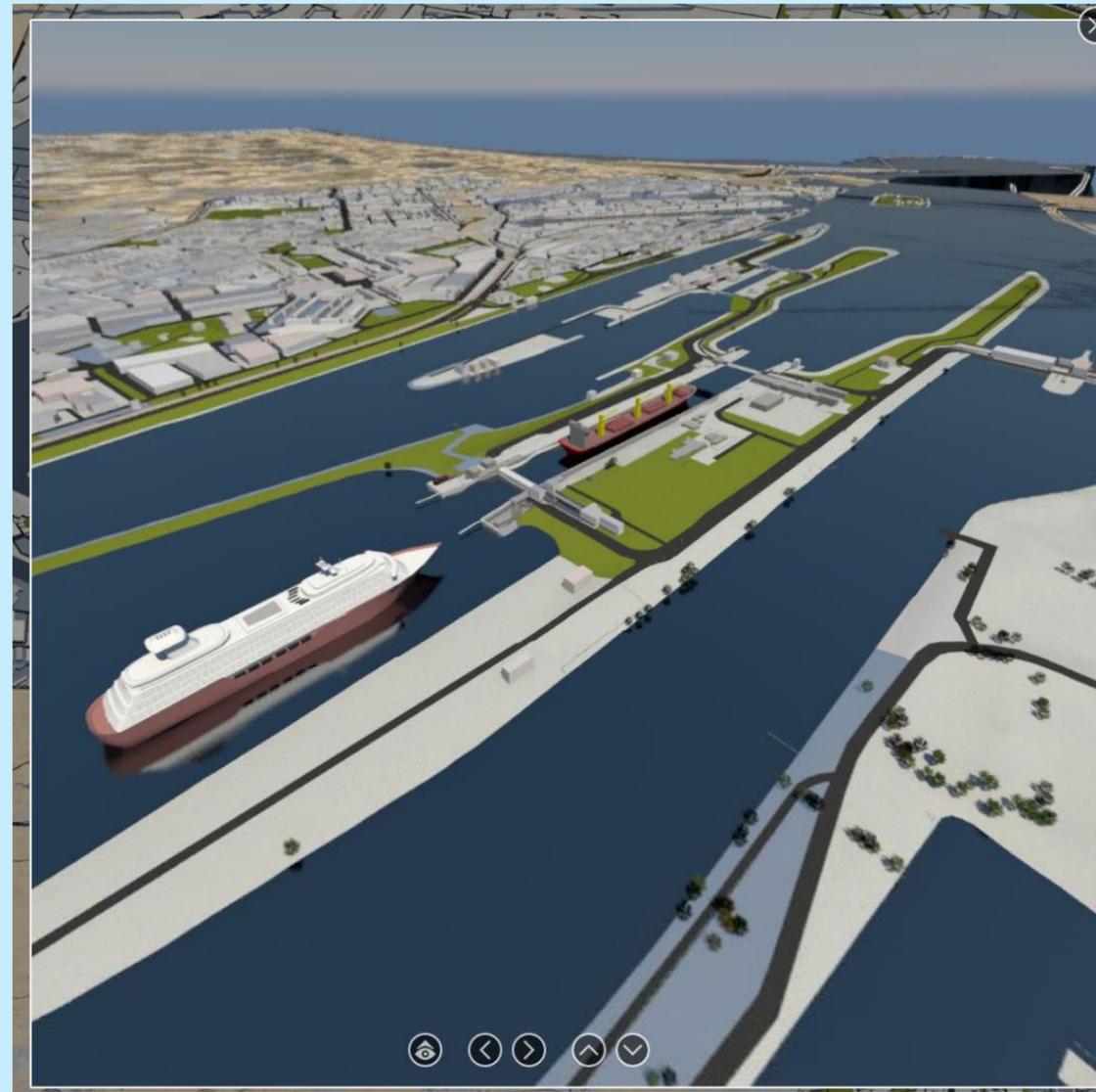
360 degrees pictures



Attachments like pictures, movies and other documents



Multiple items available



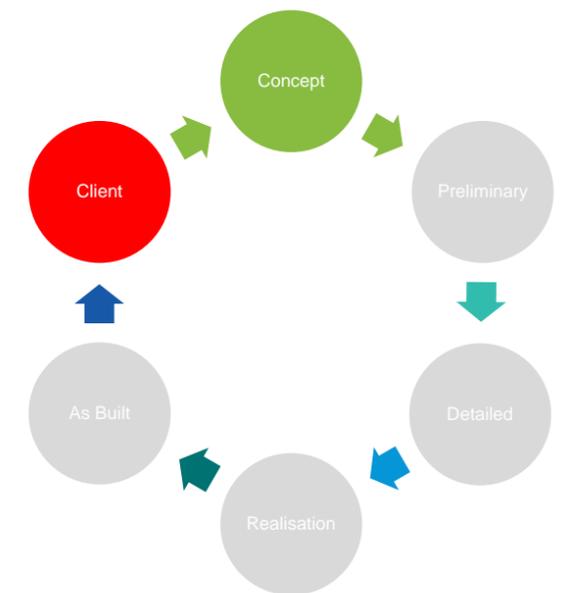
Connect with your tablet



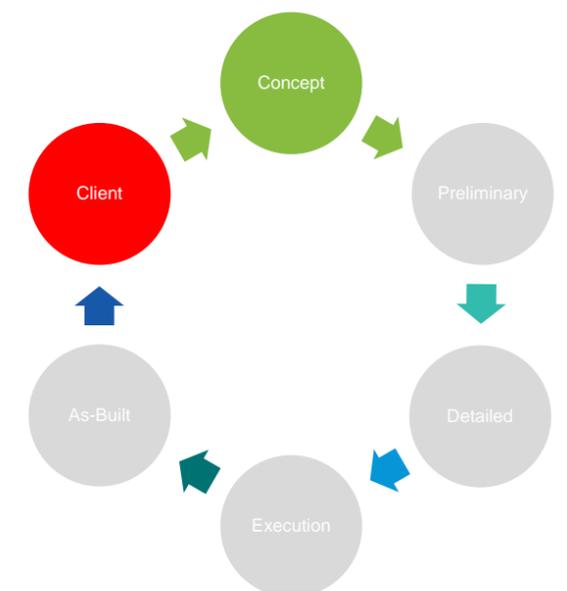
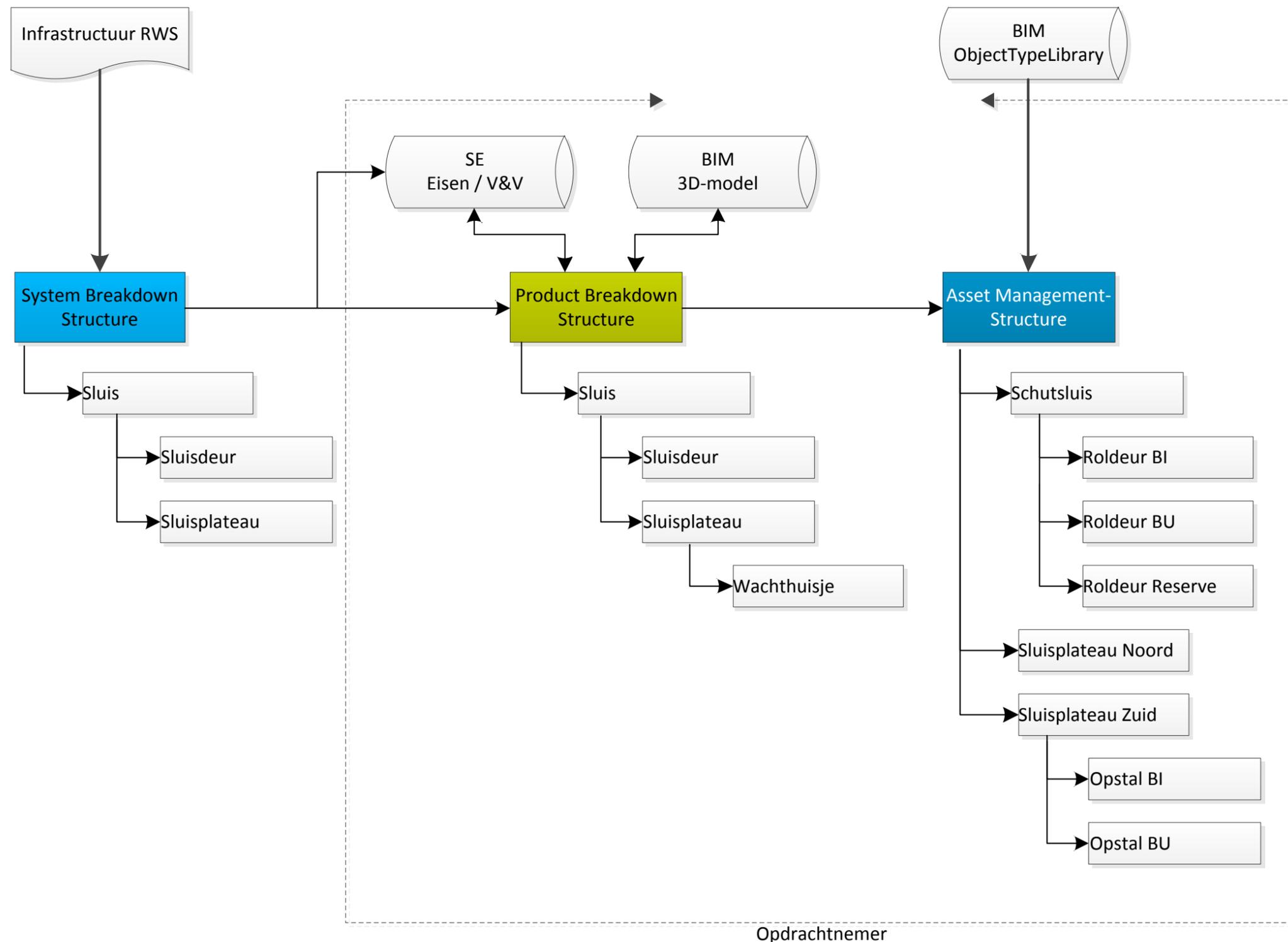
# System Engineering

Provides a structured method to create a system that functions in a controlled process, meets the requirements (and wishes) of the customer and is completed within the stipulated time and budget.

**Systems Engineering**  
=  
**Engineering Systems**



# The contractor OPENIJ

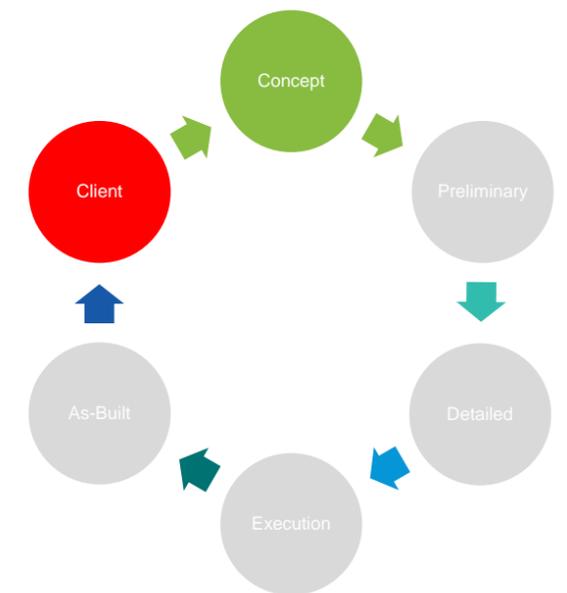
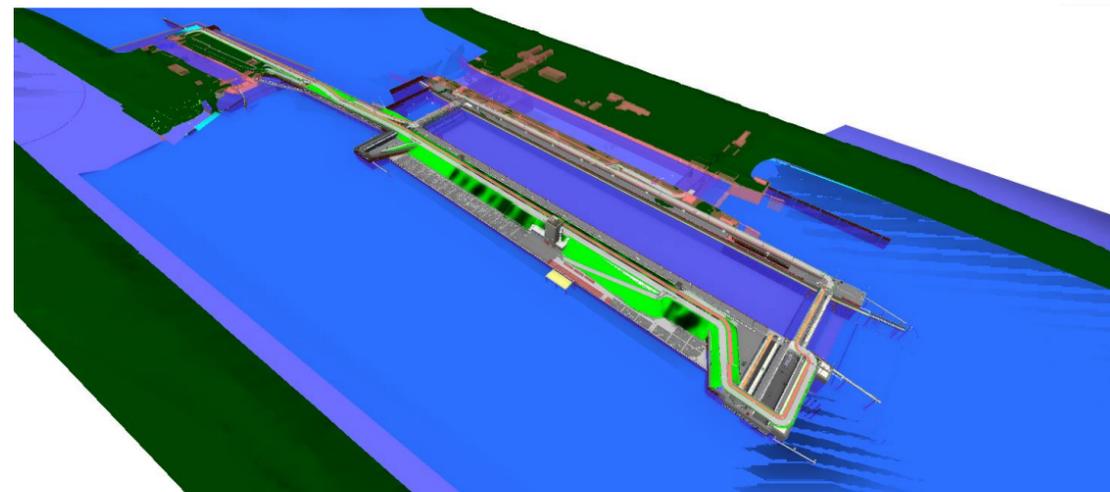
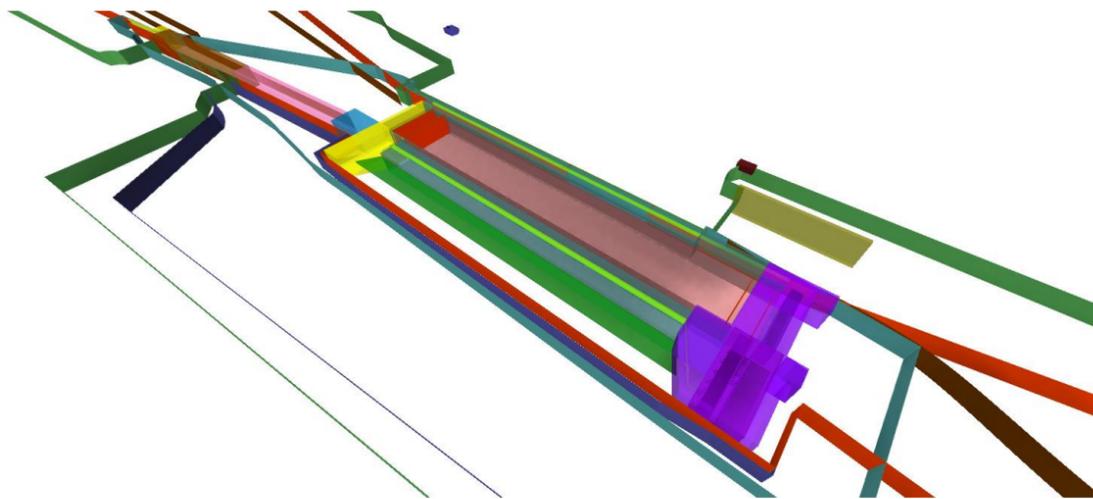
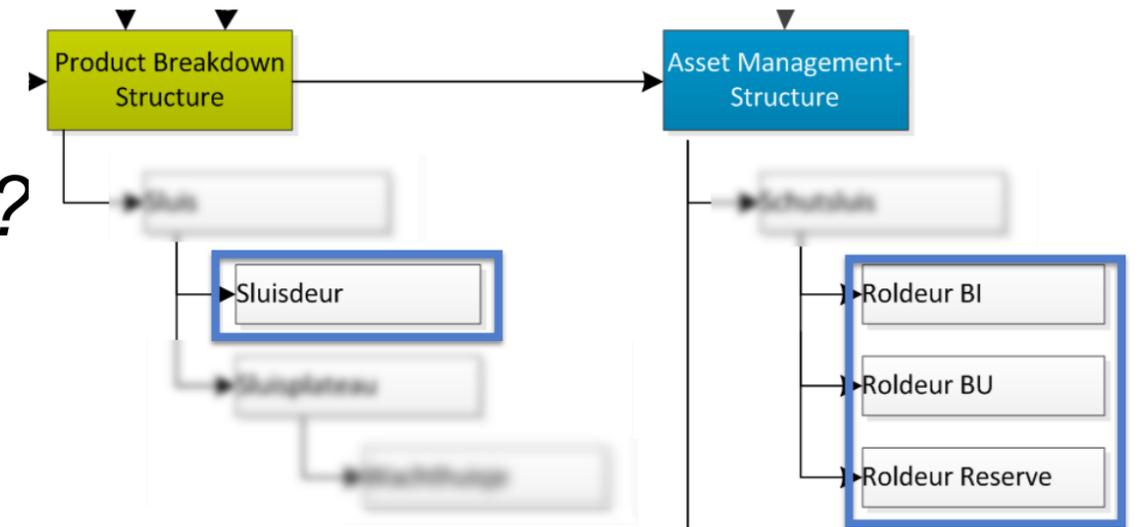


# System Engineering to 3D

Divide the design scope in such a way it matches the System Breakdown Structure

Question that raises on every project:

*What is the limit of decompositions of the structure?*



# System Engineering

## Object library

- Physical geometry, also temporary items;
- The breakdown structure has an impact on all disciplines!
- Has big impact on the deliverables at the end!

P-1 | Infrastructuur RWS

01.SL | Sluis

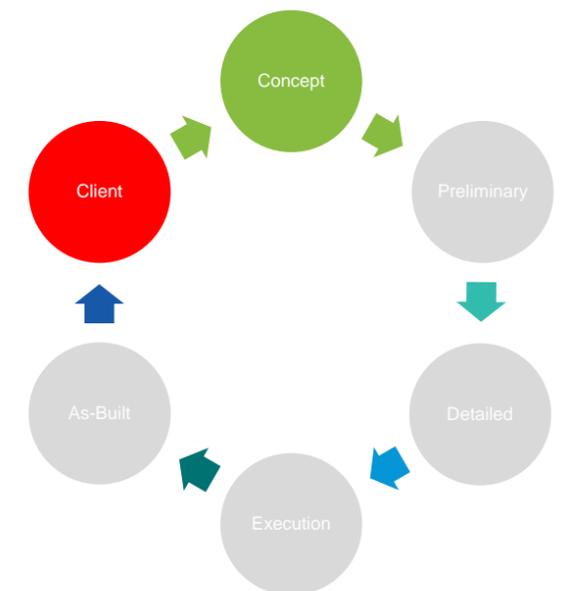
SL.AZ | Afmeervoorziening zeeschepen

SL.AZ.BZN | Bolders zeeschepen Noord

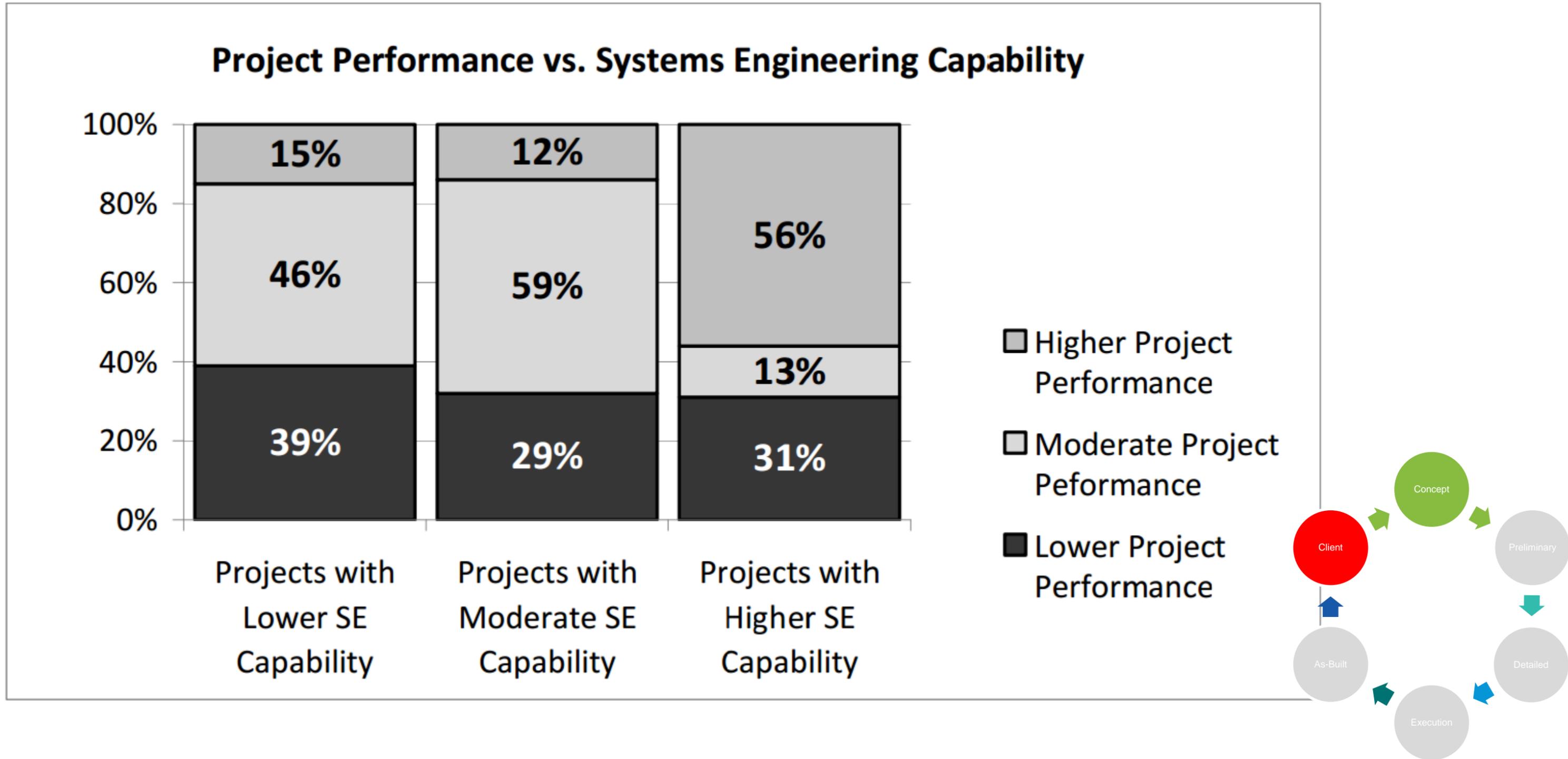
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SL.AZ.WKN | Winchkoppen Noord

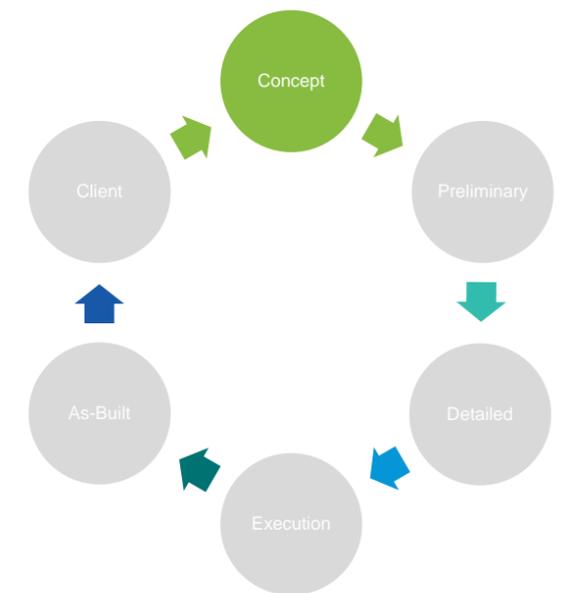
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# System Engineering

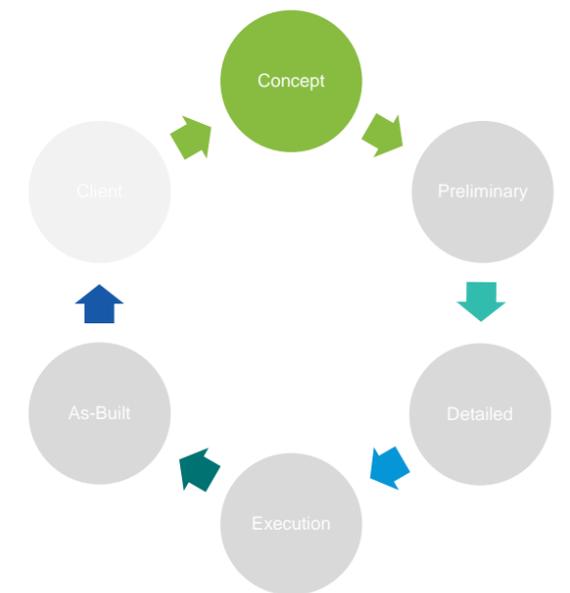


# The (winning) conceptual design by OPENIJ



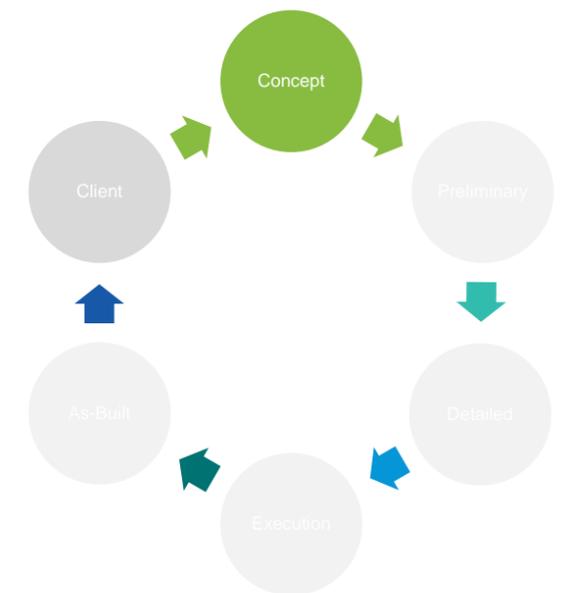
# The contractor OPENIJ

- So now the challenge is for real!
  - Facing the software challenges
  - Site / office location
  - Templates / library objects
- Sharing knowledge with other companies?
- What kind of document management system will be used?
- How are we going to coordinate the integral review procedures?



# Conceptual design - *BIM protocol*

- System break down implementation
- Representation of the drawing
- As built in 2D, 3D, what format, etc?
- The 'I' from BIM (quick scan)
- Software tools
- Exchanges between software
- Document management software (Vault)
- Etc.



# Conceptual design - BIM protocol

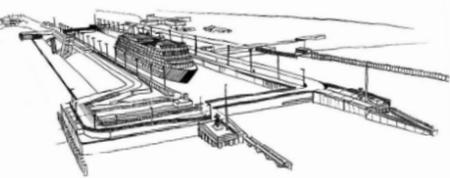
- Software
- Project information
- Organisation structure
- BIM (codes)
- Input/Output
- Communication
- IT
- Model/drawing setup
- Survey
- Quantity takeoff
- GIS
- Cloud usage
- As-built
- etc

**BIM Plan van aanpak VP**

Project: Zeetoeegang IJmond  
 Zaaknummer: 31080535  
 Opdrachtgever: Rijkswaterstaat Grote Projecten en Onderhoud

Documentnummer: OPENIJ-1.000.007  
 Revisie: 2.0  
 Status: DEFINITIEF  
 Datum: 09-02-2016

Werkpakket: WP-00243  
 Object: Ontwerp algemeen  
 Fase:



Opgesteld door Cees Kruit BIM Coördinator/M heer	Gecontroleerd door Miguel Casas Ontwerpleider tel meen	Vrijgegeven door Leon Loux Technisch manager ontwerp	QR-code
Datum: 09-02-2016	Datum: 09-02-2016	Datum: 11.02.2016	

Stramiennaam	Rotatie t.o.v. As 3	X-coördinaat	Y-coördinaat
A	90°	101843.863	497962.663
B-stop (35m van deur)	90°	101956.584	497950.115
B1-stop (10m van deur)	90°	101931.738	497952.884
C-stop (35m van deur)	90°	102429.656	497897.394
C1-stop (10m van deur)	90°	102453.508	497894.736
D	90°	102508.666	497888.589
S1	90°	101916.333	497954.600
S2	90°	102449.533	497895.179
S3	90°	102469.913	497892.913

**Project Properties**

Family: System Family: Project Information  
 Type:   
 Instance Parameters - Control selected or to-be-created instance

**Energy Analysis**

Energy Settings  
 Main Model

**Data**

Vico 01  
 Vico 02  
 Vico 03  
 PBS-code  
 PBS-code

**Other**

Project Issue Date  
 Project Status  
 Client Name  
 Project Address  
 Project Name  
 Project Number  
 Extensions.Parameters  
 Client Name (2)

**CHECK**

Opdrachtgever: Rijkswaterstaat  
 Project: Zeetoeegang IJmond  
 Omschrijving: Algemeen Voorbeeldtekening  
 Standaard tekening  
**OPENIJ**  
 TP-code:   
 Status: **CONCEPT**  
 Deze tekening is gebaseerd op: OPENIJ-ALG-AL-DO-S000

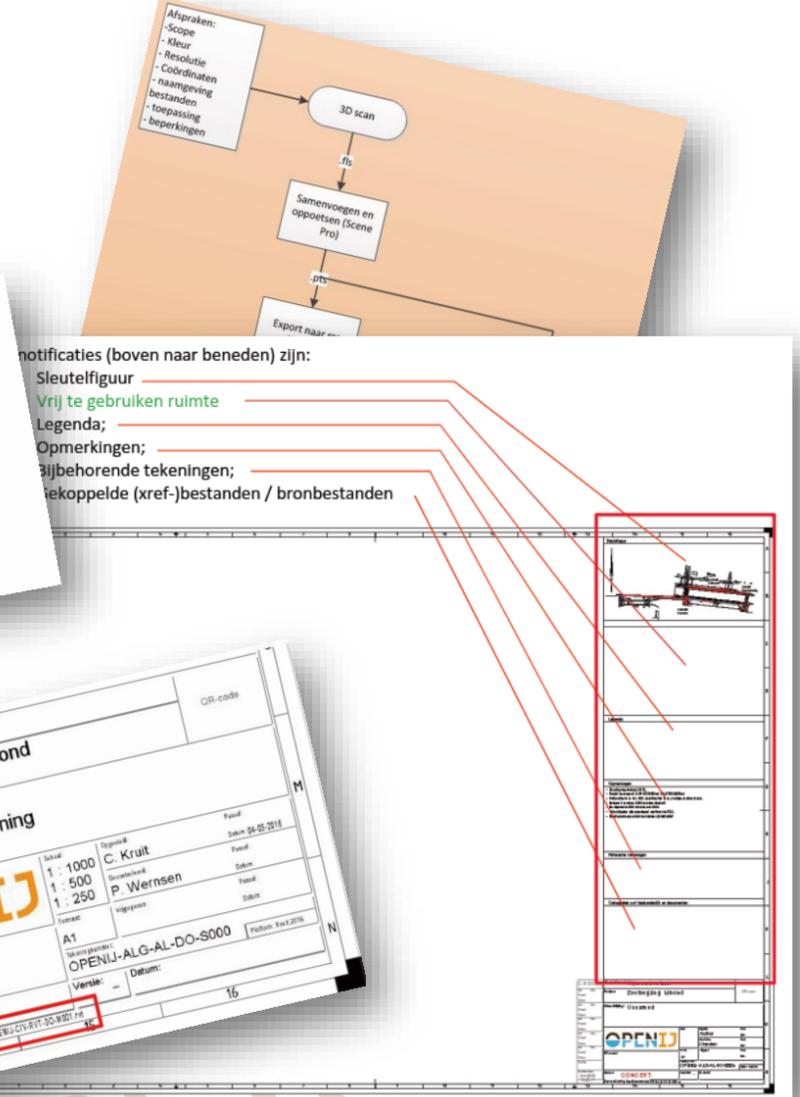
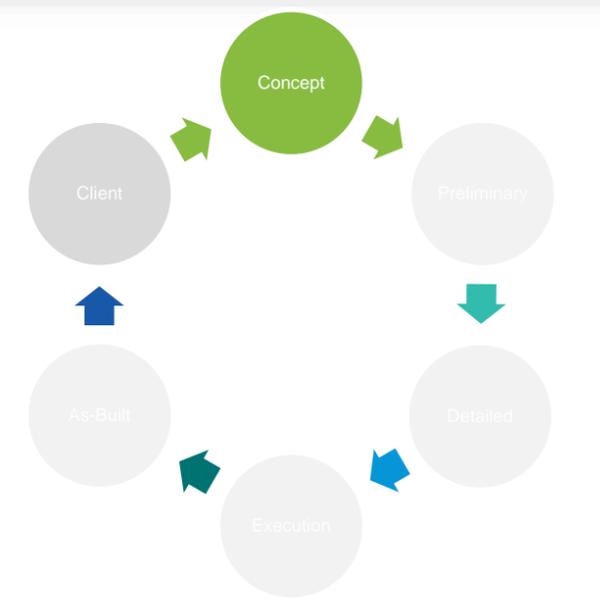
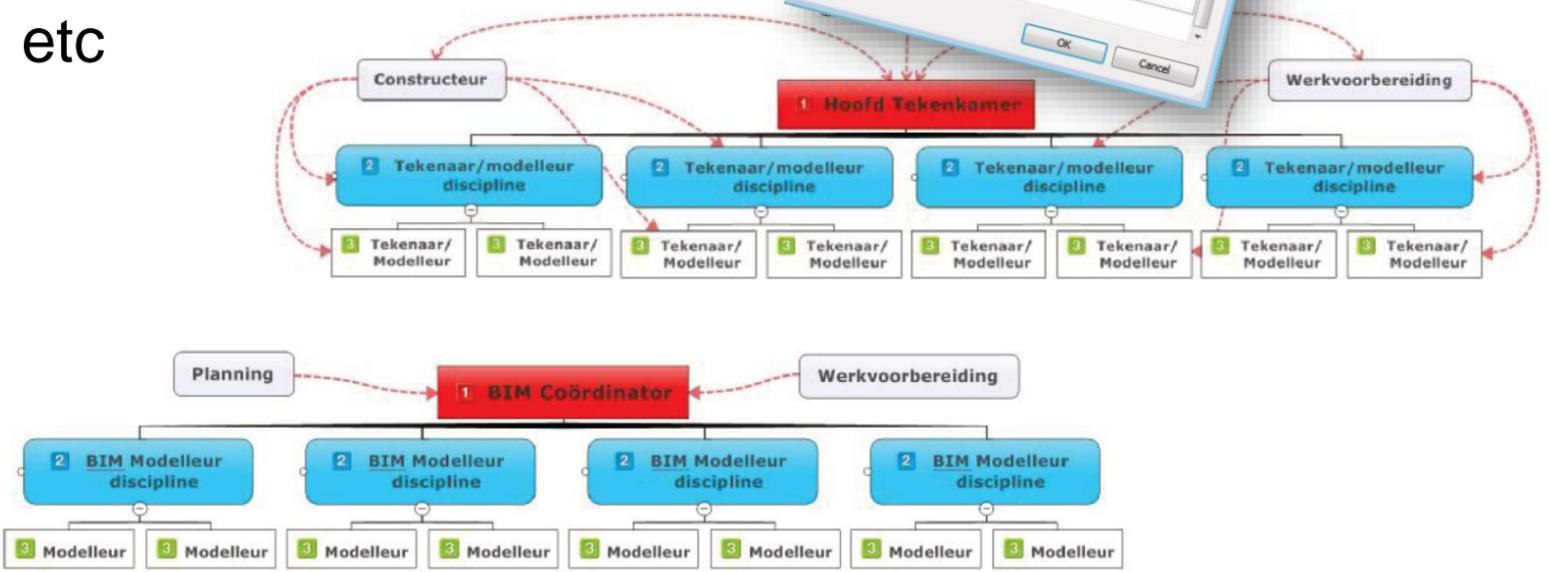
3D scan

Samenvoegen en oppoetsen (Scene Pro)

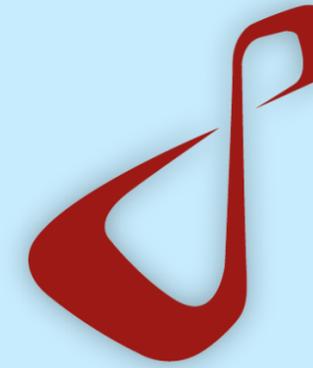
Export naar

notificaties (boven naar beneden) zijn:

- Sleutelfiguur
- Vrij te gebruiken ruimte
- Legenda;
- Opmerkingen;
- Bijbehorende tekeningen;
- gekoppelde (xref-)bestanden / bronbestanden

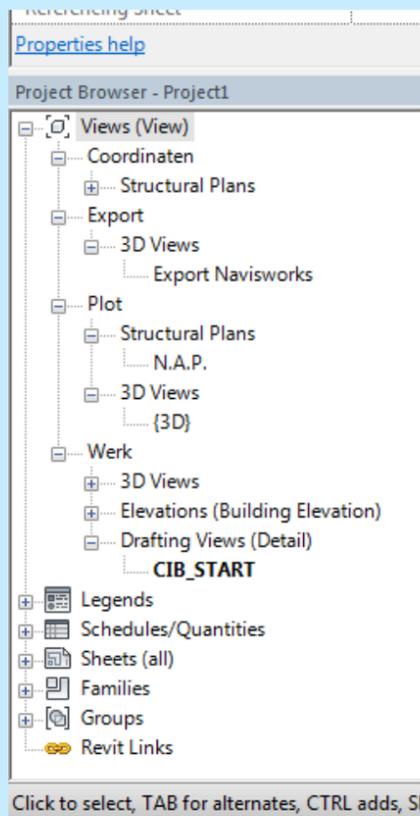



# Templates

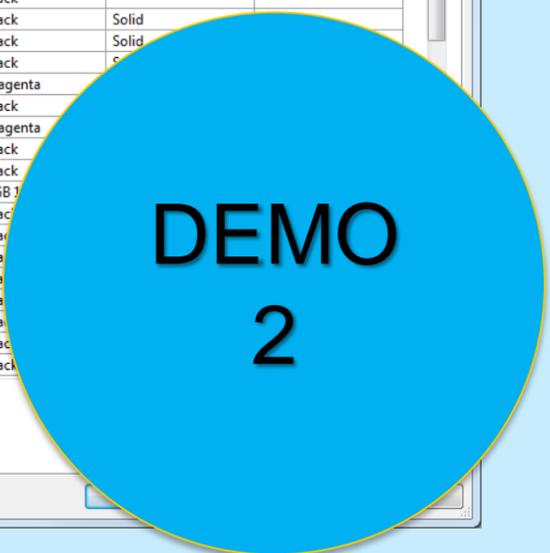
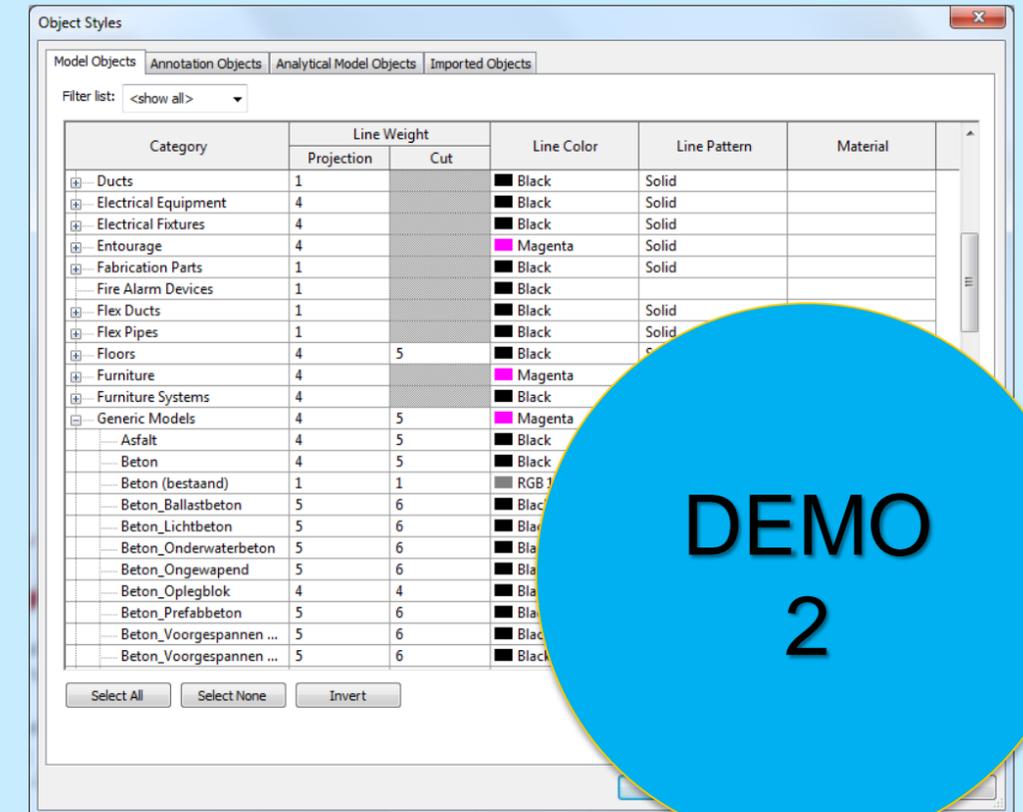
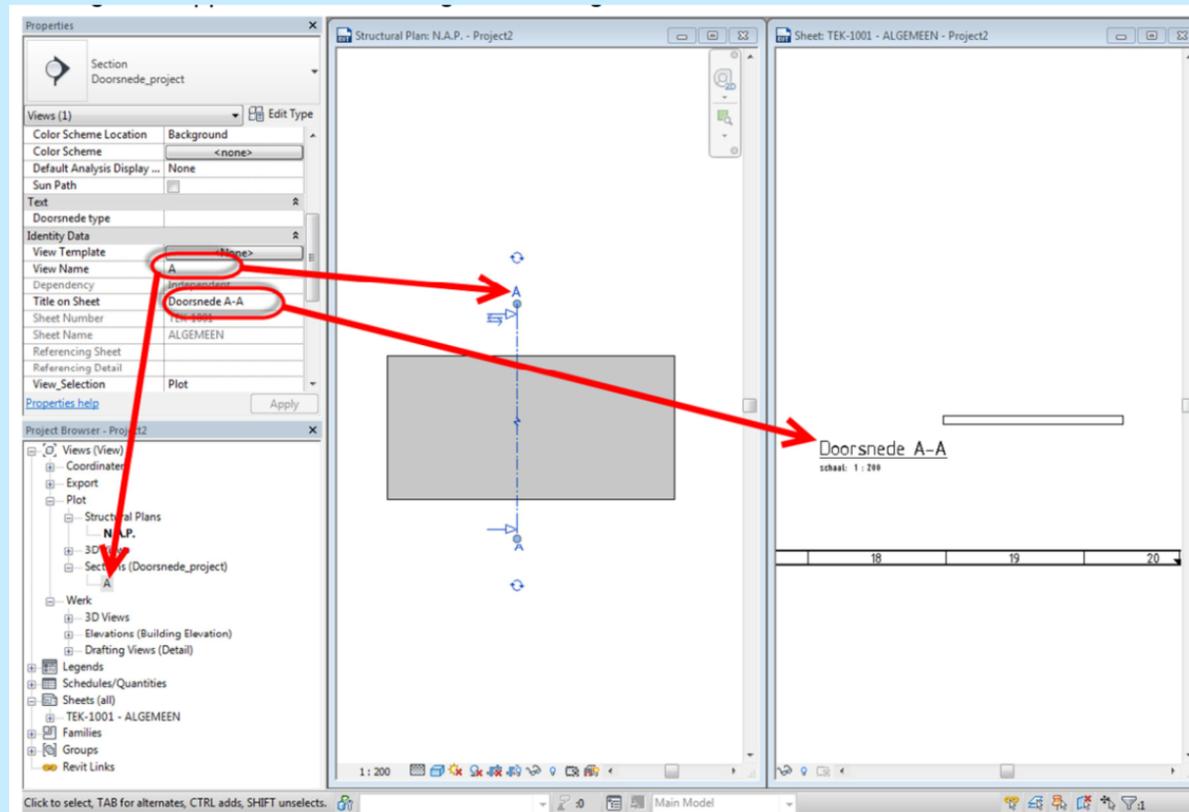


Civil Infra  
Benelux  
werkgroep Revit

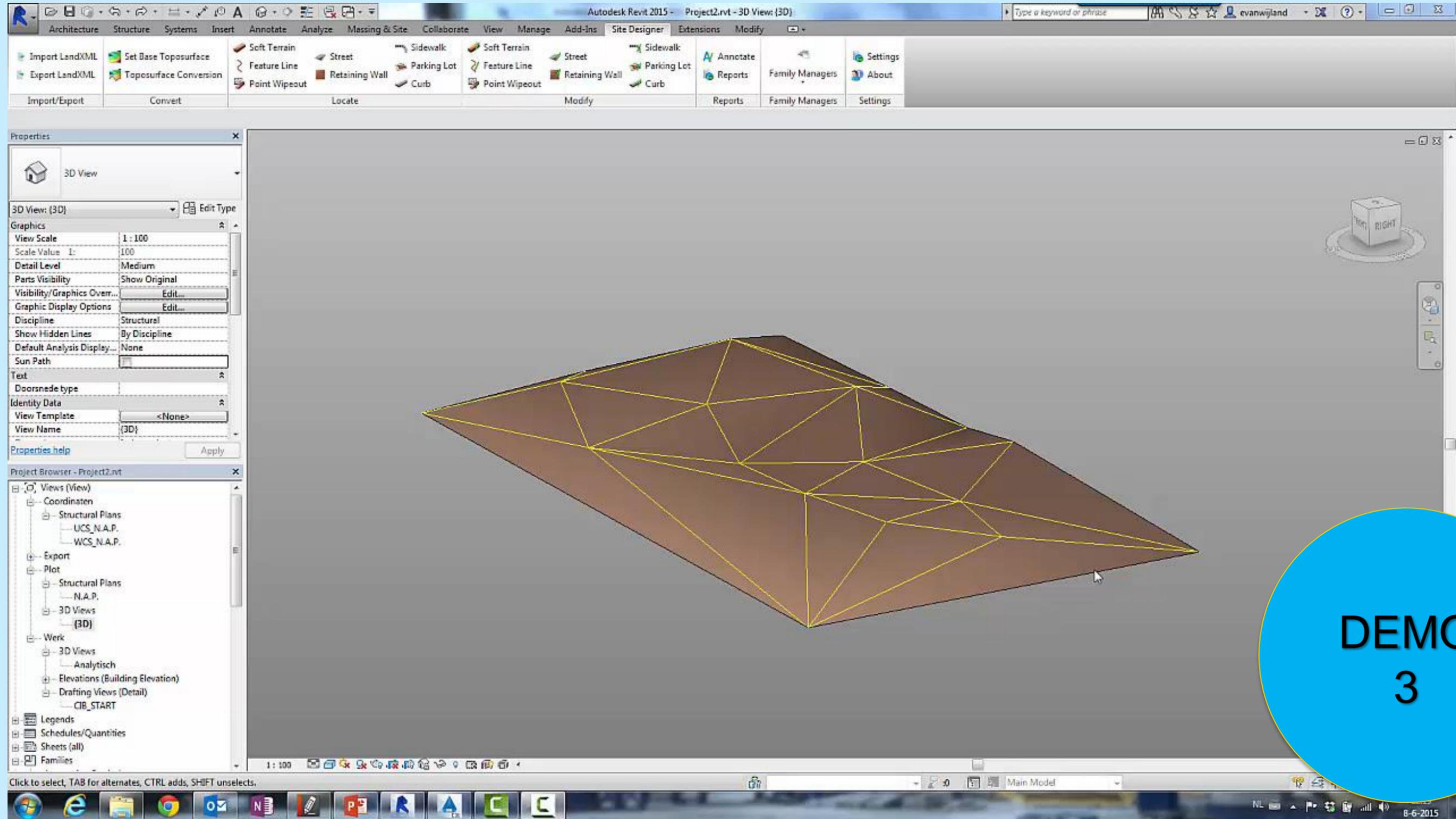
## Revit Dutch template for Infrastructure projects



Click to select, TAB for alternates, CTRL adds, SI



# Exchange between software (surfaces)



DEMO  
3

# Revit

Autodesk Revit Structure 2016 - OPENIJ-CIV-RVT-DO-M015\_RoyvanHatem82 - 3D View: Export Navisworks

Modify | Walls

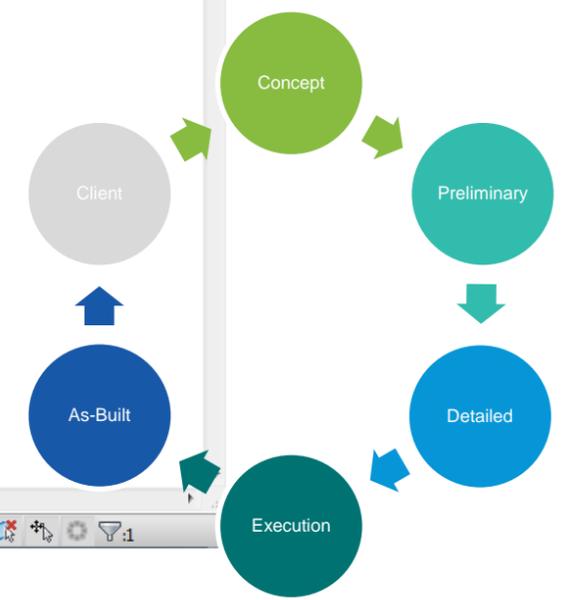
Properties

Walls (1)	
BIM42_Discipline	Civiel
BIM42_Date	05-02-2016
BIM42_Version	In bewerking
BIM42_File	OPENIJ-CIV-RVT-DO-M015
LOD	200
Workset	SUB_Deurkas 3
Edited by	
Phasing	
Phase Created	Eindsituatie
Phase Demolished	None
Data	
Vico 01	
Vico 02	
Vico 03	
PBS-code	SL.BI.BC.F3
Other	

Project Browser - OPENIJ-CIV-RVT-DO-M015\_RoyvanHatem82

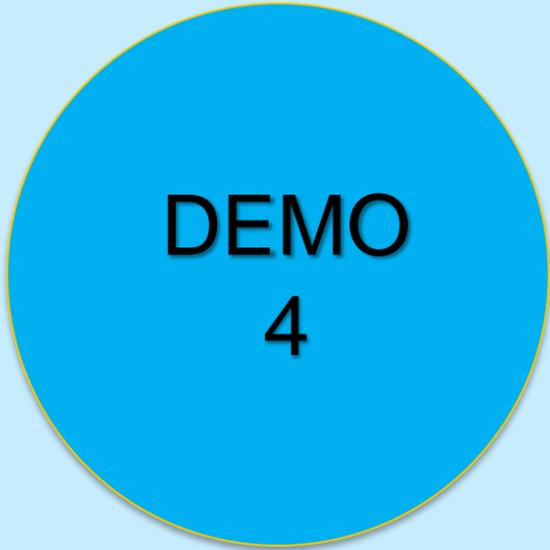
- Views (View)
  - 3D Views
    - Check PBS
  - Coordinates
    - Structural Plans (OPENIJ)
      - Coordinaten
      - N.A.P.
  - Export
    - 3D Views
      - Displaced elements
      - Export 3D DWG
      - Export FBX
      - Export Inventor Binnenhoofd
      - Export Jakarta - snijranden (verzonden)
      - Export Jakarta - vloer (verzonden)
    - Export Navisworks
  - Plot
    - Plot UO
  - Werk
    - Structural Plans (OPENIJ)

Identity Data	
Image	
Comments	
Mark	WII-21.6
BIM42_Discipline	Civiel
BIM42_Date	05-02-2016
BIM42_Version	In bewerking
BIM42_File	OPENIJ-CIV-RVT-DO-M015
LOD	200
Workset	SUB_Deurkas 3
Edited by	
Phasing	
Phase Created	Eindsituatie
Phase Demolished	None
Data	
Vico 01	
Vico 02	
Vico 03	
PBS-code	SL.BI.BC.F3
Other	

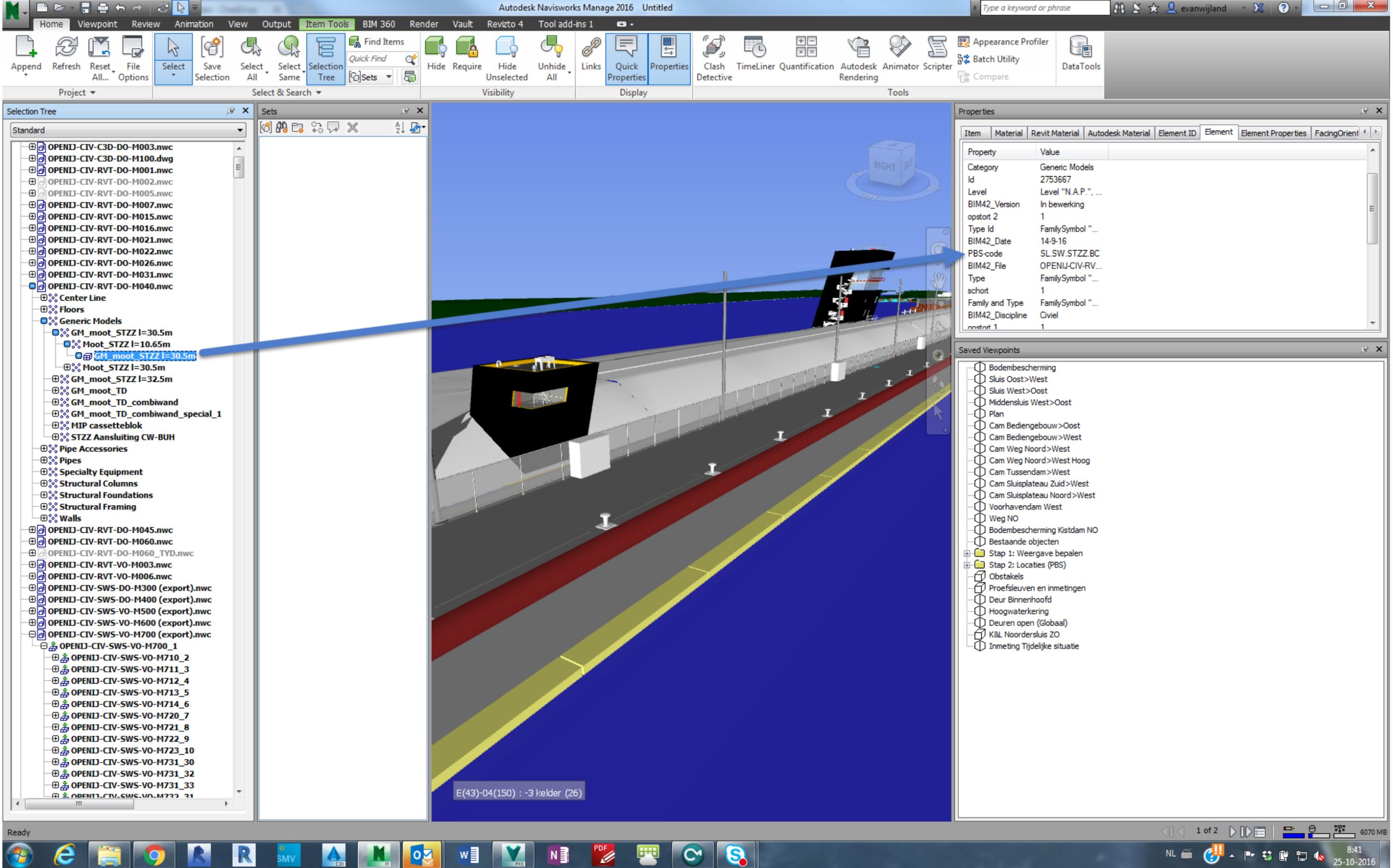


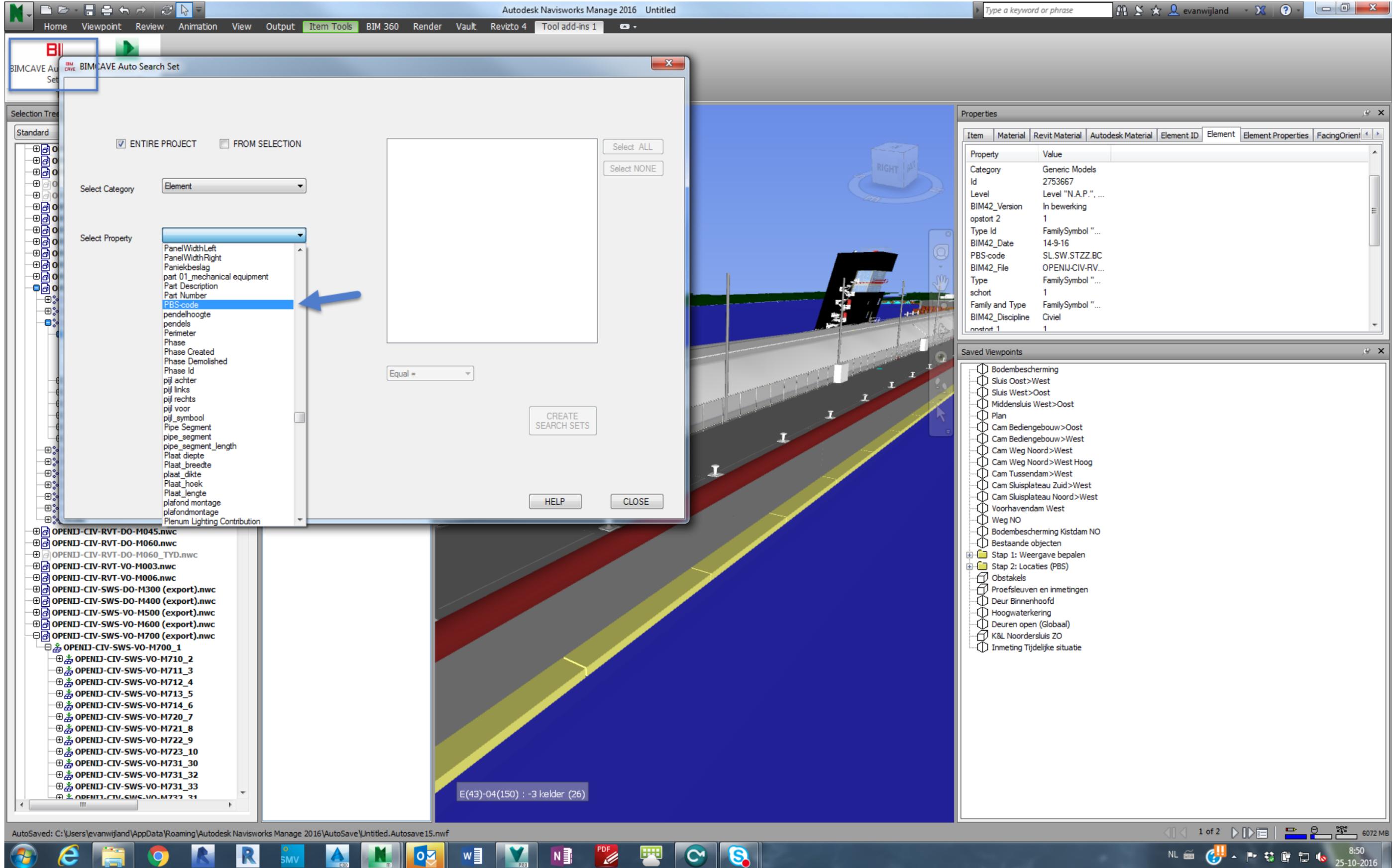
# Navisworks

- Use SBS parameter in Navisworks
- Creating search sets (BIM cave)
- Hide/ appearance settings (3 views which defines the type of view)



DEMO  
4





**BIMCAVE Auto Search Set**

ENTIRE PROJECT  FROM SELECTION

Select Category:

Select Property:

LIST VALUES

- DD.TD.BCZ
- DD.TD.CW
- DD.TD.DV
- DD.TD.DWN
- DD.TD.DWZ
- DD.TD.GK
- DD.TD.LO
- DD.TD.LW
- DD.TD.VM
- DD.VD
- DD.VD.AN
- DD.VD.CW
- DD.VD.DI
- DD.VD.KE
- DD.VD.OP.BO
- DD.VD.OP.HK
- DD.VD.OP.TR
- DD.VD.OP.WD

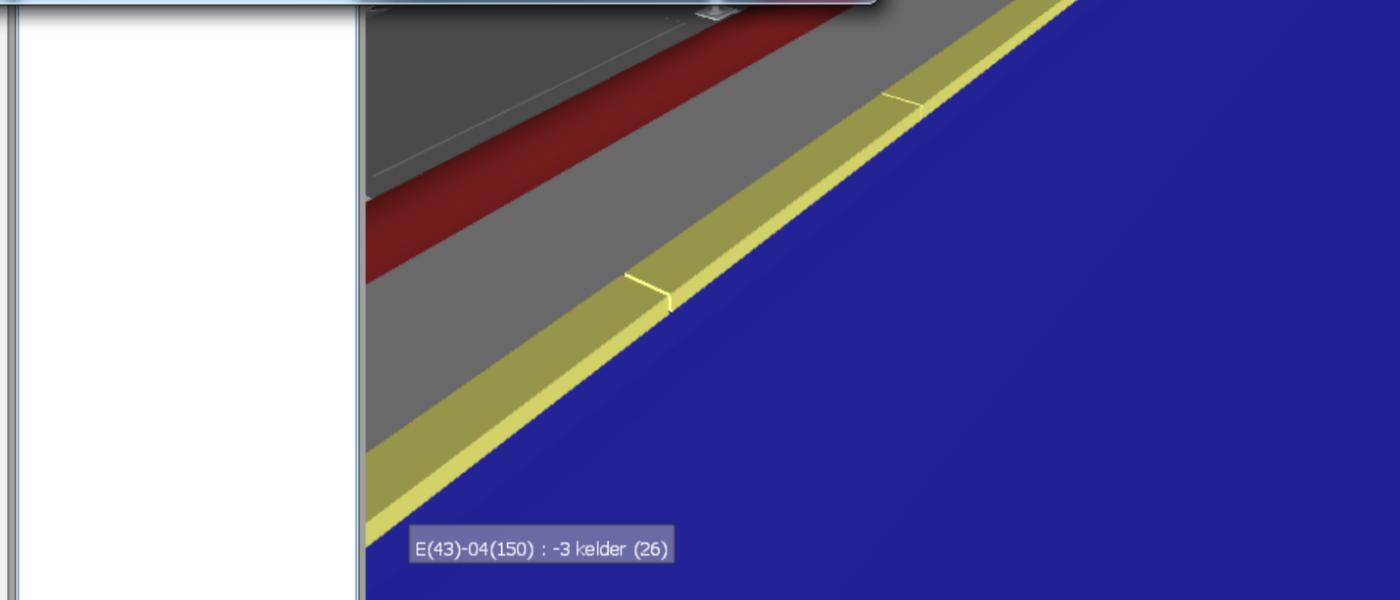
Select ALL  
Select NONE

Equal =

CREATE SEARCH SETS

HELP CLOSE

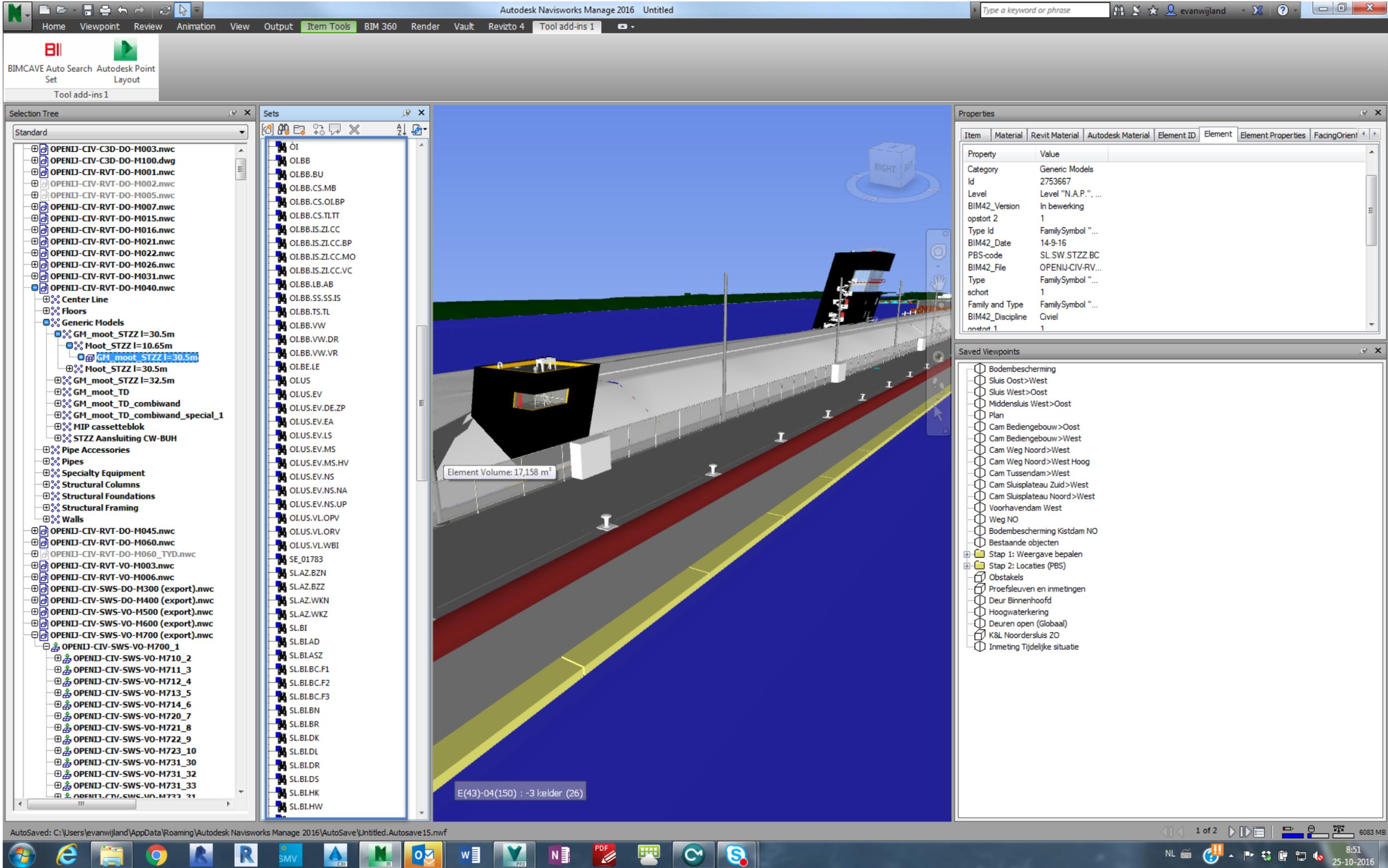
- OPENIJ-CIV-RVT-DO-M045.nwc
- OPENIJ-CIV-RVT-DO-M060.nwc
- OPENIJ-CIV-RVT-DO-M060\_TYD.nwc
- OPENIJ-CIV-RVT-VO-M003.nwc
- OPENIJ-CIV-RVT-VO-M006.nwc
- OPENIJ-CIV-SWS-DO-M300 (export).nwc
- OPENIJ-CIV-SWS-DO-M400 (export).nwc
- OPENIJ-CIV-SWS-VO-M500 (export).nwc
- OPENIJ-CIV-SWS-VO-M600 (export).nwc
- OPENIJ-CIV-SWS-VO-M700 (export).nwc
- OPENIJ-CIV-SWS-VO-M700\_1
- OPENIJ-CIV-SWS-VO-M710\_2
- OPENIJ-CIV-SWS-VO-M711\_3
- OPENIJ-CIV-SWS-VO-M712\_4
- OPENIJ-CIV-SWS-VO-M713\_5
- OPENIJ-CIV-SWS-VO-M714\_6
- OPENIJ-CIV-SWS-VO-M720\_7
- OPENIJ-CIV-SWS-VO-M721\_8
- OPENIJ-CIV-SWS-VO-M722\_9
- OPENIJ-CIV-SWS-VO-M723\_10
- OPENIJ-CIV-SWS-VO-M731\_30
- OPENIJ-CIV-SWS-VO-M731\_32
- OPENIJ-CIV-SWS-VO-M731\_33
- OPENIJ-CIV-SWS-VO-M731\_31



**Properties**

Item	Material	Revit Material	Autodesk Material	Element ID	Element	Element Properties	FacingOrient
Property	Value						
Category	Generic Models						
Id	2753667						
Level	Level "N.A.P.", ...						
BIM42_Version	In bewerking						
opstort 2	1						
Type Id	FamilySymbol "...						
BIM42_Date	14-9-16						
PBS-code	SL.SW.STZZ.BC						
BIM42_File	OPENIJ-CIV-RV...						
Type	FamilySymbol "...						
schort	1						
Family and Type	FamilySymbol "...						
BIM42_Discipline	Civiel						
onstort 1	1						

- Saved Viewpoints**
- Bodembescherming
  - Sluis Oost>West
  - Sluis West>Oost
  - Middensluis West>Oost
  - Plan
  - Cam Bediengebouw>Oost
  - Cam Bediengebouw>West
  - Cam Weg Noord>West
  - Cam Weg Noord>West Hoog
  - Cam Tussendam>West
  - Cam Sluisplateau Zuid>West
  - Cam Sluisplateau Noord>West
  - Voorhavendam West
  - Weg NO
  - Bodembescherming Kistdam NO
  - Bestaande objecten
  - Stap 1: Weergave bepalen
  - Stap 2: Locaties (PBS)
  - Obstakels
  - Proefsleuven en inmetingen
  - Deur Binnenhoofd
  - Hoogwaterkering
  - Deuren open (Globaal)
  - K&L Noordersluis ZO
  - Inmeting Tijdelijke situatie



Autodesk Navisworks Manage 2016 - Untitled

Home Viewpoint Review Animation View Output Item Tools BIM 360 Render Vault Revizto 4 Tool add-ins 1

BIMCAVE Auto Search Autodesk Point Set Layout

Tool add-ins 1

Selection Tree

- Standard
  - 600x800x2000
  - 7000x2700x2600
  - I\_A\_Kast
  - 761x750x1750
  - 800x1000x2000
  - 800x800x2000
  - 835x1390x1455
  - I\_A\_Verderler\_SD1\_LS-verdeler b
  - I\_A\_Kast speciaal
  - I\_A\_Laskast
  - I\_A\_MAP TBP990 400x400mm
  - I\_A\_mast
  - I\_A\_Microfoon
  - I\_A\_Middenspanningskast
  - I\_A\_Montageplaat
  - I\_A\_Montageplaat2
  - I\_A\_Orus\_Led
  - I\_A\_pomp
  - I\_A\_Profiel van vrije ruimte
  - I\_A\_Schakelaar standaard
  - Type 1
    - I\_A\_Schakelaar standaard
  - I\_A\_Schets sparing
  - I\_A\_Schets sparing rond
  - I\_A\_Sokkel TS
  - I\_A\_Strip
  - I\_A\_Telefoon
  - I\_A\_U\_Profiel
  - I\_A\_U\_Profiel speciaal\_01
  - I\_A\_Unistrut ES2663T
  - I\_A\_VDC 1
  - I\_A\_VDC 10
  - I\_A\_VDC 12
  - I\_A\_VDC 14
  - I\_A\_VDC 15
  - I\_A\_VDC 19
  - I\_A\_VDC 20
  - I\_A\_VDC 21
  - I\_A\_VDC 22
  - I\_A\_VDC 23
  - I\_A\_VDC 5
  - I\_A\_VDC 6
  - I\_A\_VDC 7
  - I\_A\_VDC 8
  - I\_A\_VDC 9
  - I\_A\_Verderler
  - I\_A\_Verderler\_BGB\_Hoofdverdeler 1
  - I\_A\_Verderler\_BGB\_Hoofdverdeler 5
  - I\_A\_Verderler\_BGB\_No-break verdeler
  - I\_A\_Verderler\_SD1\_LS-verdeler 500
  - I\_A\_Voetbalk 700mm
  - I\_A\_Werkschakelaar
  - I\_A\_WKS kast
  - Lighting Fixtures
  - Pipe Accessories
  - Econecto Schuifafsluiter Fig. 317 D

Sets

- OI
- OI.BB
- OI.BB.BU
- OI.BB.CS.MB
- OI.BB.CS.OI.BP
- OI.BB.CS.TI.TT
- OI.BB.IS.ZI.CC
- OI.BB.IS.ZI.CC.BP
- OI.BB.IS.ZI.CC.MO
- OI.BB.IS.ZI.CC.VC
- OI.BB.LB.AB
- OI.BB.SS.SS.IS
- OI.BB.TS.TL
- OI.BB.VW
- OI.BB.VW.DR
- OI.BB.VW.VR
- OI.BE.LE
- OI.US
- OI.US.EV
- OI.US.EV.DE.ZP
- OI.US.EV.EA
- OI.US.EV.LS
- OI.US.EV.MS
- OI.US.EV.MS.HV
- OI.US.EV.NS
- OI.US.EV.NS.NA
- OI.US.EV.NS.UP
- OI.US.VL.OPV
- OI.US.VL.ORV
- OI.US.VL.WBI
- SE\_01783
- SL.AZ.BZN
- SL.AZ.BZZ
- SL.AZ.WKN
- SL.AZ.WKZ
- SL.BI
- SL.BI.AD
- SL.BI.ASZ
- SL.BI.BC.F1
- SL.BI.BC.F2
- SL.BI.BC.F3
- SL.BI.BN
- SL.BI.BR
- SL.BI.DK
- SL.BI.DL
- SL.BI.DR
- SL.BI.DS
- SL.BI.HK
- SL.BI.HW

Properties

Property	Value
Workset	I_A_Sluisdeur 1
Object	ZIJ
Phase Created	Phase "Eindsitu...
Mark	Reservering No...
Volume	49,140 m³
Type	FamilySymbol "7...
Offset	6,342 m
Family and Type	FamilySymbol "7...
Deelruimte	012
PBS-code	OI.US.EV.NS.NA
Comments	SD1 Kasten
Locatie	SD1
Area	44,120 m²

Saved Viewpoints

- Bodembescherming
- Sluis Oost>West
- Sluis West>Oost
- Middensluis West>Oost
- Plan
- Cam Bediengebouw>Oost
- Cam Bediengebouw>West
- Cam Weg Noord>West
- Cam Weg Noord>West Hoog
- Cam Tussendam>West
- Cam Sluisplateau Zuid>West
- Cam Sluisplateau Noord>West
- Voorhavendam West
- Weg NO
- Bodembescherming Kistdam NO
- Bestaande objecten
- Stap 1: Weergave bepalen
  - Alles weergeven
  - Eind situatie
  - Tijdelijk werk
- Stap 2: Locaties (PBS)
  - Obstakels
  - Proefsleuven en inmetingen
  - Deur Binnenhoofd
  - Hoogwaterkering
  - Deuren open (Gloobaal)
  - K&L Noordersluis ZO
  - Inmeting Tijdelijke situatie

Edit Viewpoint - Eind situatie

Camera

	X	Y	Z
Position (m):	473,685	497523,5	349,700
Look At (m):	102154,0	497909,0	-77,820
Vertical Field Of View (°):			63,273
Horizontal Field Of View (°):			48,109
Roll (°):			0,000
Vertical Offset (%):			0,000
Horizontal Offset (%):			0,000
Lens Squeeze Ratio:			1,000

Motion

Linear Speed (m/sec):	94,423
Angular Speed (°/sec):	45,000

Saved Attributes

- Hide/Required
- Override Appearance

Collision

Settings...

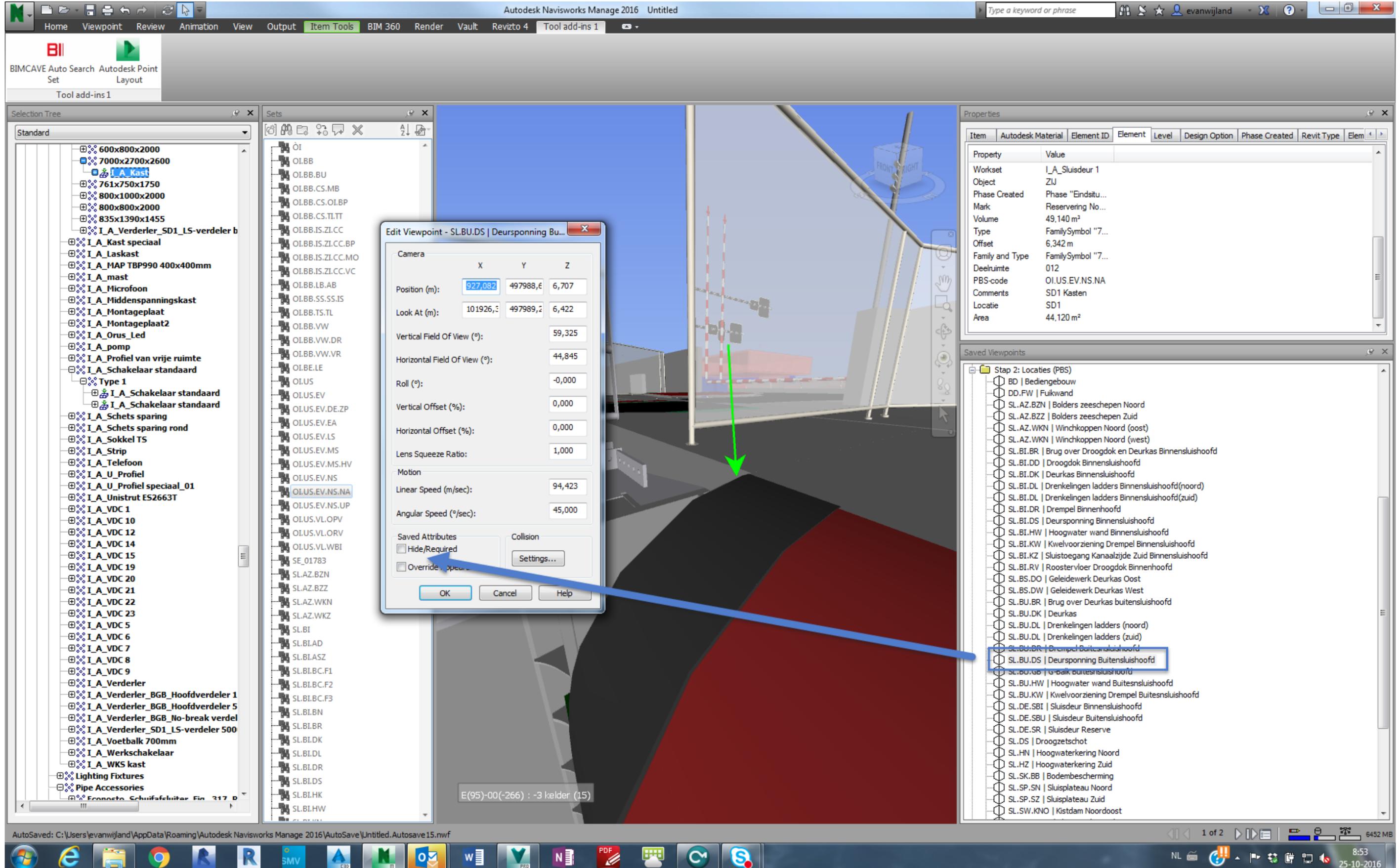
OK Cancel Help

A(-284)-04(282) : -3 kelder (358)

AutoSaved: C:\Users\evanwijland\AppData\Roaming\Autodesk Navisworks Manage 2016\AutoSave\Untitled.Autosave15.nwf

1 of 2 6082 MB

NL 8:52 25-10-2016



**Edit Viewpoint - SL.BU.DS | Deursponning Bu...**

Camera

	X	Y	Z
Position (m):	927,082	497988,6	6,707
Look At (m):	101926,3	497989,2	6,422
Vertical Field Of View (°):			59,325
Horizontal Field Of View (°):			44,845
Roll (°):			-0,000
Vertical Offset (%):			0,000
Horizontal Offset (%):			0,000
Lens Squeeze Ratio:			1,000
Motion			
Linear Speed (m/sec):			94,423
Angular Speed (°/sec):			45,000

Saved Attributes:  Hide/Required  Override appearance

Collision:

**Properties**

Property	Value
Workset	I_A_Sluisdeur 1
Object	ZIJ
Phase Created	Phase "Eindsitu...
Mark	Reservering No...
Volume	49,140 m³
Type	FamilySymbol "7...
Offset	6,342 m
Family and Type	FamilySymbol "7...
Deelruimte	012
PBS-code	OI.US.EV.NS.NA
Comments	SD1 Kasten
Locatie	SD1
Area	44,120 m²

- Saved Viewpoints**
- Stap 2: Locaties (PBS)
    - BD | Bediengebouw
    - DD.FW | Fuikwand
    - SL.AZ.BZN | Bolders zeeschepen Noord
    - SL.AZ.BZZ | Bolders zeeschepen Zuid
    - SL.AZ.WKN | Winchkoppen Noord (oost)
    - SL.AZ.WKN | Winchkoppen Noord (west)
    - SL.BI.BR | Brug over Droogdok en Deurkas Binnensluishoofd
    - SL.BI.DD | Droogdok Binnensluishoofd
    - SL.BI.DK | Deurkas Binnensluishoofd
    - SL.BI.DL | Drenkelingen ladders Binnensluishoofd(noord)
    - SL.BI.DL | Drenkelingen ladders Binnensluishoofd(zuid)
    - SL.BI.DR | Drempel Binnenshoofd
    - SL.BI.DS | Deursponning Binnensluishoofd
    - SL.BI.HW | Hoogwater wand Binnensluishoofd
    - SL.BI.KW | Kwelvoorziening Drempel Binnensluishoofd
    - SL.BI.KZ | Sluistoegang Kanaalzijde Zuid Binnensluishoofd
    - SL.BI.RV | Roostervloer Droogdok Binnenshoofd
    - SL.BS.DO | Geleidewerk Deurkas Oost
    - SL.BS.DW | Geleidewerk Deurkas West
    - SL.BU.BR | Brug over Deurkas buitensluishoofd
    - SL.BU.DK | Deurkas
    - SL.BU.DL | Drenkelingen ladders (noord)
    - SL.BU.DL | Drenkelingen ladders (zuid)
    - SL.BU.DR | Drempel Buitensluishoofd
    - SL.BU.DS | Deursponning Buitensluishoofd**
    - SL.BU.GB | G-balk buitensluishoofd
    - SL.BU.HW | Hoogwater wand Buitensluishoofd
    - SL.BU.KW | Kwelvoorziening Drempel Buitensluishoofd
    - SL.DE.SBI | Sluisdeur Binnensluishoofd
    - SL.DE.SBU | Sluisdeur Buitensluishoofd
    - SL.DE.SR | Sluisdeur Reserve
    - SL.DS | Droogzetschot
    - SL.HN | Hoogwaterkering Noord
    - SL.HZ | Hoogwaterkering Zuid
    - SL.SK.BB | Bodembescherming
    - SL.SP.SN | Sluisplateau Noord
    - SL.SP.SZ | Sluisplateau Zuid
    - SL.SW.KNO | Kistdam Noordoost





# A360 & Collaboration 4 Revit

- Published models accessible for everyone in the project organization

The screenshot displays the A360 web interface. The top navigation bar includes 'Home > IsalaDelta' and 'Data | Calendar | Discussions'. Below this, there are buttons for 'Upload', 'New Folder', 'Details', and 'Activity'. The main content area shows a list of project folders on the left, including 'Wiki Pages', 'O-00054 Recreatieschutsluis IJsseldijk', and 'O-00057 Wegverbinding Nieuwendijk'. The central part of the screen features a 'Model viewers' section with two 3D Revit model thumbnails. The first thumbnail is titled 'O-00054 Recreatieschutsluis IJsseldijk (stand 17-08-2016)' and shows a complex industrial structure. The second thumbnail is titled 'O-00057 Wegverbinding Nieuwendijk (stand 17-08-2016)' and shows a long bridge structure. The interface also includes a search bar and various navigation icons.

DEMO  
5

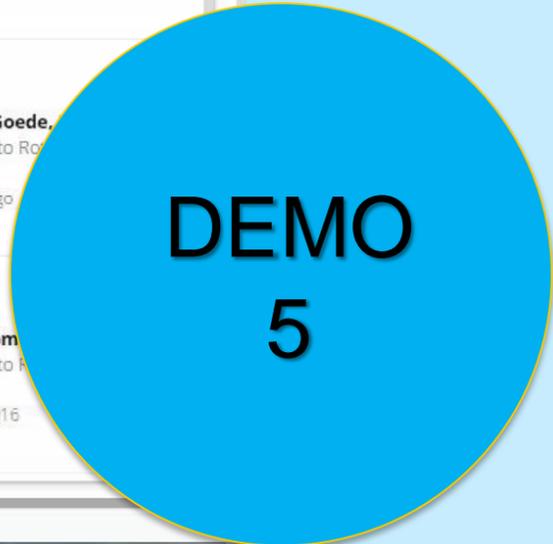
# A360 & Collaboration 4 Revit

The screenshot displays the Autodesk A360 web interface. The main content area shows a list of projects with columns for Name, Owned By, and Created On. The activity feed on the right shows updates to various project files.

Name	Owned By	Created On
Admin Project		Jun 21, 2016
BBV24	Jeroen Tishauser	Aug 31, 2016
Demo Project		Jun 21, 2016
Herinrichting Beursgebied	Arthur Hulhoven	Aug 22, 2016
IsalaDelta	Eric Van Wijland	Aug 12, 2016
Rotterdamse Baan	Jeroen Tishauser	Jun 22, 2016
Test new project	Fernando Oliveira	Jun 22, 2016

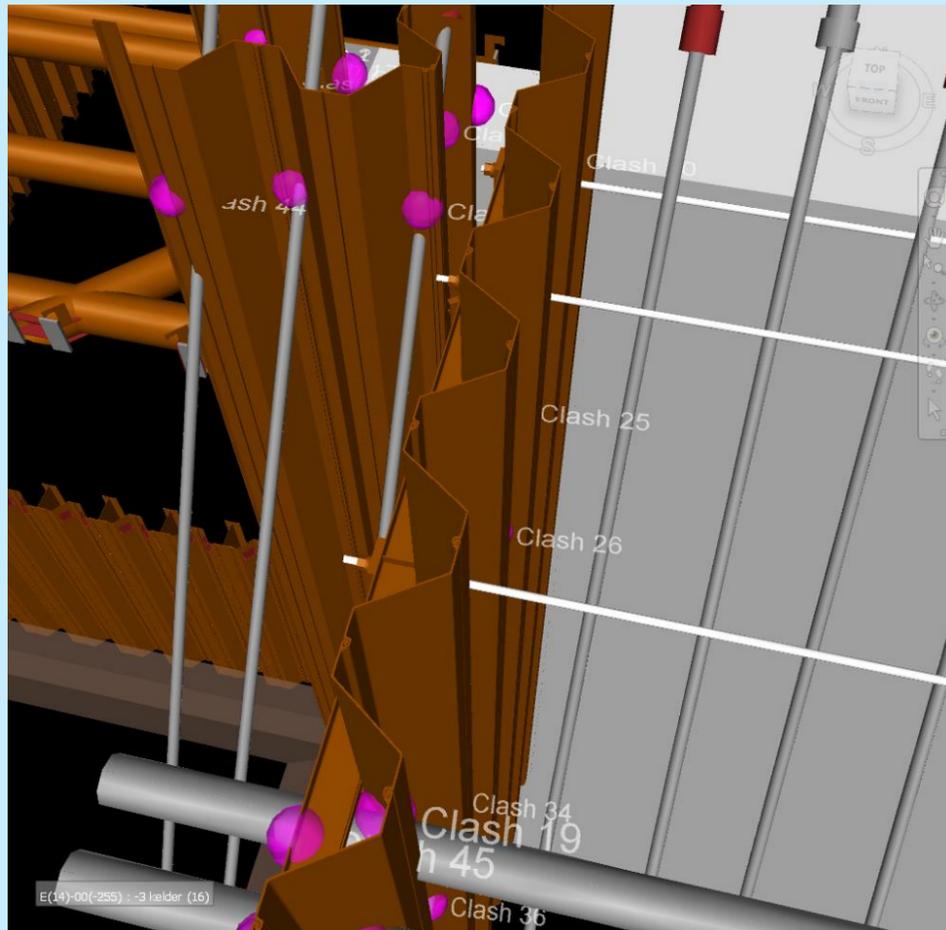
**Activity Feed:**

- RBT\_BCA\_BK\_330000.nwc**: Marcel Goede, De updated to Rotterdamse Baan (8 hours ago)
- RBT\_BCA\_BK\_320400.nwc**: Marcel Goede, De updated to Rotterdamse Baan (8 hours ago)
- RBT\_BCA\_BK\_320300.nwc**: Marcel Goede, De updated to Rotterdamse Baan (8 hours ago)
- RBT\_BCA\_BK\_310000.nwc**: Marcel Goede, De updated to Rotterdamse Baan (8 hours ago)
- RBT\_PDR\_BK\_300000.nwc**: Mark Hom updated to Rotterdamse Baan (Oct 21, 2016)



# Clash control tip

- 3D clashpoint export to Excel
- Read coördinaties in DWG
- Share data throughout multiple applications



Home Viewpoint Review Animation View Output BIM 360 Render Vault Revit 4 Tool add-ins 1

Append Refresh Reset File Select Save Selection Select All Select Same Selection Tree Find Items Quick Find Sets

Hide Require Hide Unselected Unhide All Links Quick Properties Properties Clash Detective TimeLiner Quantification Autodesk Rendering Animator Scripter Appearance Profiler Batch Utility Compare DataTools

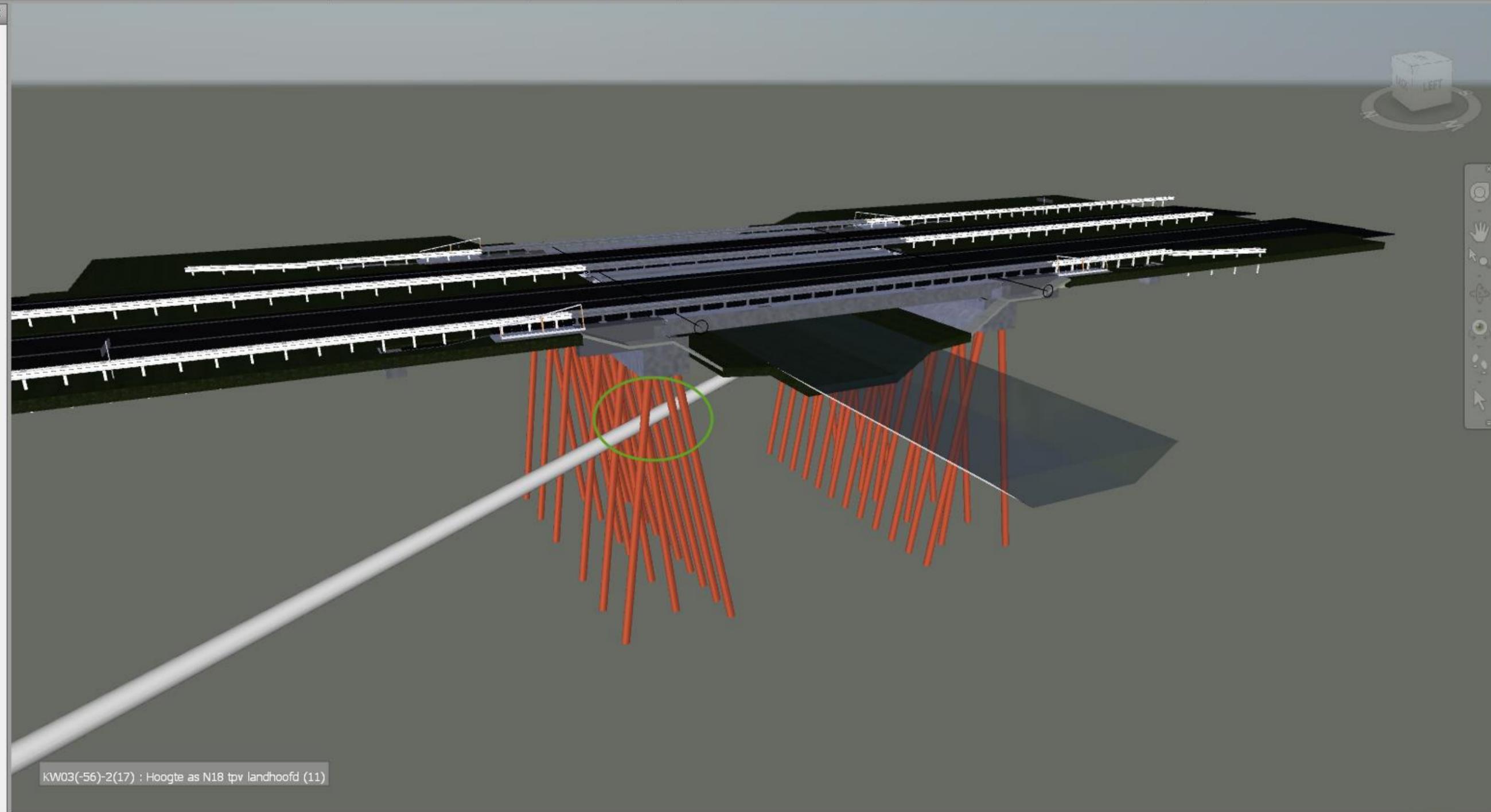
Project Select & Search Visibility Display Tools

Selection Tree

Standard

- Pipe.nwc
- KW03\_01.nwc

Ready



S...

- \_3D\_
- 3D V

1 of 1

657 MB

19:59

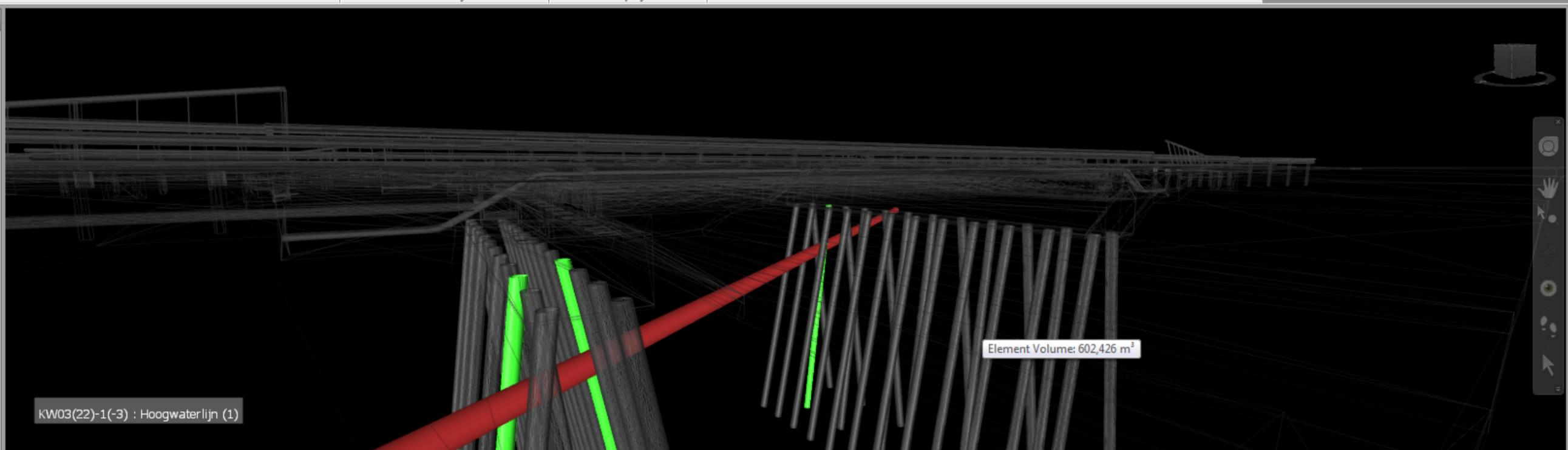
24-10-2016

Windows taskbar with icons for Internet Explorer, File Explorer, Chrome, Outlook, Word, PowerPoint, and other applications. System tray shows network, volume, and power icons.

Selection Tree

Standard

- Pipe.nwc
- KW03\_01.nwc



3D Viewport navigation controls including pan, zoom, and rotate tools.

Clash Detective

Test 1 Last Run: Monday, October 24, 2016 8:00:37 PM  
Clashes - Total: 6 (Open: 6 Closed: 0)

Name	Status	Clashes	New	Active	Reviewed	Approved	Resolved
Test 1	Done	6	6	0	0	0	0

Rules Select Results Report

Items

Item 1  Highlight

- Pipe.nwc
- N-CO-BC-BETONVORM-G
- pipe - pipe-3001685-\_3D\_
- pipe - pipe-3001685-\_3D\_

Item 2  Highlight

Element Volume: 0,270 m³

- KW03\_01.nwc
- N.A.P.
- Structural Foundations
- NLI\_Funderingspaal

Append Refresh Reset All... File Options Select Save Selection Select All Select Same Selection Tree Quick Find Sets Hide Require Hide Unselected Unhide All Links Quick Properties Properties Clash Detective TimeLine

Project Select & Search Visibility Display

Selection Tree

Standard

- Pipe.nwc
- KW03\_01.nwc

KW03(22)-1(-3) : Hoogwaterlijn (1)

Clash Detective

Test 1

Name	Status	Clashes	New	Active	Reviewed	Approved	Resolved
Test 1	Done	6	6	0	0	0	0

Add Test Reset All Compact All Delete All Update All

Rules Select Results Report

Contents

- Summary
- Clash Point
- Date Found
- Assigned To
- Date Approved
- Approved By
- Layer Name
- Item Path
- Item ID
- Status
- Distance
- Description
- Comments
- Quick Properties
- Image
- Simulation Dates

Include Clashes For Clash Groups, Group Headers O

Include only fill

Include these statu

- New
- Active
- Reviewed
- Approved
- Resolved

Output Settings

Autodesk Navisworks Manage 2016 - Untitled

Home Viewpoint Review Animation View Output BIM 360 Render Vault Revit 4 Tool-add-ins 1

Append Refresh Reset All... Options Select Save Selection Select All Select Same Selection Tree Find Items Quick Find Hide Require Hide Unselected Unhide All Links Quick Properties Properties Clash Detective TimeLiner Quantification Autodesk Animator Scripter Appearance Profiler Batch Utility Compare DataTools

Project Select & Search Visibility Display Tools

Selection Tree: Standard, Pipe.nwc, KW03\_01.nwc

View: kW03(22)-1(-3) : Hoogwaterlijn (1)

Clash Detective: Test 1

Name	Status	Clashes	New	Active	Reviewed
Test 1	Done	6	6	0	0

Buttons: Add Test, Reset All, Compact All, Delete All, Update All

Contents: Summary, Clash Point, Date Found, Assigned To, Date Approved, Approved By, Layer Name, Item Path, Item ID, Status, Distance, Description, Comments, Quick Properties, Image, Simulation Dates

Output Settings: Report Type: Current test, Report Format: Text, Preserve result highlighting

Write Report

Test 1.txt - Kladblok

```

Bestand  Bewerken  Opmaak  Beeld  Help

Clashes
-----
Report Batch

Test 1 clash
Tolerance:      0.001m

-----
Name:  clash1
Distance:      m
Image Location:
Clash Point:   239948.419m, 451953.109m, 18.538m

-----
Name:  clash2
Distance:      m
Image Location:
Clash Point:   239948.591m, 451952.684m, 17.758m

-----
Name:  clash3
Distance:      m
Image Location:
Clash Point:   239963.546m, 451928.999m, 18.376m

-----
Name:  clash4
Distance:      m
Image Location:
Clash Point:   239963.525m, 451928.939m, 18.043m

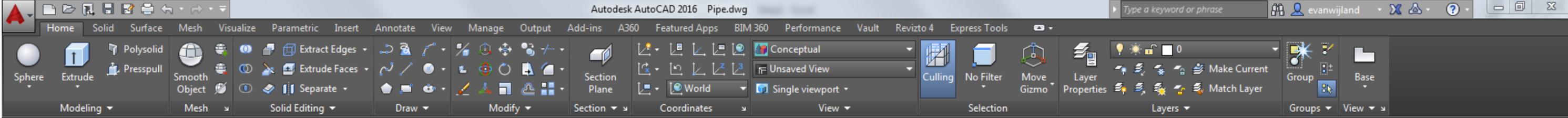
-----
Name:  clash5
Distance:      m
Image Location:
Clash Point:   239961.552m, 451931.957m, 18.225m

```

Clash Detective Summary: Last Run: Monday, October 24, 2016 8:00:37 PM, Clashes - Total: 6 (Open: 6 Closed: 0)

AutoSaved: C:\Users\evanwijland\AppData\Roaming\Autodesk Navisworks Manage 2016\AutoSave\Untitled.Autosave13.nwf

1 of 1 | 714 MB | 20:02 | 24-10-2016



Start Pipe\* x +

[--][Custom View][Conceptual]

Test 1.txt - Excel

BESTAND START INVOEGEN PAGINA-INDELING FORMULES GEGEVENS CONTROLLEREN BEELD ONTWIKKELAARS OfficeTemplates Wijland, E...

Plakken Klembord Lettertype Uitlijning Getal Stijlen Cellen Bewerken

B2 : X ✓ fx 239948419

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Name:	Clash point (mm):												
2	Clash1	239948419	451953109	18538										
3	Clash2	239948591	451952684	17758										
4	Clash3	239963546	451928999	18376										
5	Clash4	239963525	451928939	18043										
6	Clash5	239961552	451931957	18225										
7	Clash6	239961739	451931800	17921										

Test 1

Een bestemming kiezen en op ENTER drukken of Plakken kiezen GEMIDDELDE: 230637985 AANTAL: 18 SOM: 4151483721

Draw from Coordinates

File Edit Help

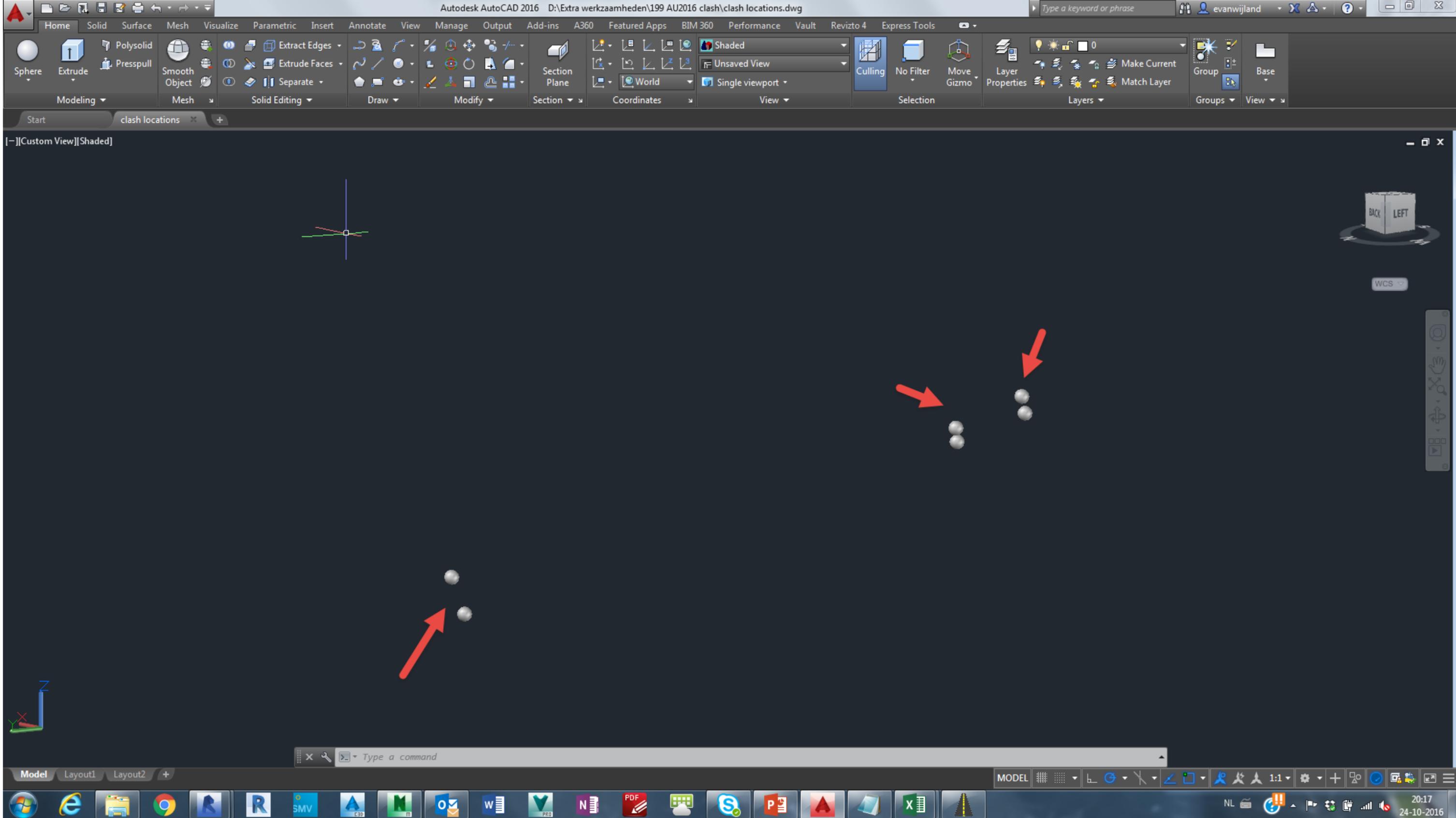
Type: Block at Point Block: clash point

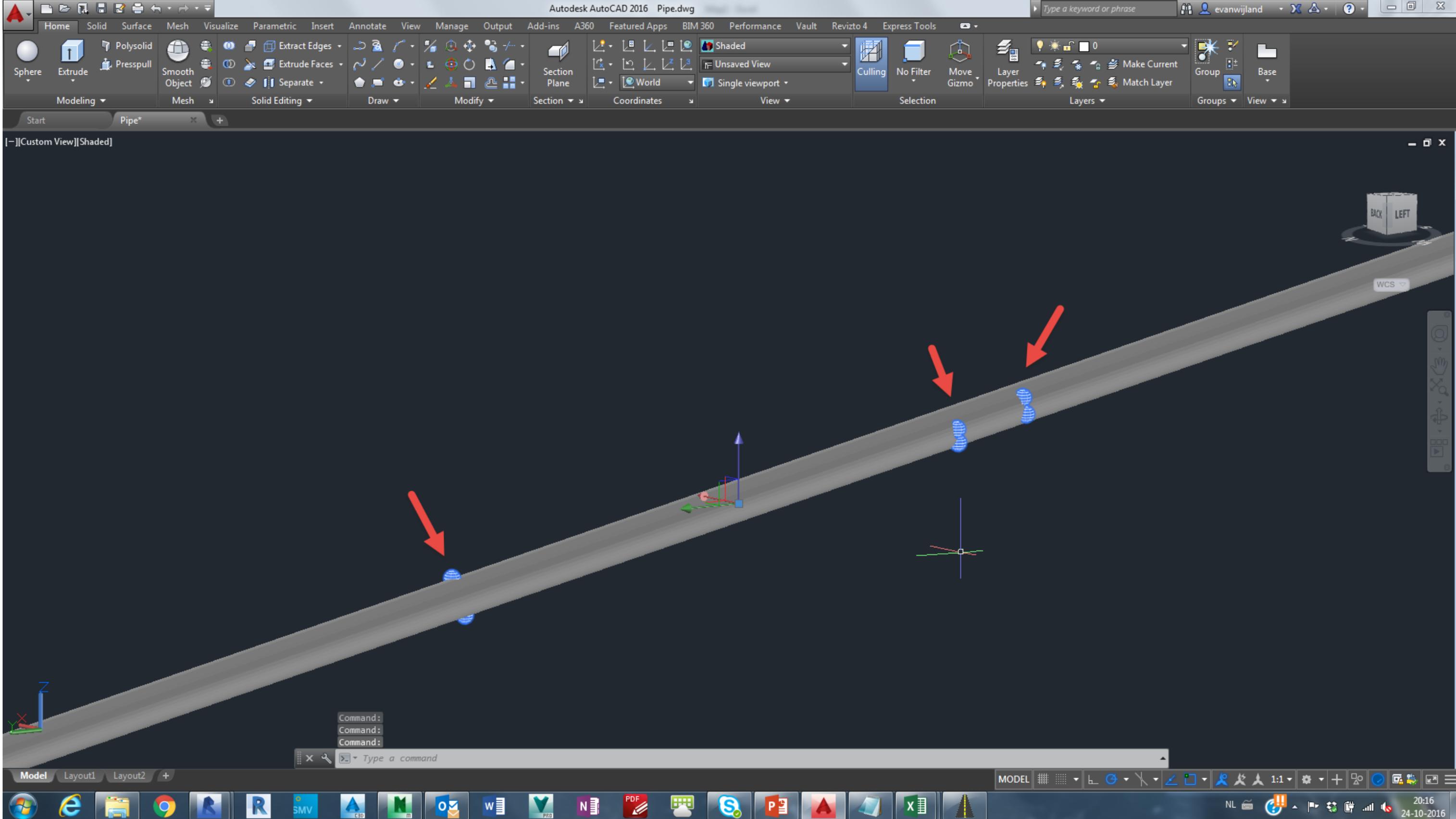
X (east)	Y (north)	Z	Rotation	Scale	Layer Override
239948419	451953109	18538	0		
239948591	451952684	17758	0		
239963546	451928999	18376	0		
239963525	451928939	18043	0		
239961552	451931957	18225	0		
239961739	451931800	17921	0		

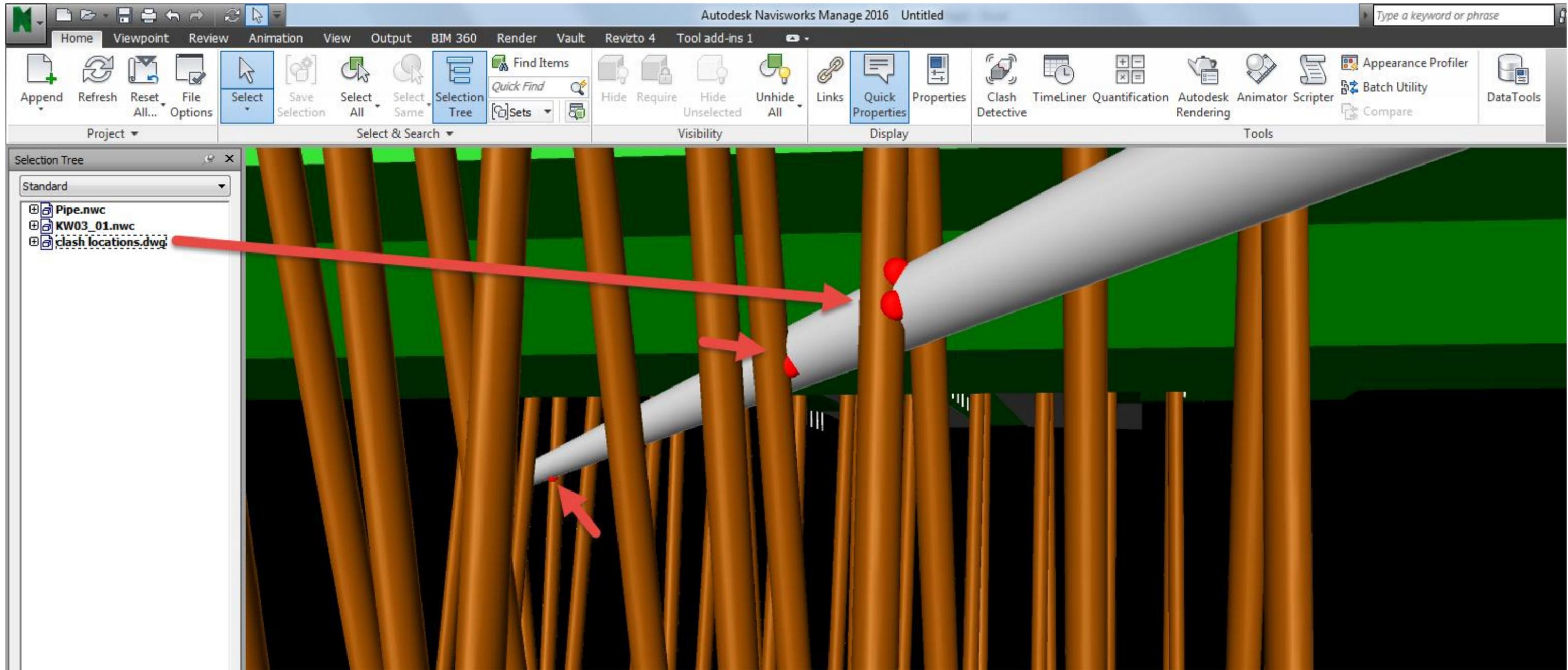
Layer: 0

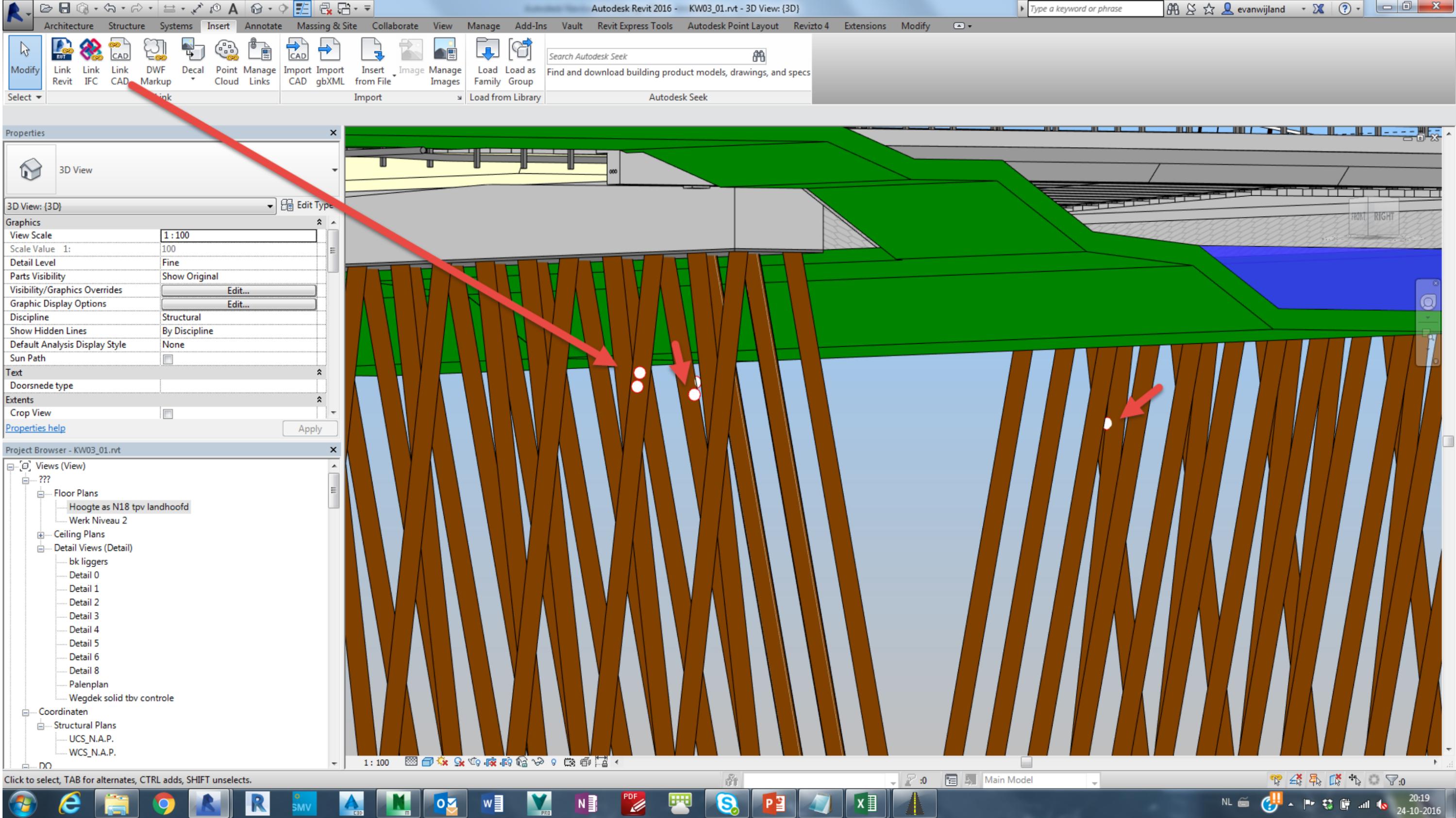
Draw Cancel

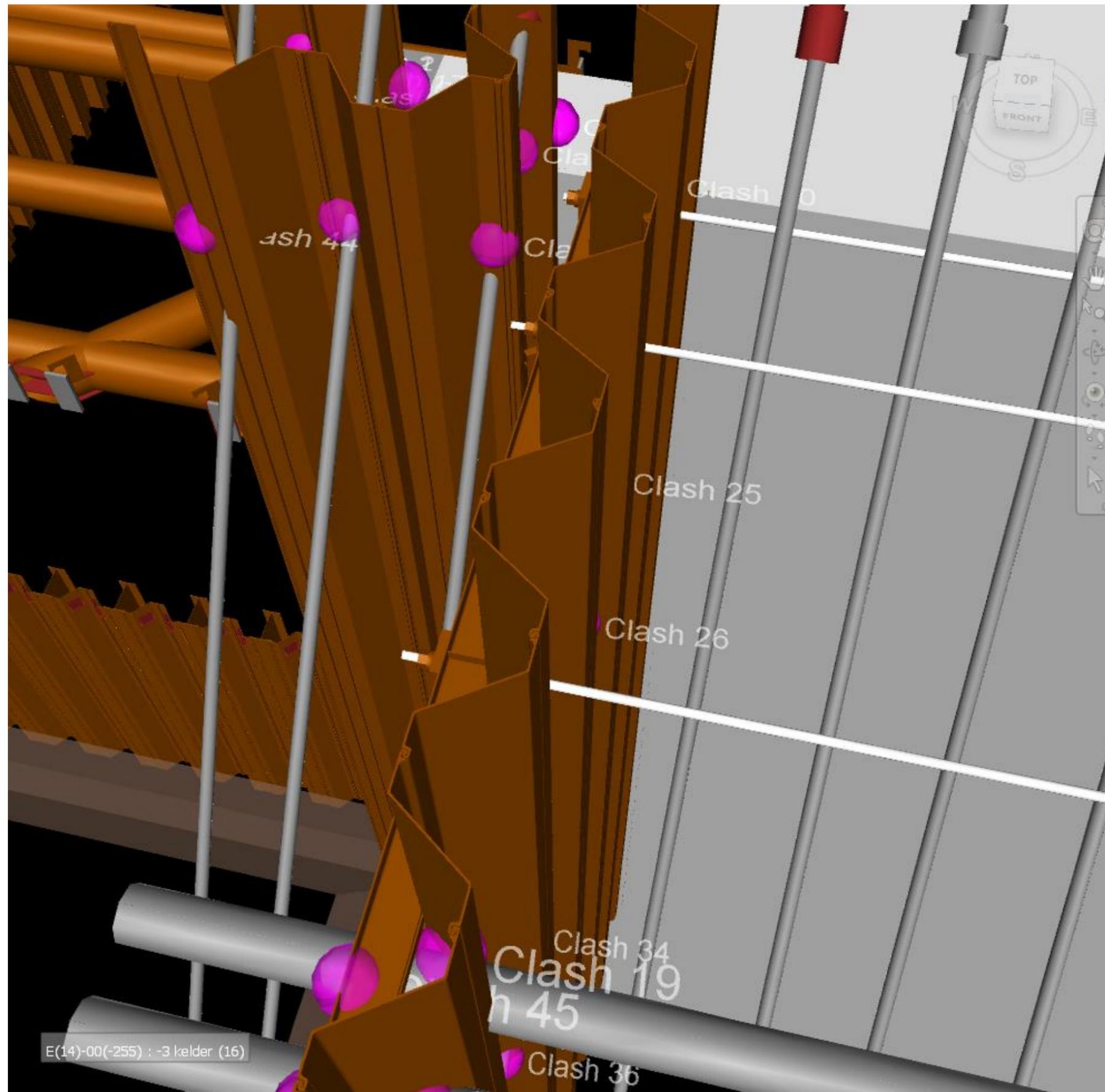






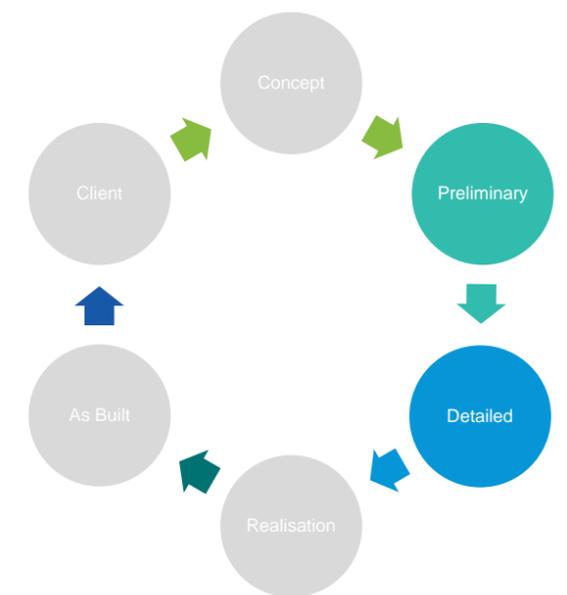




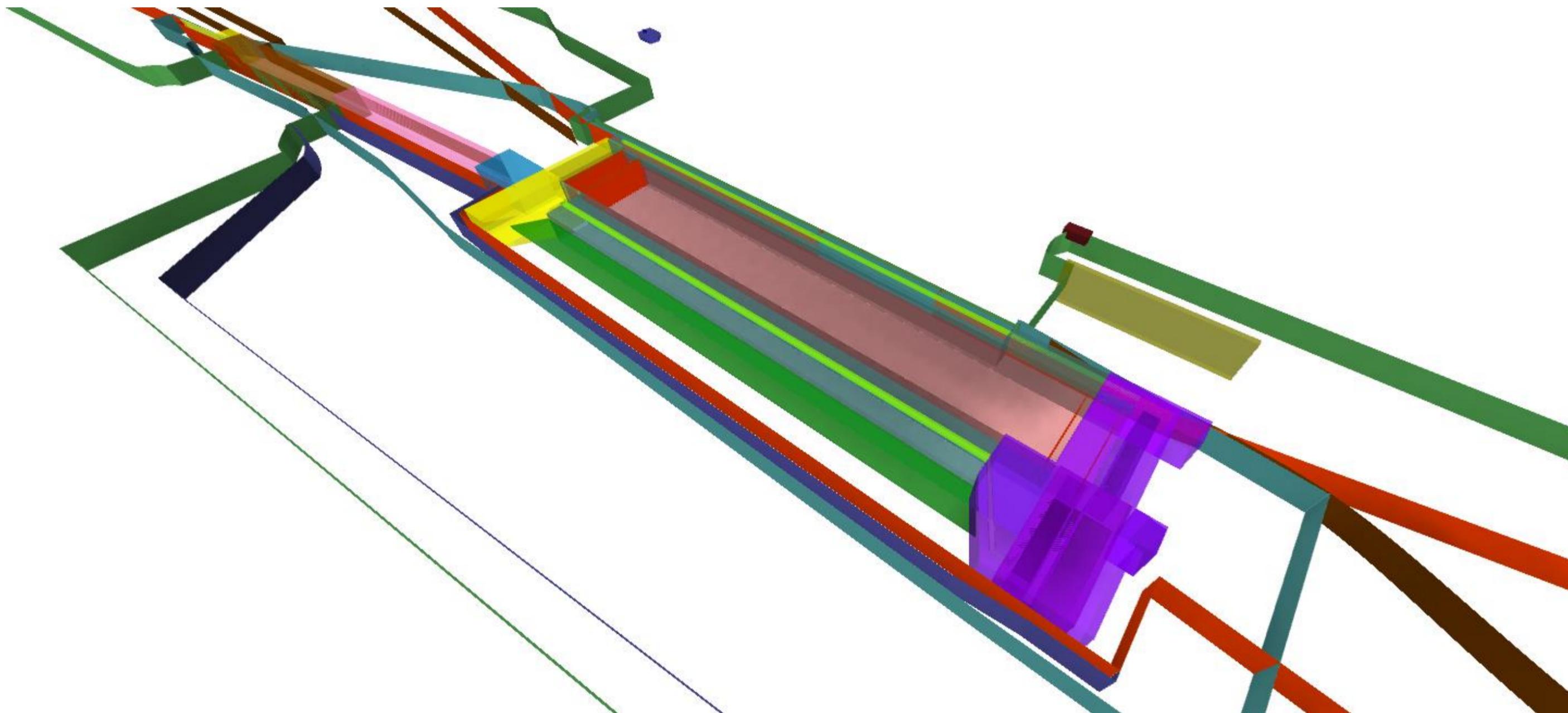


# Preliminary and detailed design

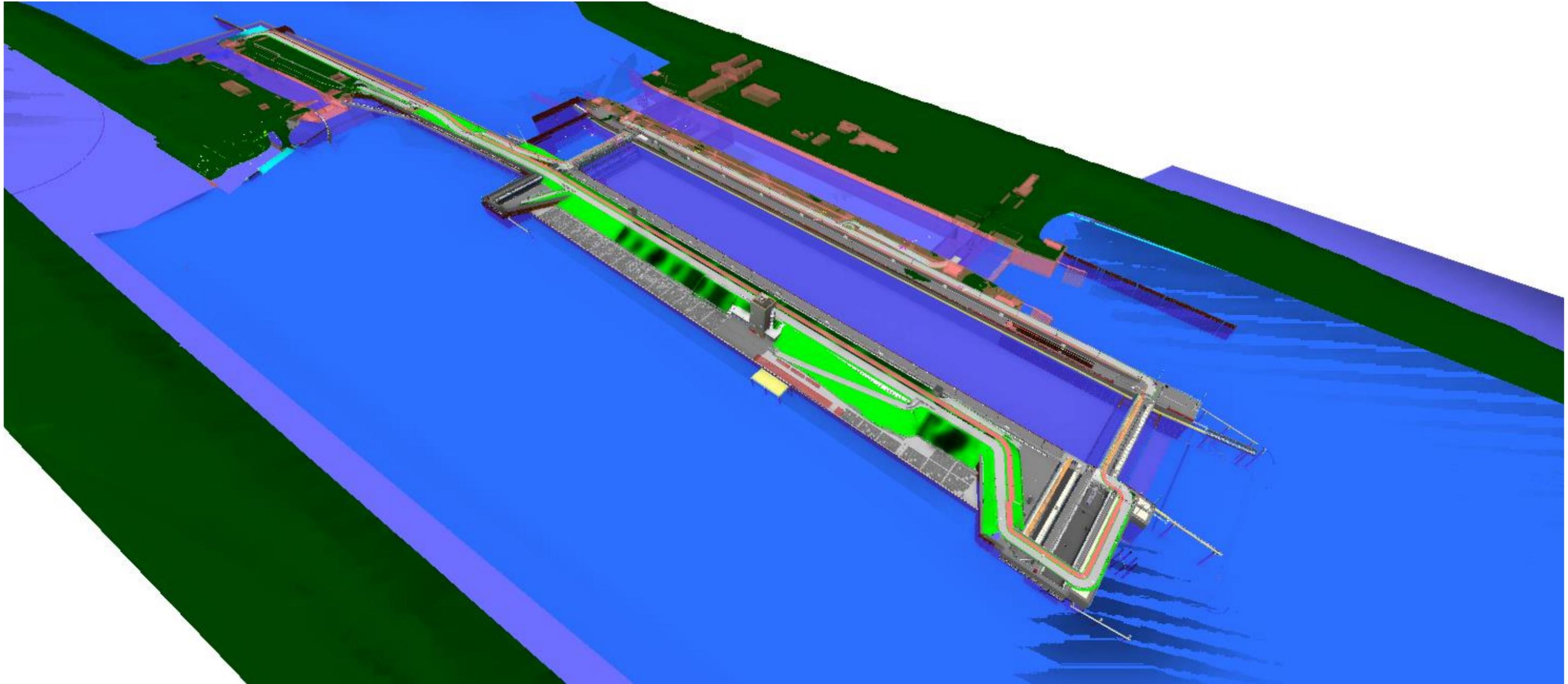
- From conceptual design to preliminary design
- Design available for the project team
- Preliminary design - application for licenses
- 1 continuous model (according to the BIM protocol)
- Implementing Vault (DMS)
- Level of detail / development
- Display models and drawings
- Point cloud data collected by drones



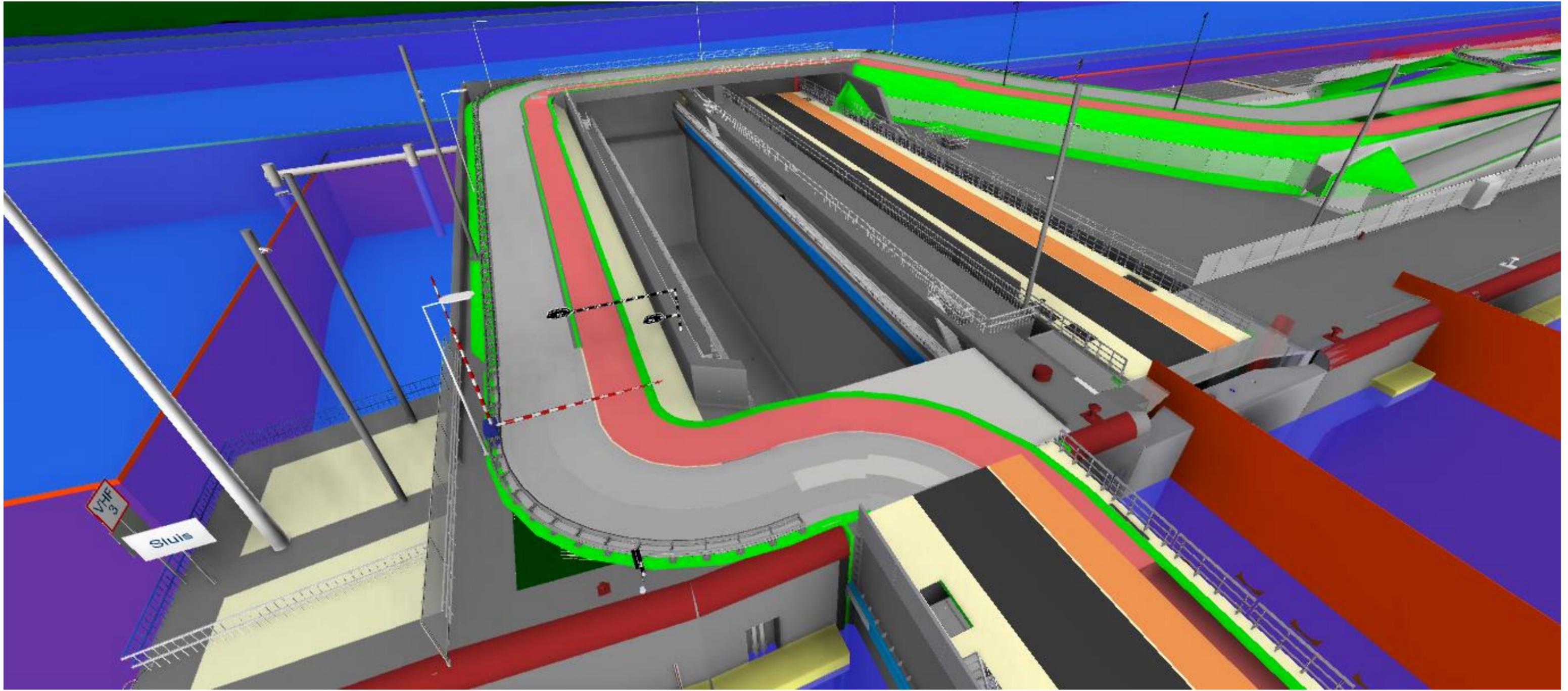
# Conceptual design



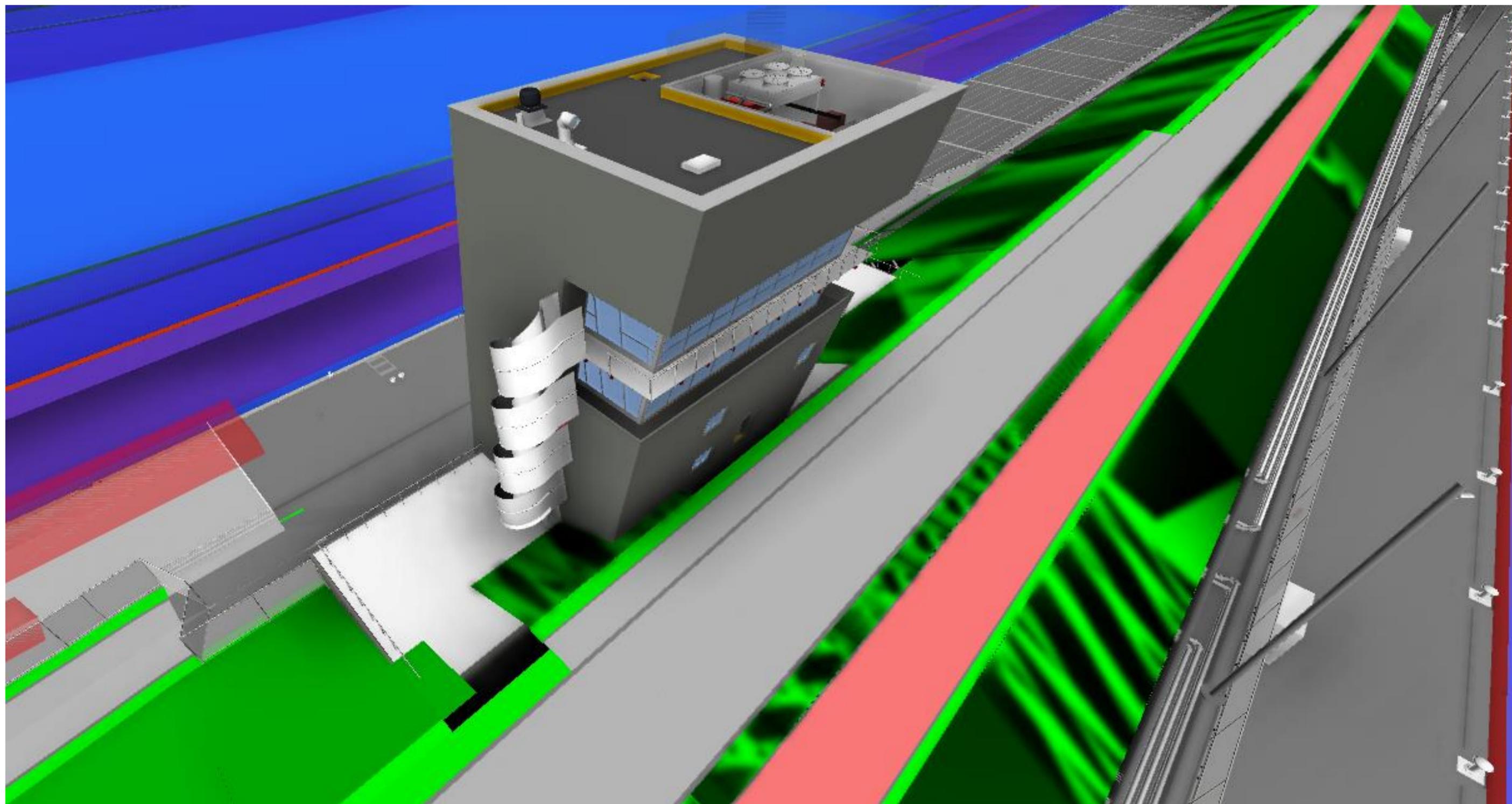
# Preliminary and detailed design



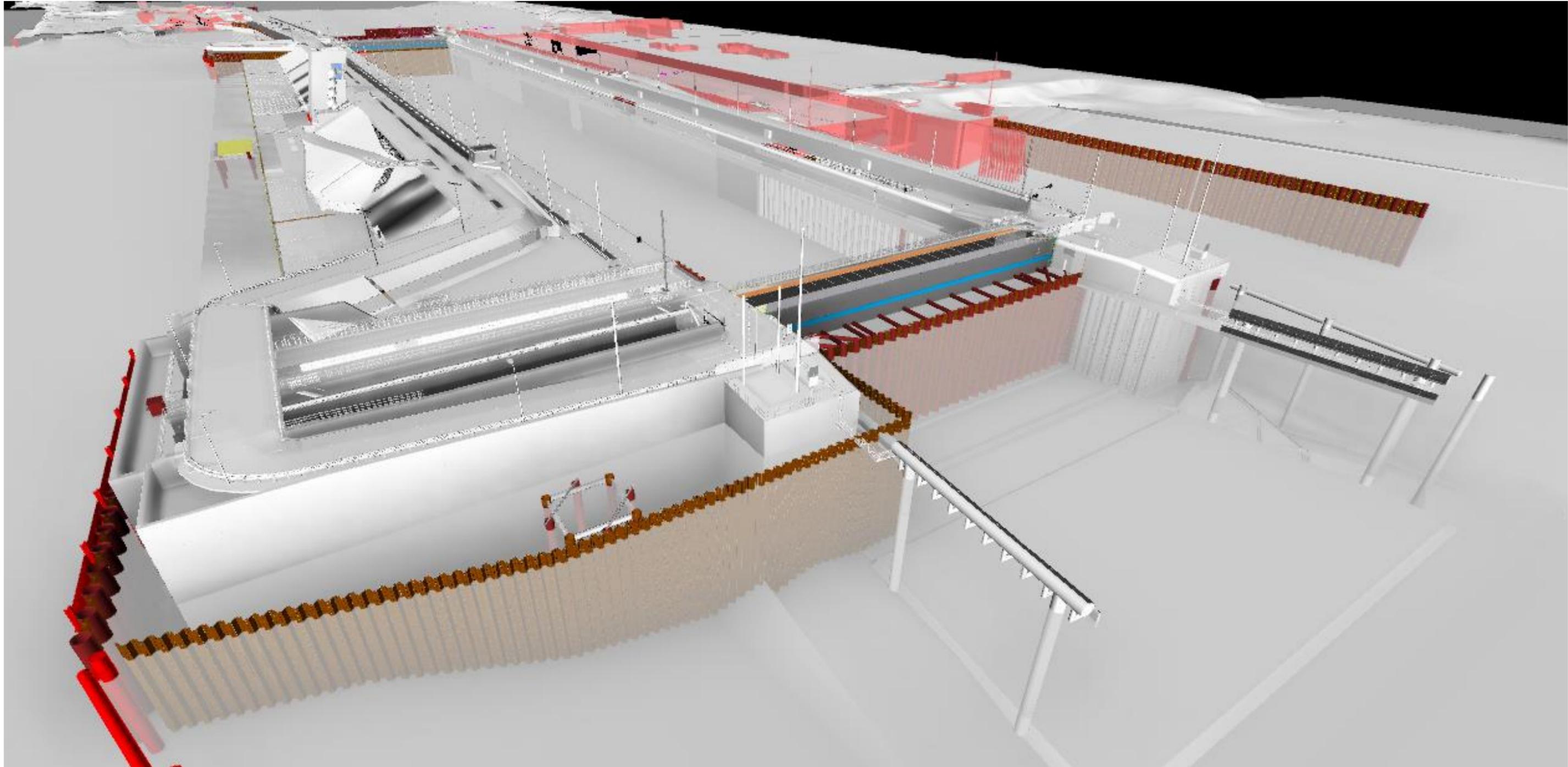
# Preliminary and detailed design



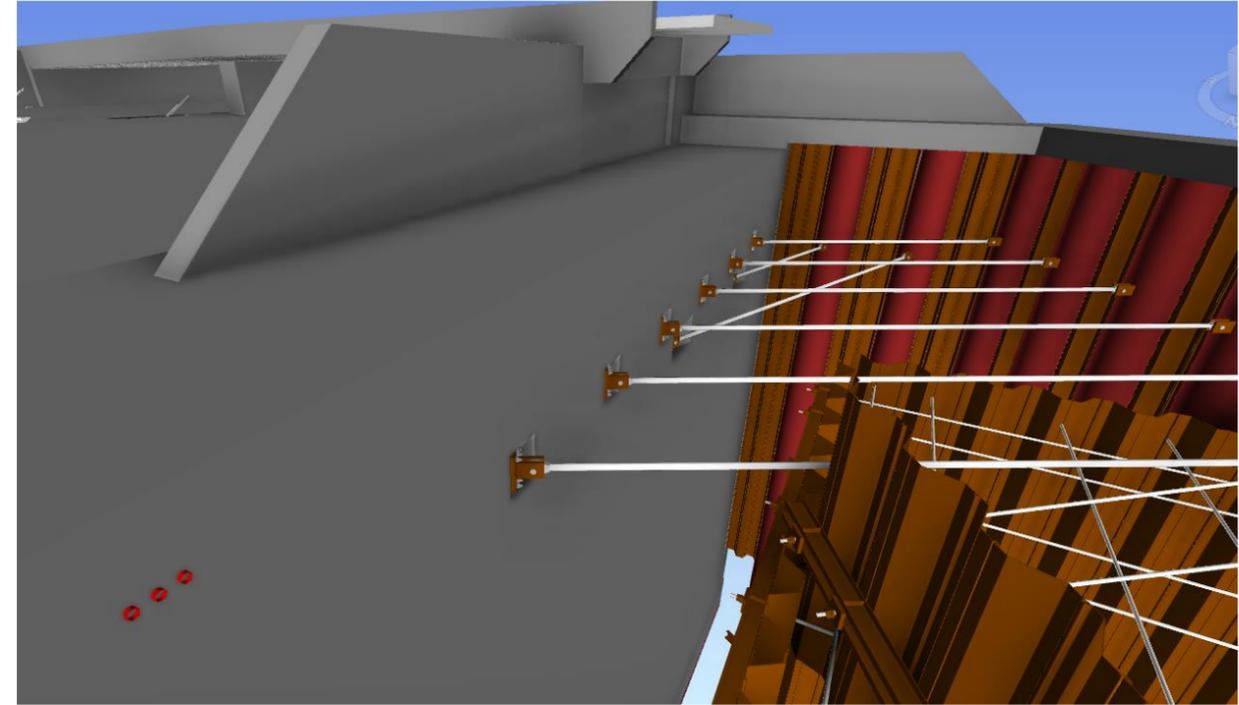
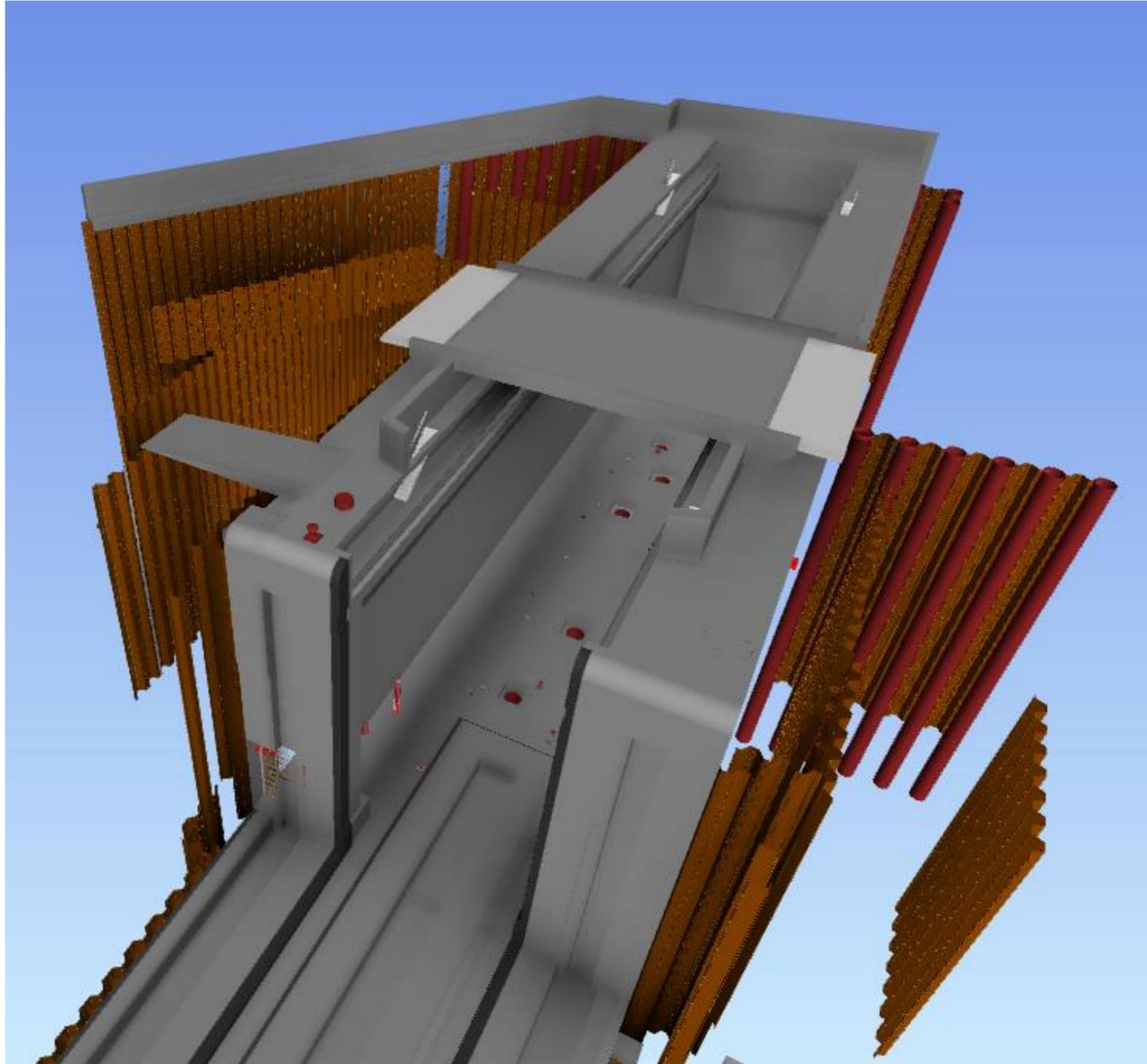
# Preliminary and detailed design



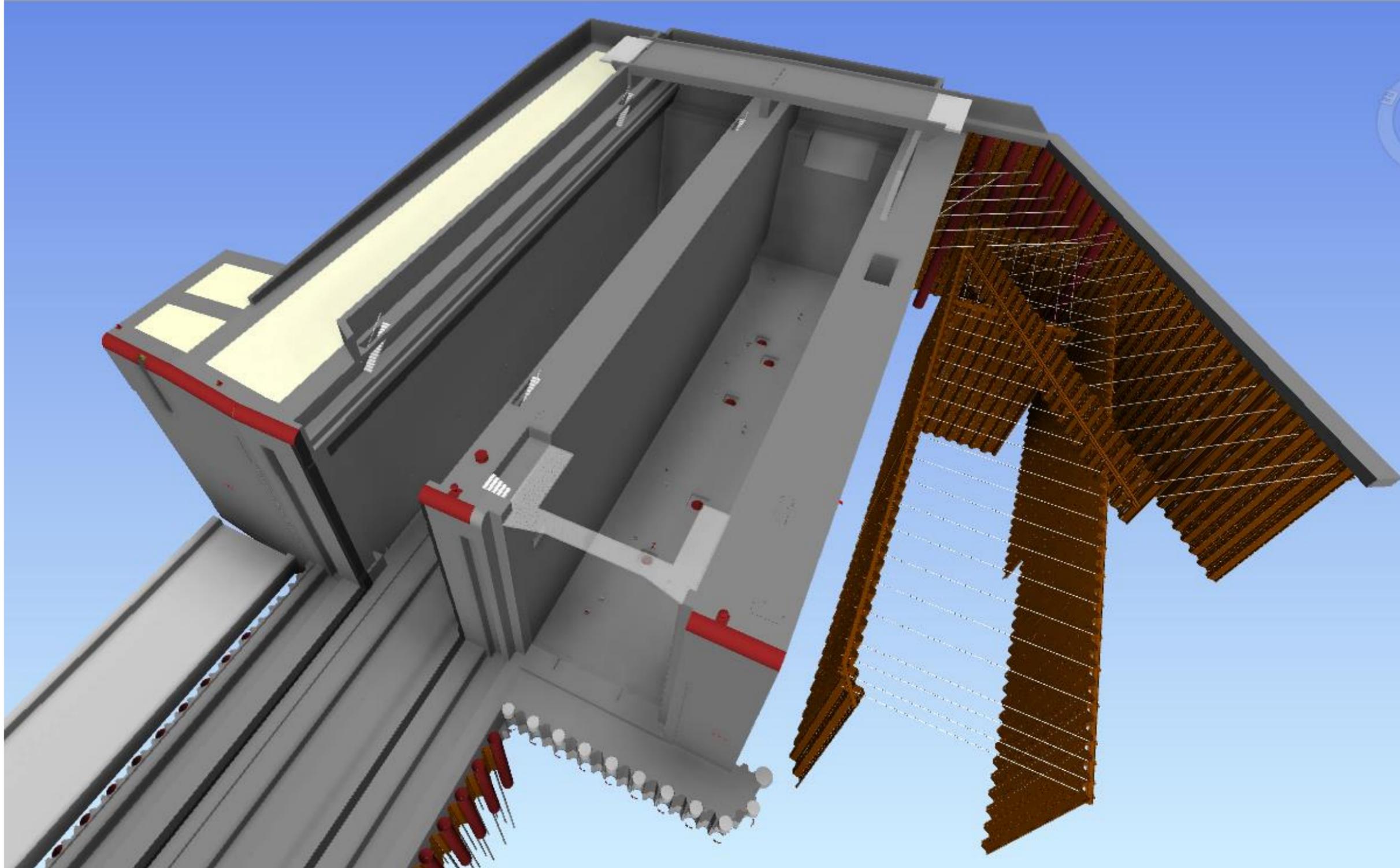
# Preliminary and detailed design



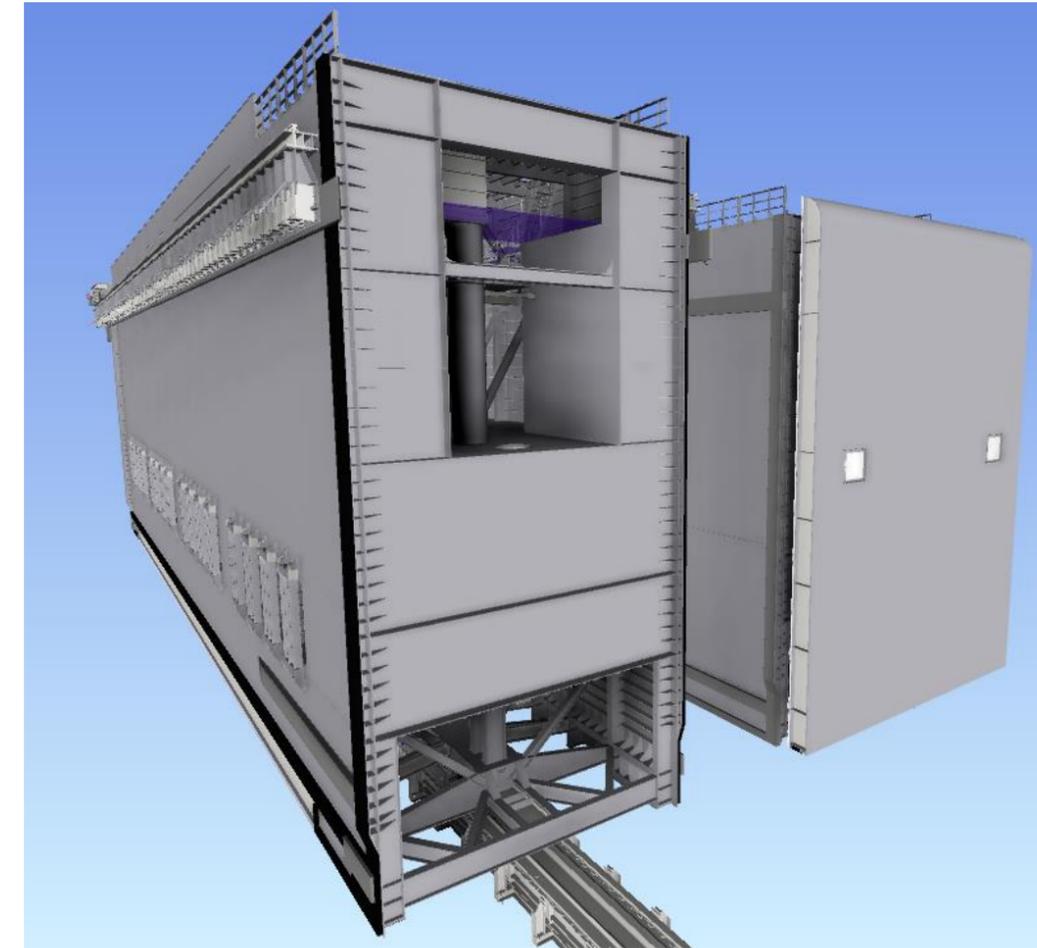
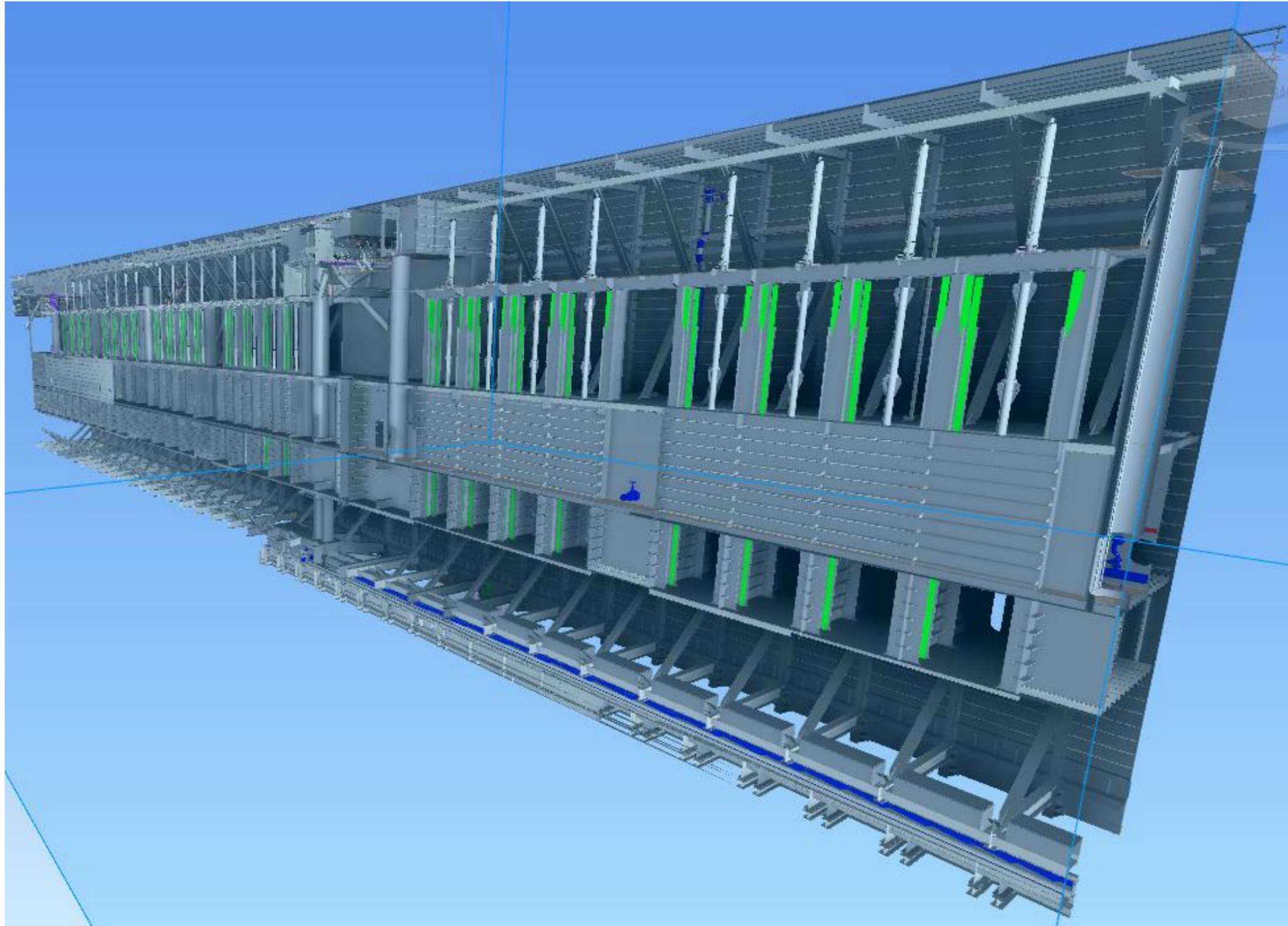
# Detailed design – Lock head- Revit



# Detailed design – Lock head- Revit

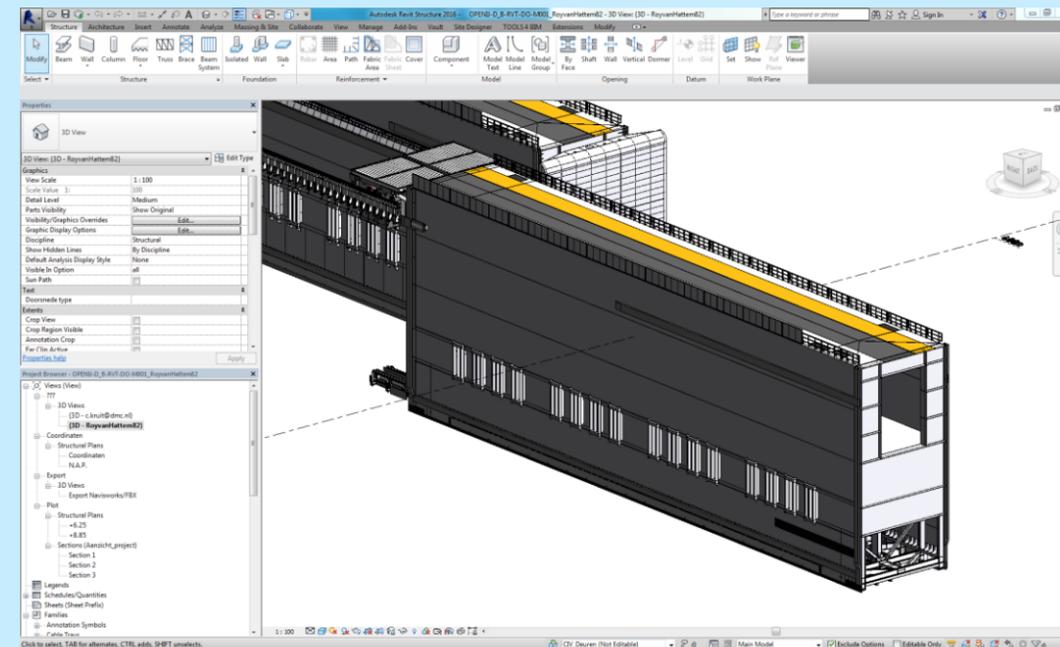
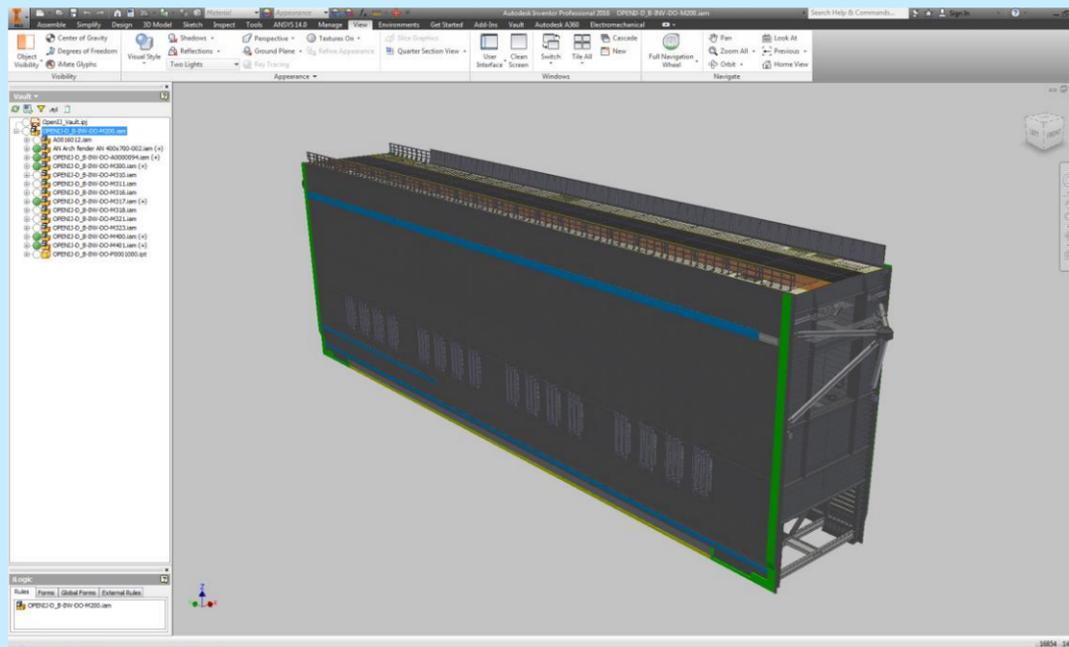


# Detailed design – Lock gate - Inventor



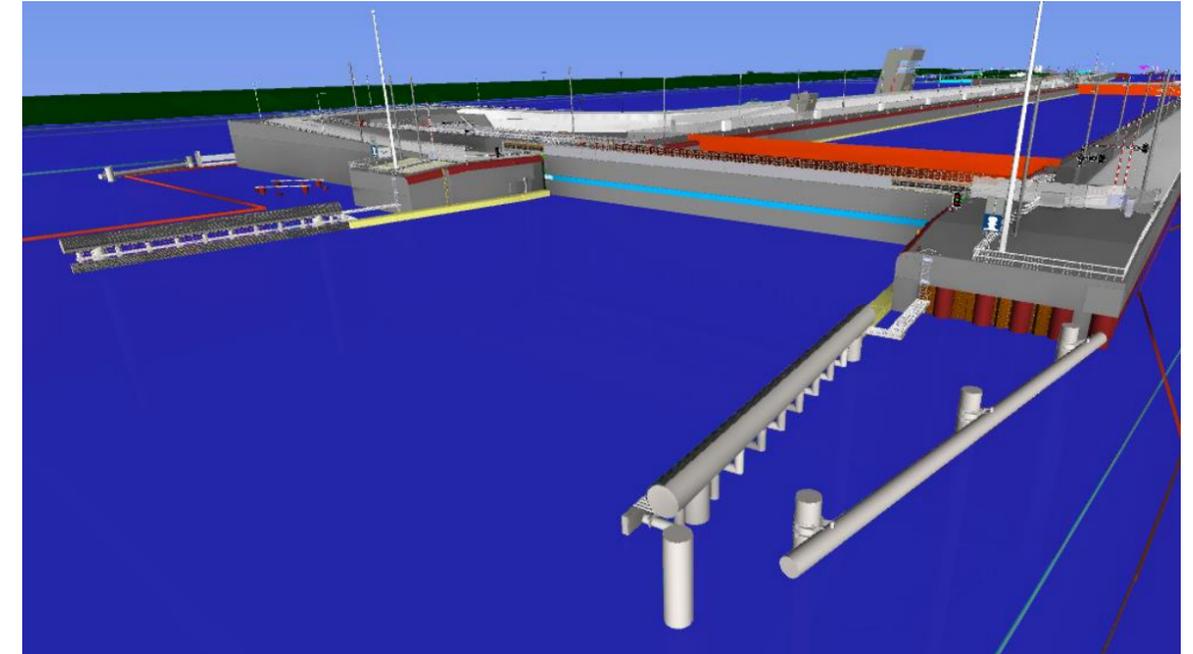
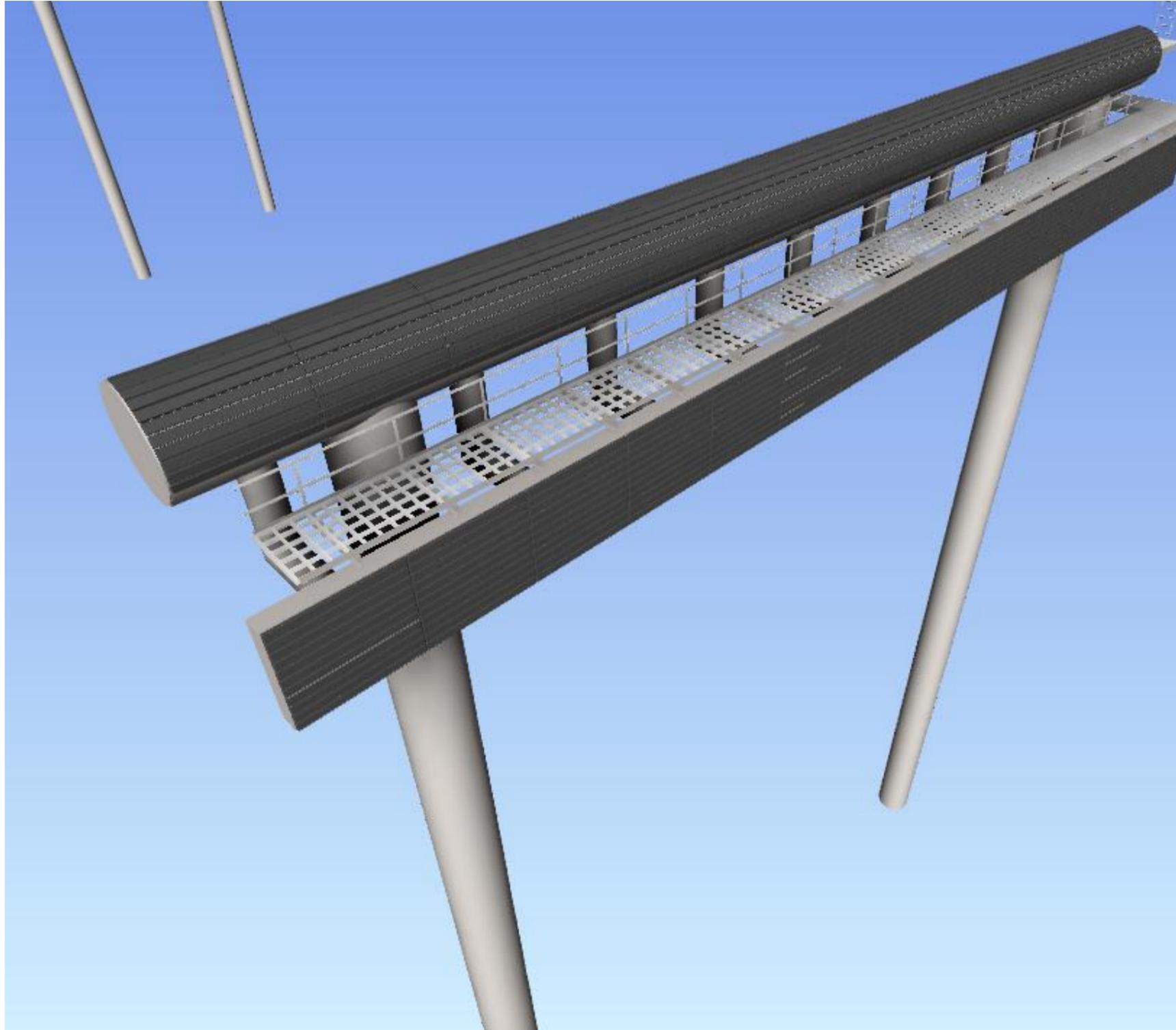
# Demo

- The Inventor gate model is converted to an ADSK file (max. 125 MB).
- Place this ADSK file into a Revit Family (RFA);
- You could place the family at the correct coordinate with the prepared axis inside the family

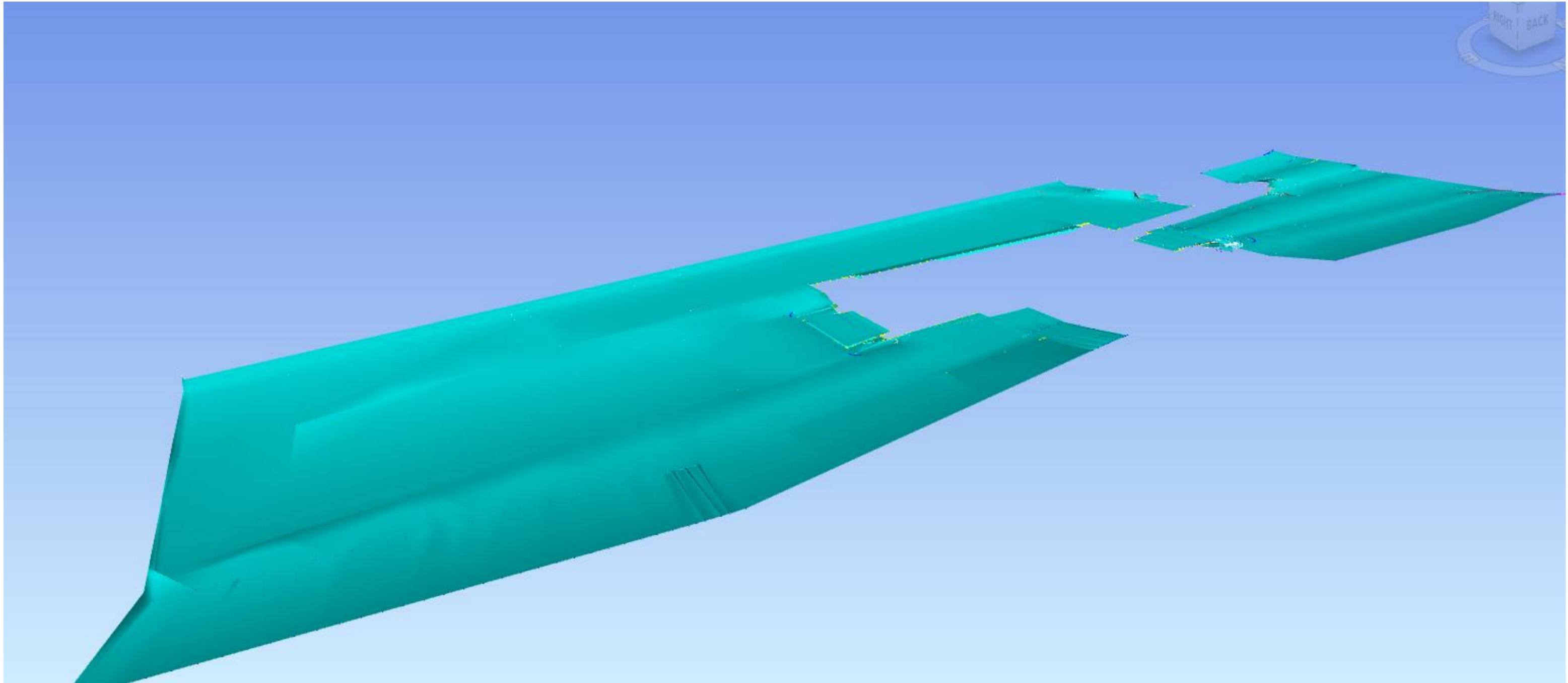


DEMO  
7

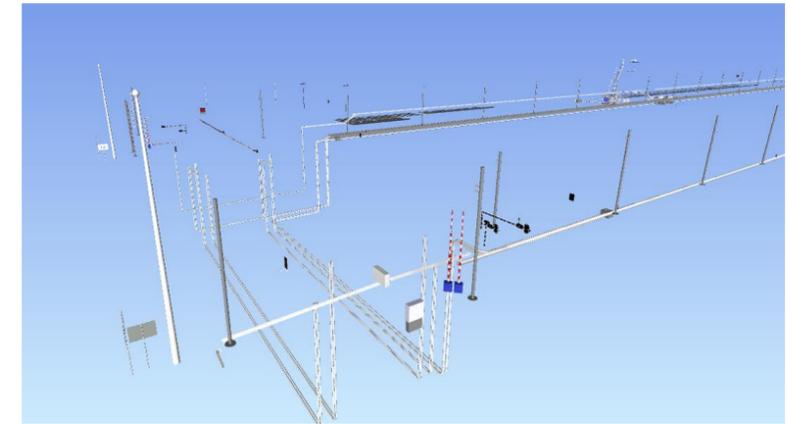
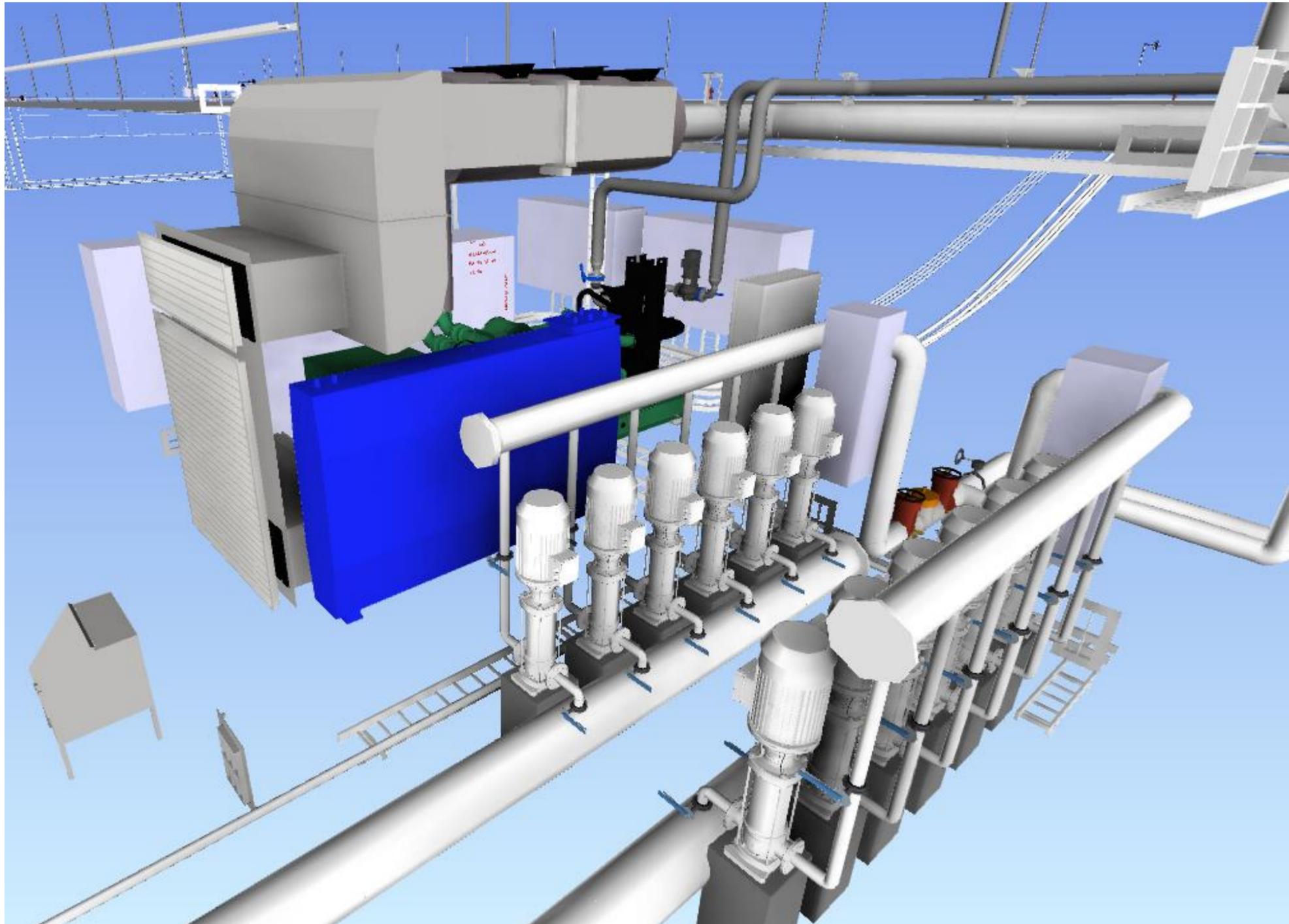
# Detailed design – Fender- Solidworks



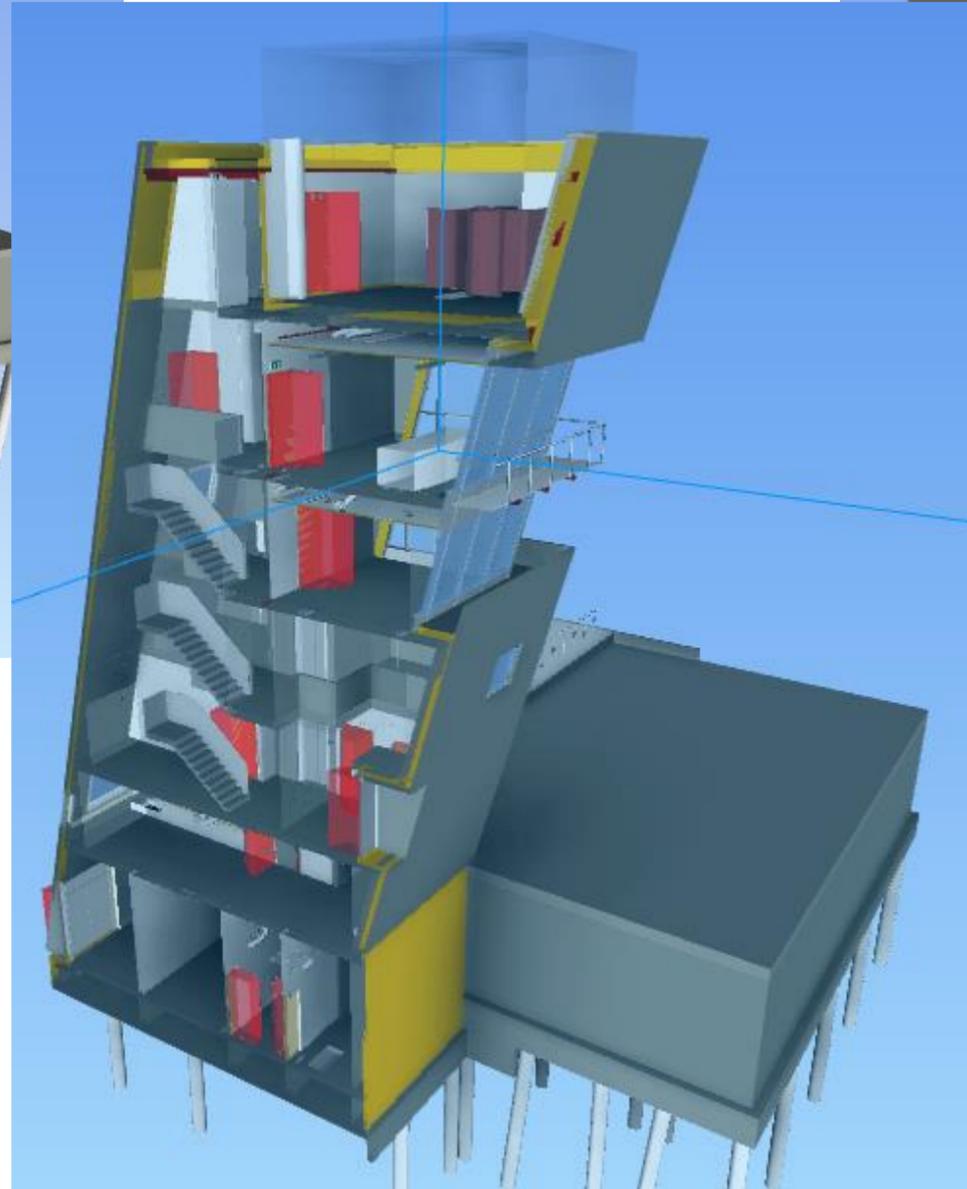
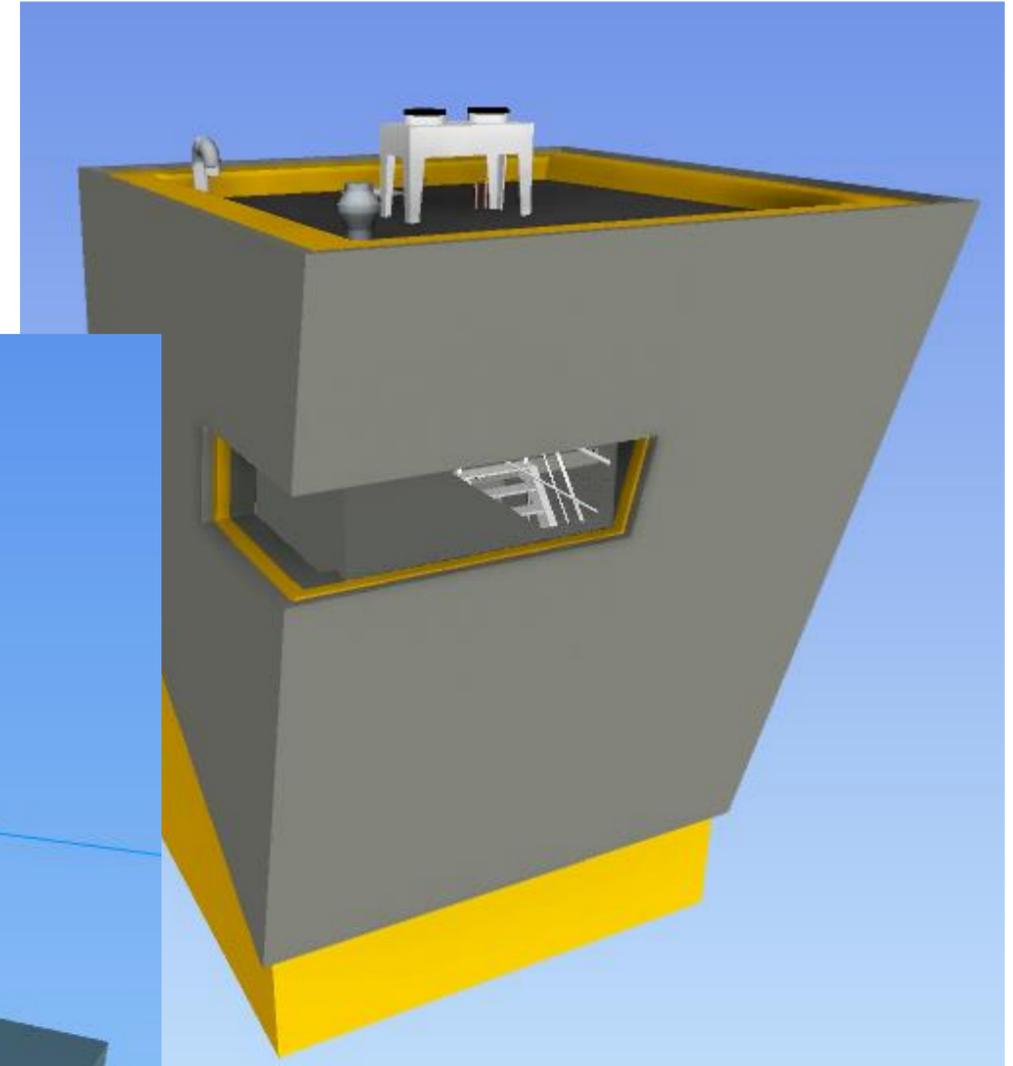
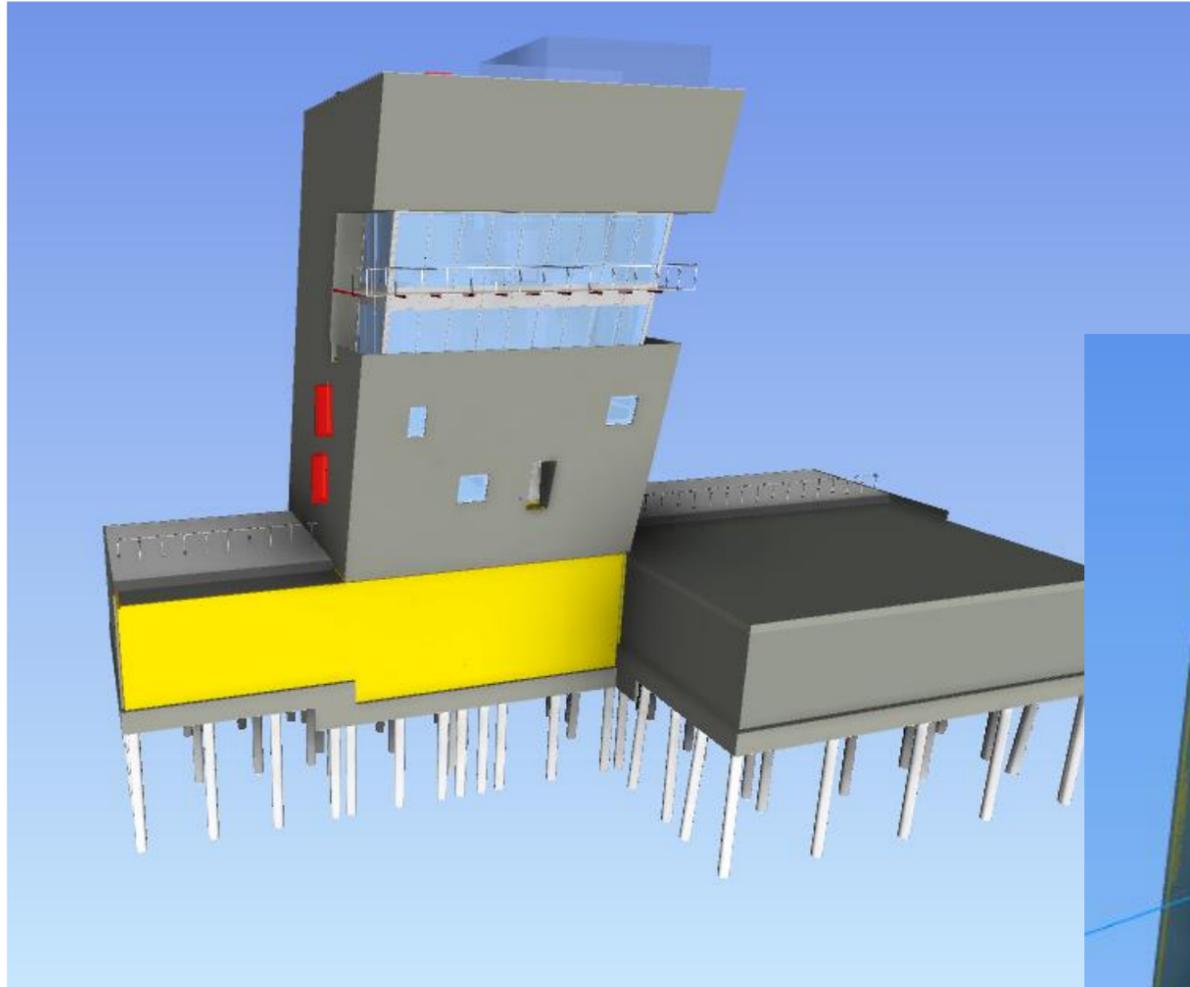
# Detailed design – bottom - Civil3D / VOSS



# Detailed design – Installations - Revit MEP



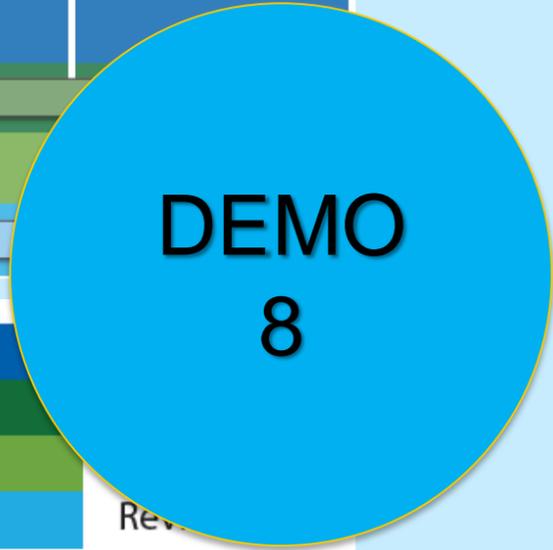
# Detailed design – control building - Revit



CAD Resources Matrix		Conceptual design	Preliminary design	Final design	Execution design	As-built	Maintenance
Bridges, Viaducts & Ecoducts steel	Inventor / Tekla / Revit						
Bridges, Viaducts & Ecoducts concrete	C3D / Revit						
Dikes, Dams, Levees & Embankments	C3D / Revit						
Moveable bridges							
Noise barriers							
Reclamations, Excavations & Fills							
Retaining structures & Quay walls							
Roads & Highways							
Sluices	Allplan / C3D / Revit						
Tunnels, Aquaducts & Underground structures	Infraworks						

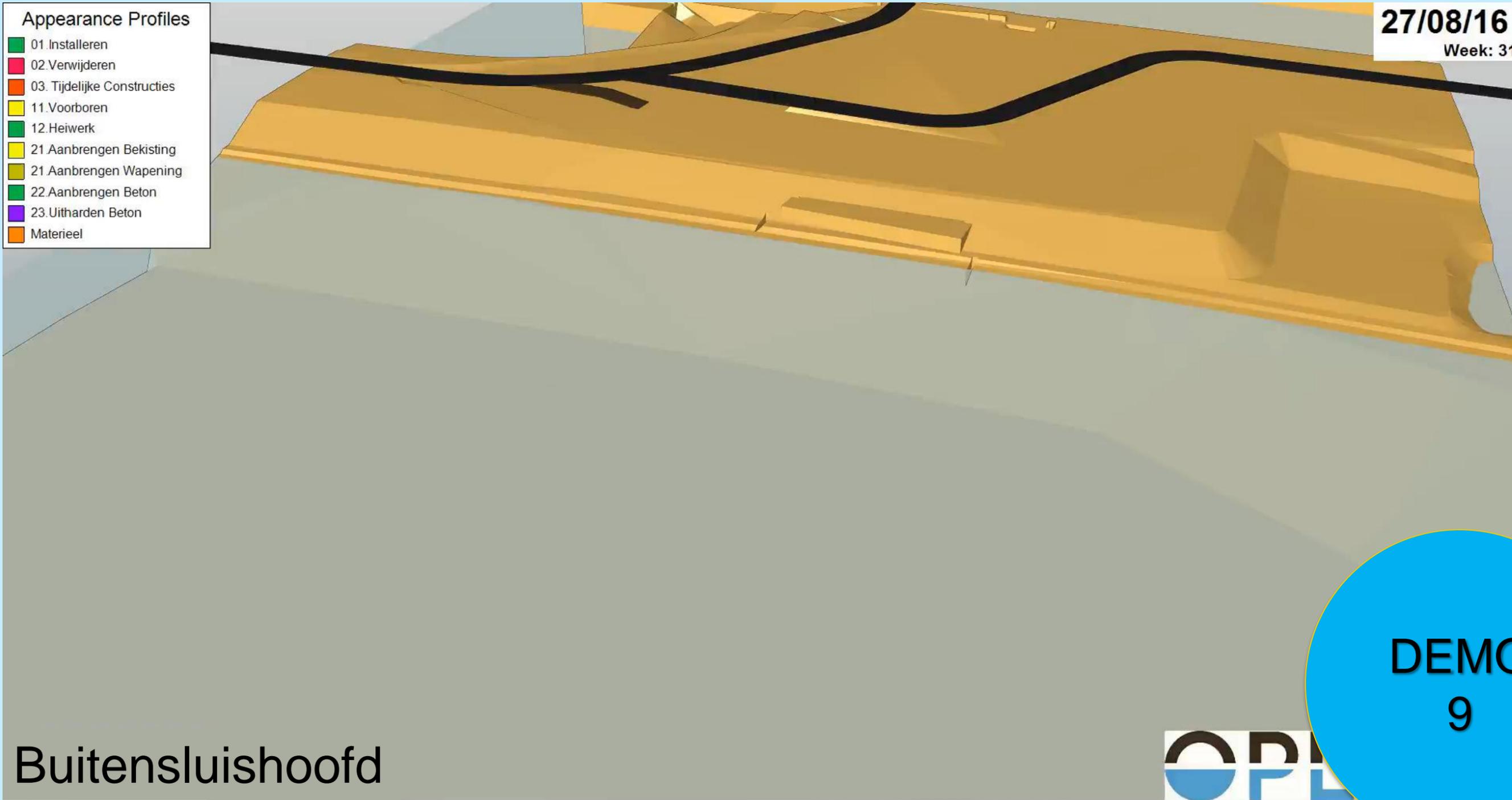
CAD Resources Matrix		Conceptual design	Preliminary design	Final design	Execution design	As-built	Maintenance
Bridges, Viaducts & Ecoducts steel	Inventor / Tekla / Revit						
Bridges, Viaducts & Ecoducts concrete	C3D / Revit						
Dikes, Dams, Levees & Embankments	C3D / Revit						
Moveable bridges							
Noise barriers							
Reclamations, Excavations & Fills							
Retaining structures & Quay walls							
Roads & Highways							
Sluices	Allplan / C3D / Revit						
Tunnels, Aquaducts & Underground structures	Infraworks						



# 4D

- Appearance Profiles**
- 01. Installeren
  - 02. Verwijderen
  - 03. Tijdelijke Constructies
  - 11. Voorboren
  - 12. Heiwerk
  - 21. Aanbrengen Bekisting
  - 21. Aanbrengen Wapening
  - 22. Aanbrengen Beton
  - 23. Uitharden Beton
  - Materieel

**27/08/16**  
Week: 31



DEMO  
9

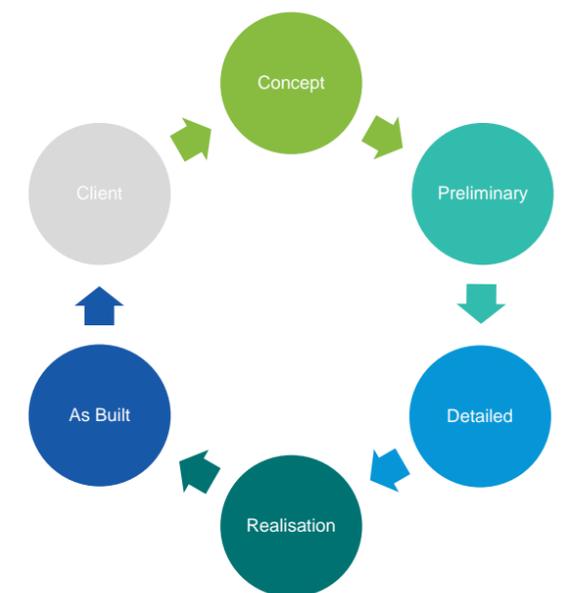
## Buitensluishoofd



Sep 2016					Oct 2016				Nov 2016				Dec 2016				Jan 2017				Feb 2017				Mar 2017				Apr 2017													
1st	8th	15th	22nd	29th	6th	13th	20th	27th	3rd	10th	17th	24th	1st	8th	15th	22nd	29th	5th	12th	19th	26th	2nd	9th	16th	23rd	2nd	9th	16th	23rd	30th	6th	13th	20th	27th								
wk 32	wk 33	wk 34	wk 35	wk 36	wk 37	wk 38	wk 39	wk 40	wk 41	wk 42	wk 43	wk 44	wk 45	wk 46	wk 47	wk 48	wk 49	wk 50	wk 51	wk 52	wk 53	wk 54	wk 55	wk 56	wk 57	wk 58	wk 59	wk 60	wk 61	wk 62	wk 63	wk 64	wk 65	wk 66	wk 67	wk 68	wk 69					

# Autodesk Vault

- Challenges:
  - Multiple companies with their own IT
  - Differences in licencing on Autodesk Products
  - How to solve worksharing?
  - LAN and WAN acces
  - Implementing on ongoing project (<1 month)
  - Acceptance by team members



Autodesk Vault Professional 2016

File Edit View Go Tools Actions Help

New Report... Plot... Check In... Find... Change Category... Update Properties from Folder Change State... Change Revision...

Default View Layout Workspace Sync...

Project Explorer

- Project Explorer (\$)
  - \_Configuratie
  - \_Content Center Files
  - \_Design Data
  - \_Revit Template
  - Deliverables
  - Libraries
  - Persoonlijke mappen
  - Project
    - 01 Revit
    - 02 AutoCAD
      - AS BUILD BORINGEN TP
      - LE
      - Uitwissel Openij
    - 03 CAD-data
    - 04 Civil 3D
    - 05 Inventor
    - 06 Solidworks
    - 07 Navisworks
    - 08 E-Plan
    - 09 Allplan
    - 10 Recap
    - 11 3ds Max
    - 12 Office
    - 13 ArcGIS
    - 14 VOSS
    - 15 Infraworks
    - Civil 3D Data
    - Richtlijnen
    - My Search Folders
      - xrefs

Deliverables

Search Deliverables

Entity Type / State /

Name	Omschrijving 2	Revision	
middensluis2.pdf		0	
K_L-VE-DO-0810.pdf		0	
K_L-VE-DO-0710.pdf		0	
K_L-VE-DO-0410.pdf		0	
K_L-VE-DO-0310.pdf		0	
K_L-VE-DO-0110.pdf		0	
I_A-EN-DO-0018.pdf	Blockschema Sluisdeur 3	0	
hoogten_Ligging_bouwdok_spuisluis.pdf		0	
CIV-LZ-UO-0565.pdf	Loswal Sluis Zuid	0	
CIV-LZ-UO-0564.pdf		0	
CIV-LZ-UO-0563.pdf	Loswal Sluis Zuid	0	
CIV-LZ-UO-0562.pdf		0	
CIV-LZ-UO-0561.pdf		0	
CIV-LS-UO-0681.pdf		0	
CIV-KN-UO-3282.pdf	Sluiswand Noord	0	
CIV-GO-DO-0001.pdf	Aanvullende onderzoek 2015	0	

History Uses Where Used Preview

Number of versions: 6 (Local = Unknown)  
Number of revisions: 1 Show all versions

Thumbnail	File Name	Revision	State (Historical)	Created By	Checked In	Comment
	CIV-KN-UO-3282.pdf	0	Work in Progress	Automation	28-9-2016 7:49	Checked in by CAD &...

Properties

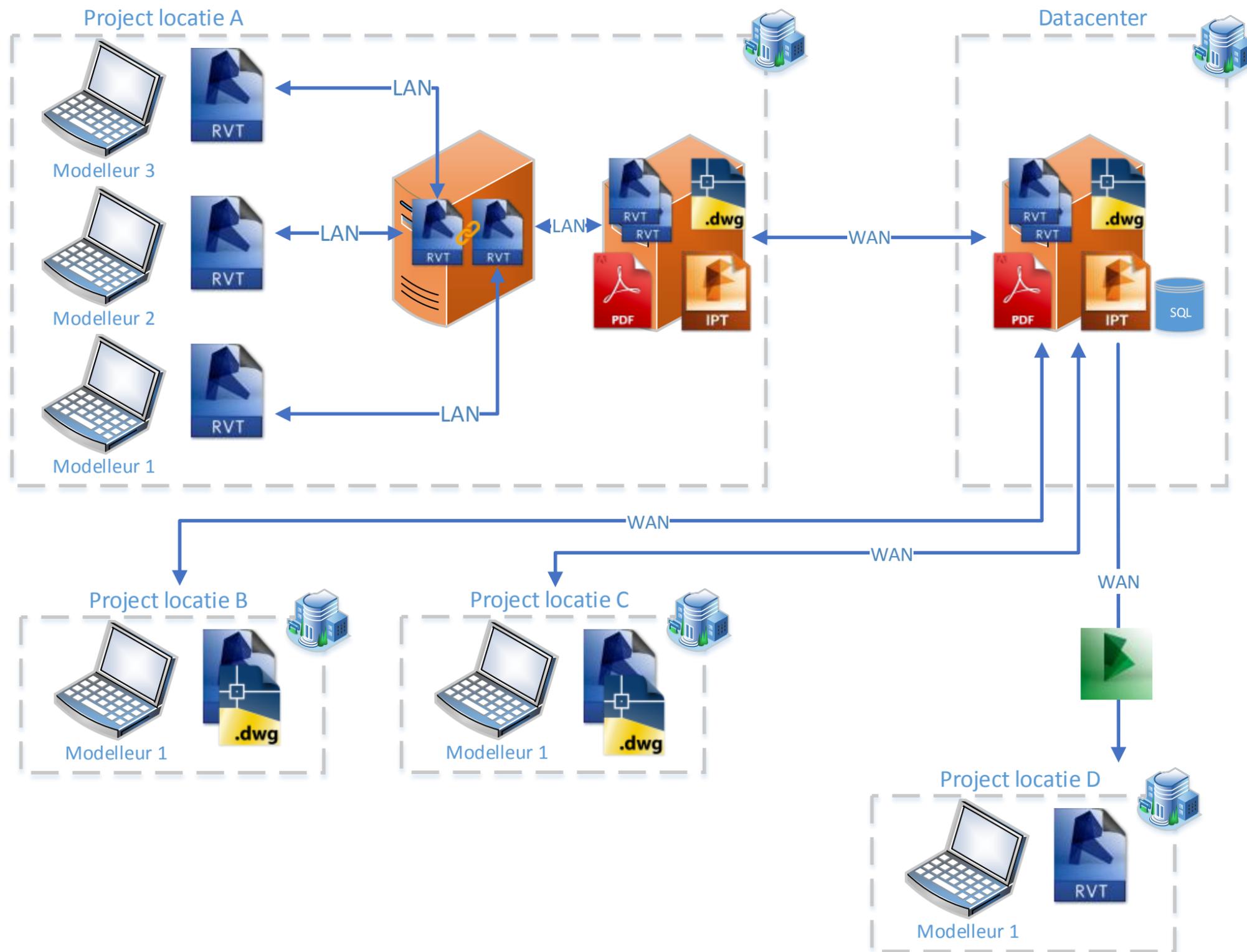
CIV-KN-UO-3282.pdf

System

User Defined

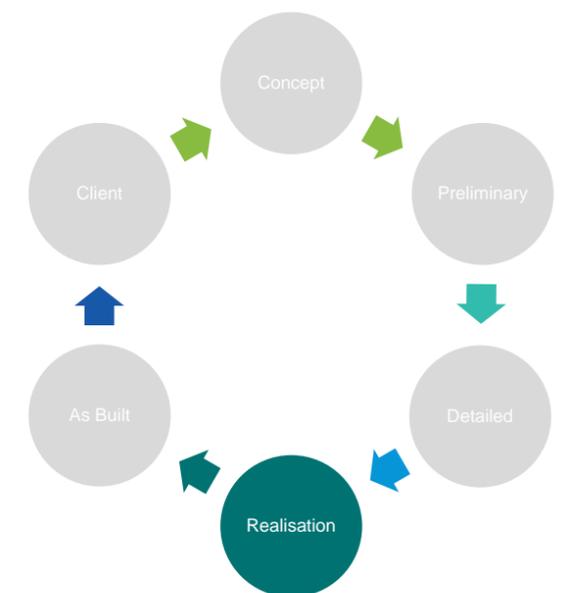
Aantal bladen	
Bladnummer	
Discipline	CIV
Documentsoort	
Eigenaar	OpenIJ
Getekend door	L. Rijkers
Getekend op	
Omschrijving 1	Civiel
Omschrijving 2	Sluiswand Noord
Omschrijving 3	Diepwand supportliggers en detail...
Opdrachtgever	Rijkswaterstaat
Papierformaat	
PBS	PBS code
Programma	
Projectfase	DO
Projectnummer	
Projectomschrijving 1	IJmond Sea Lock
Revisie datum	9/28/2016 7:48:34 AM
Revisie gepubliceerd	2
Schaal 1	1:100
Schaal 2	1:20
Schaal 3	1:5
Status	Definitief
Taalcode	NL
Tekeningnummer	CIV-KN-UO-3282

# Vault infrastructure

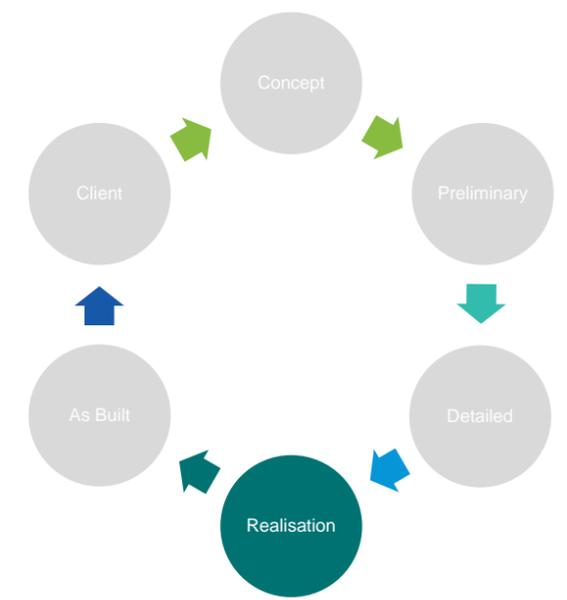
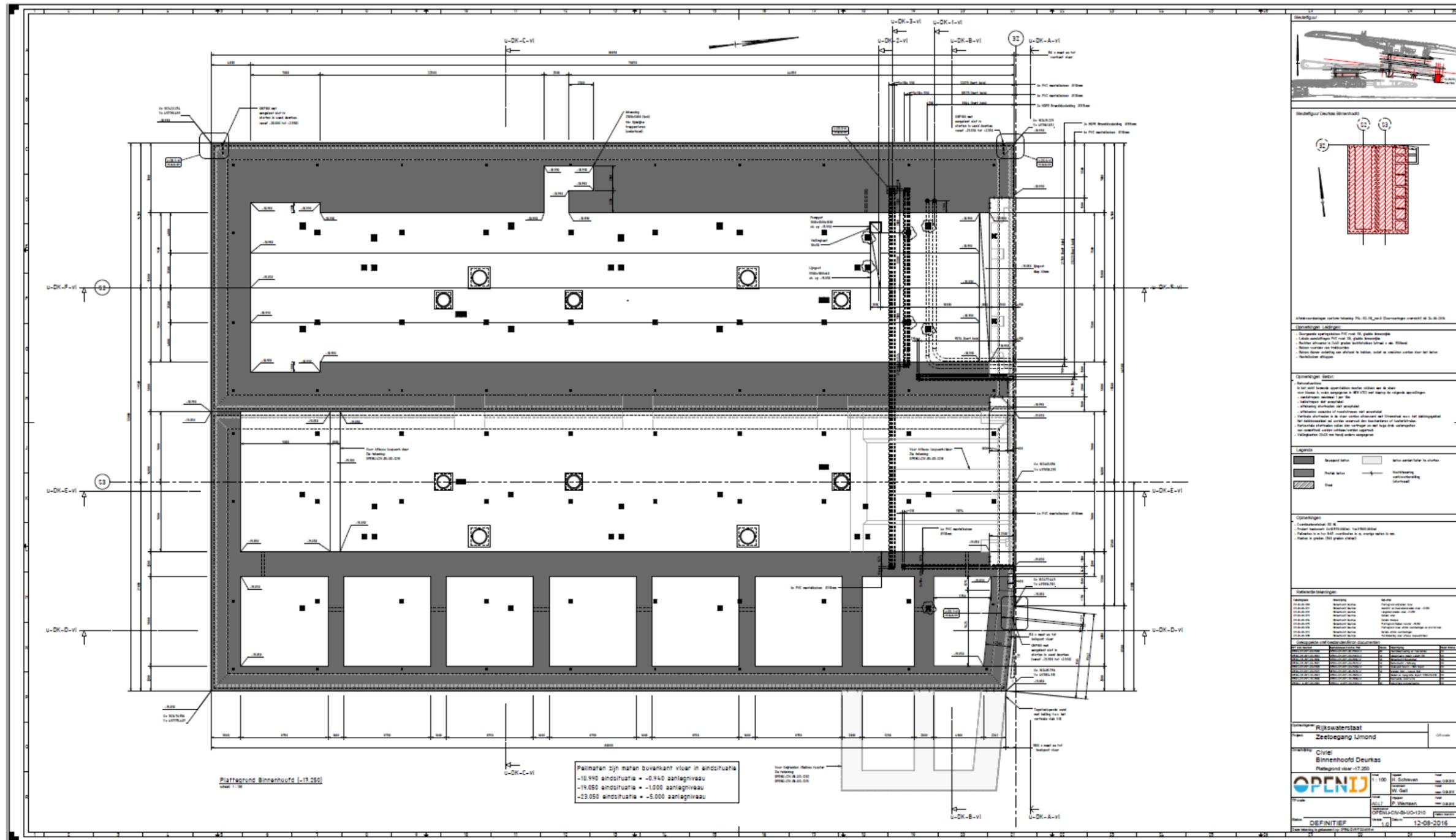


# Realisation

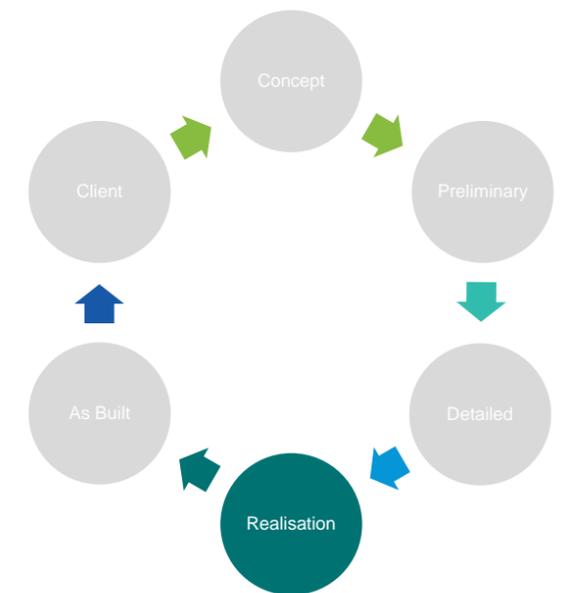
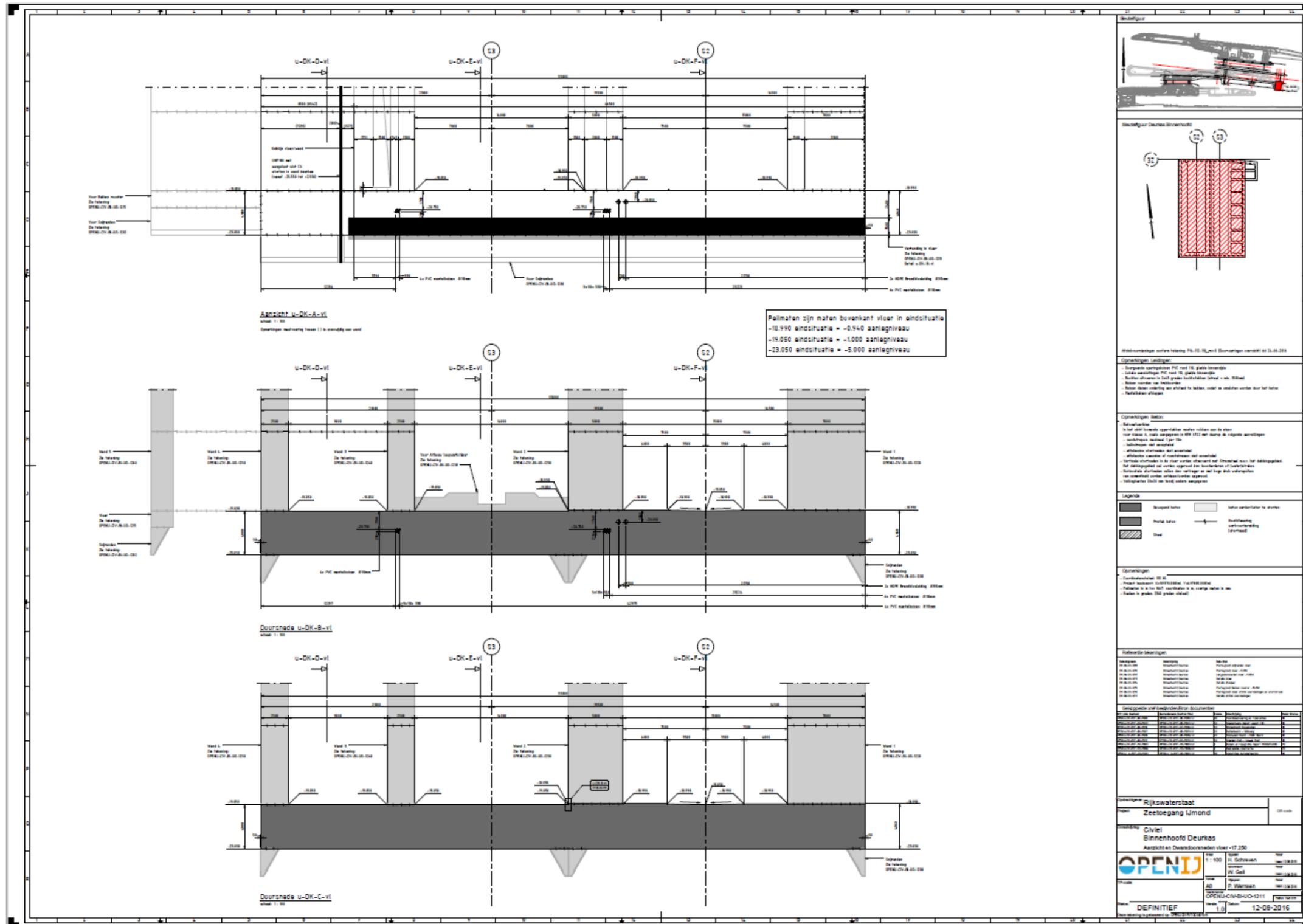
- Representation of drawing
- Exchange with 3d parties and suppliers → Rebar
- Send 3D data to the field → MC next and Point layout
- Earthworks
- Virtual reality

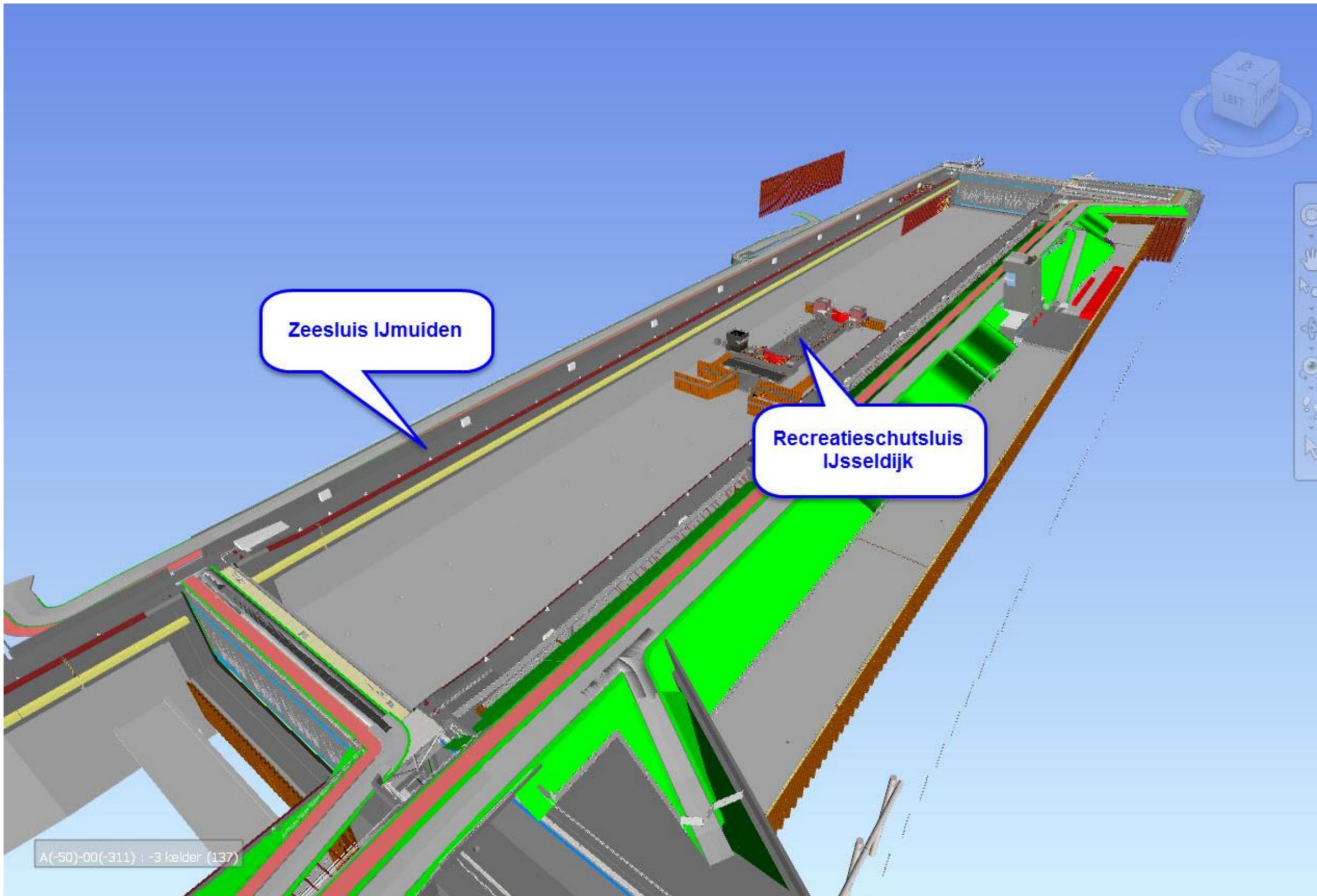


# Current layout from Revit @ OpenIJ



# Curent layout from Revit @ OpenIJ





# New layout from Revit

**LEGENDA VORMTEKENINGEN BETONWERK BRUGHOOFD**

Symbol	Betekening	Symbol	Betekening
[Symbol]	betonwerk	[Symbol]	betonwerk
[Symbol]	betonwerk	[Symbol]	betonwerk
[Symbol]	betonwerk	[Symbol]	betonwerk

**Overzicht**

**Doorsnede C-C**

**Doorsnede D-D**

**Principe detail oplegging stootplaat**

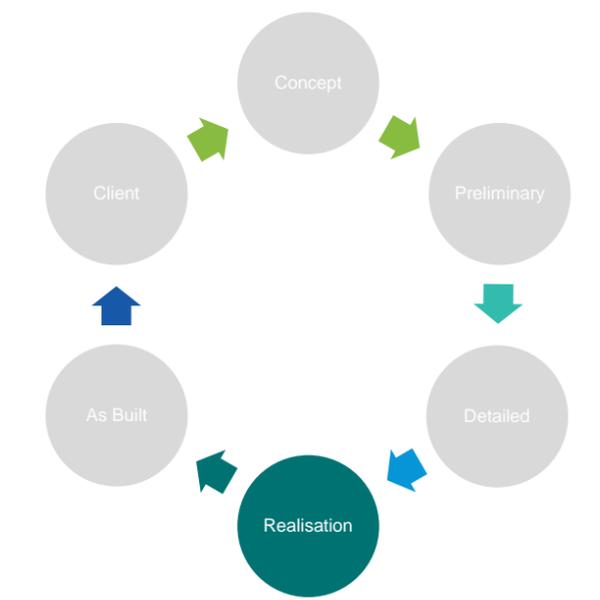
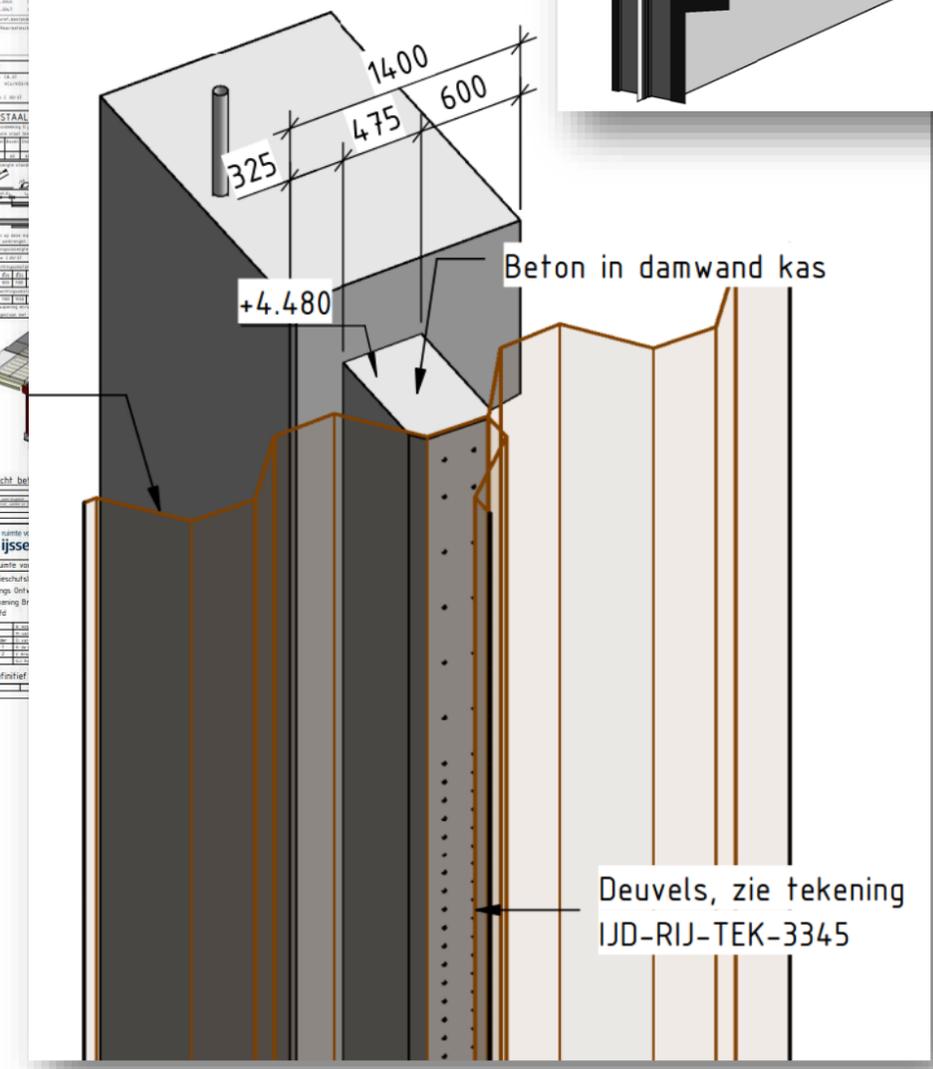
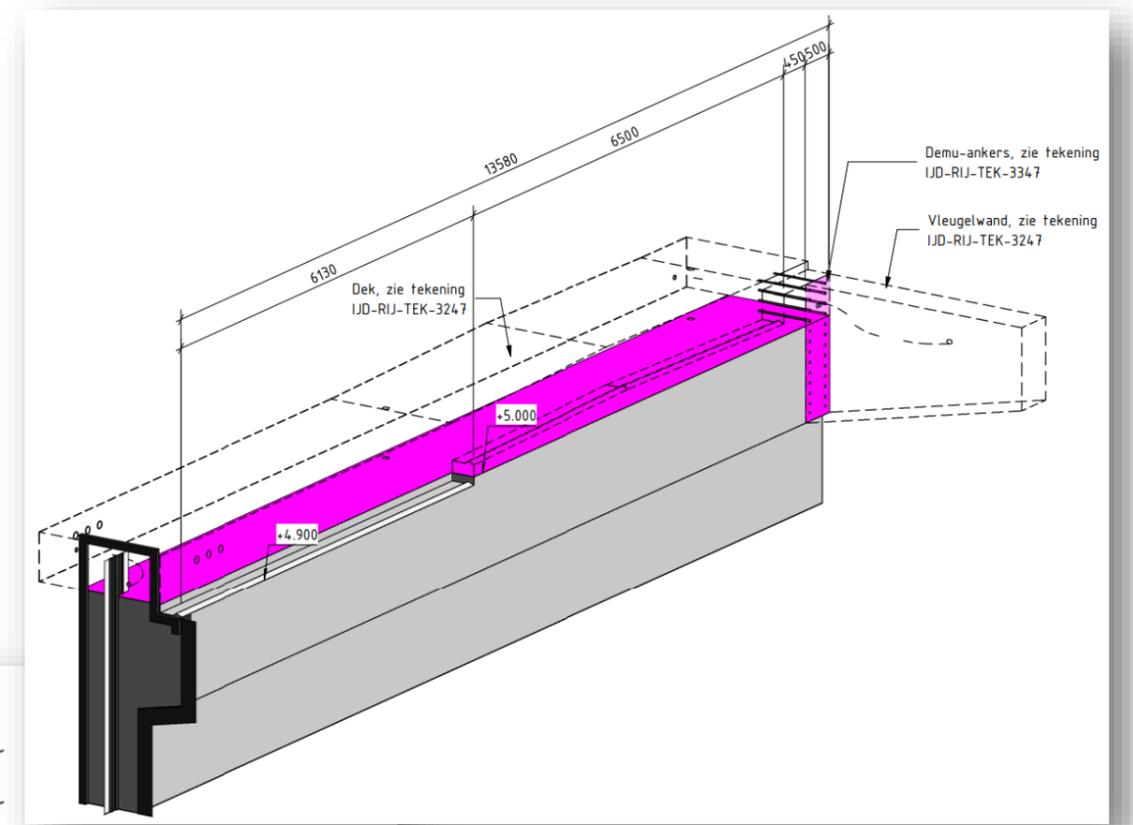
**Aanzicht A**

**Aanzicht B**

**Bovenaanzicht landhoofd t.p.v. as-3**

**Isometrisch aanzicht voegprofiel**

**Isometrisch aanzicht wanden brughoofd**







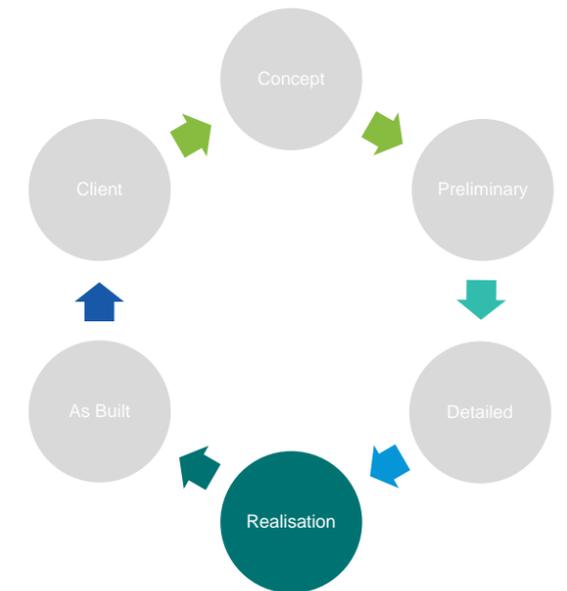
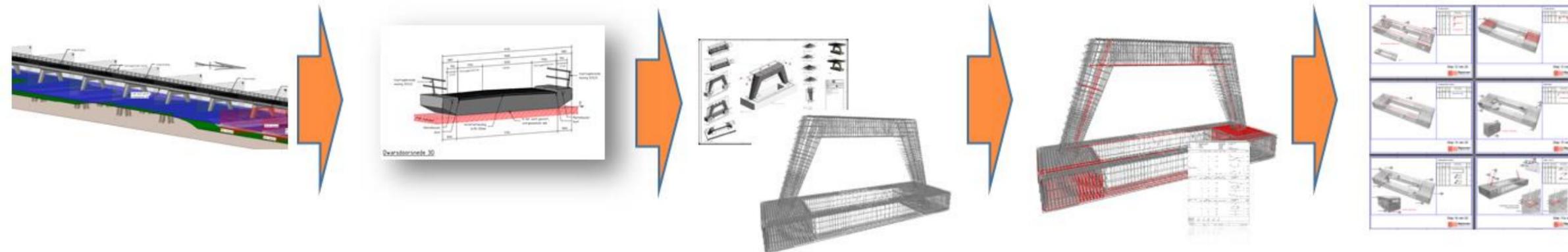
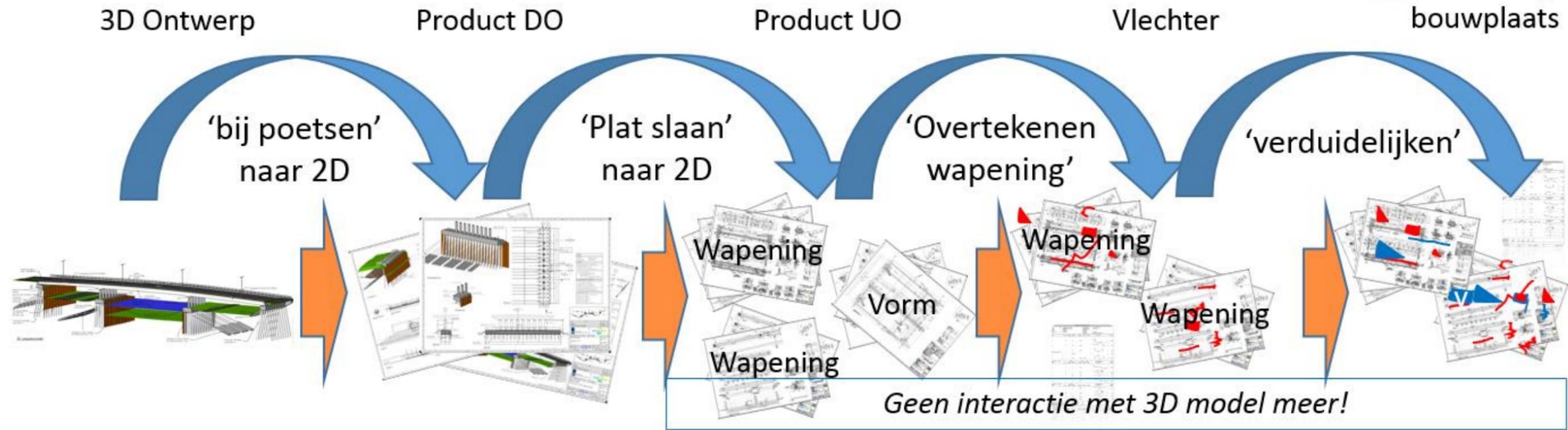
# Exchange with rebar supplier

## uitwisseling met vlechter

Volker InfraDesign



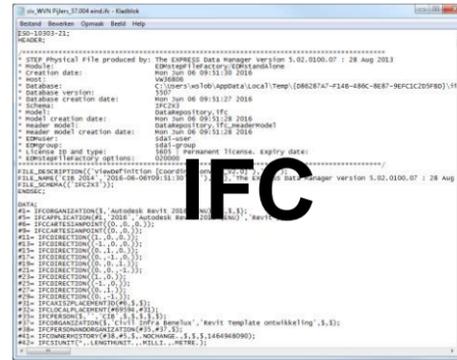
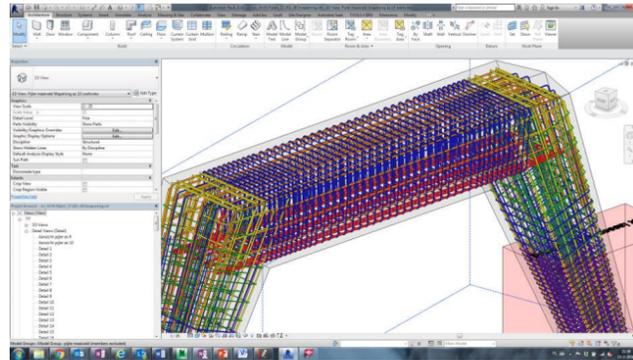
Uitvoering  
bouwplaats



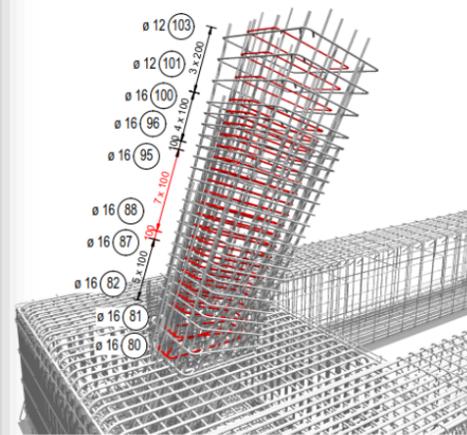
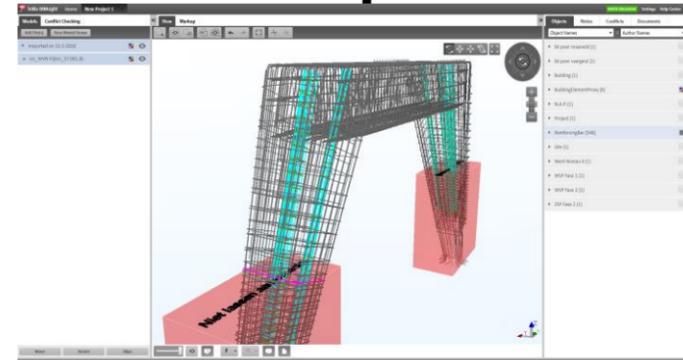


# Exchange with rebar supplier

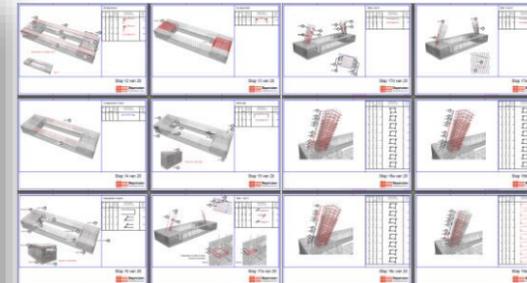
Revit



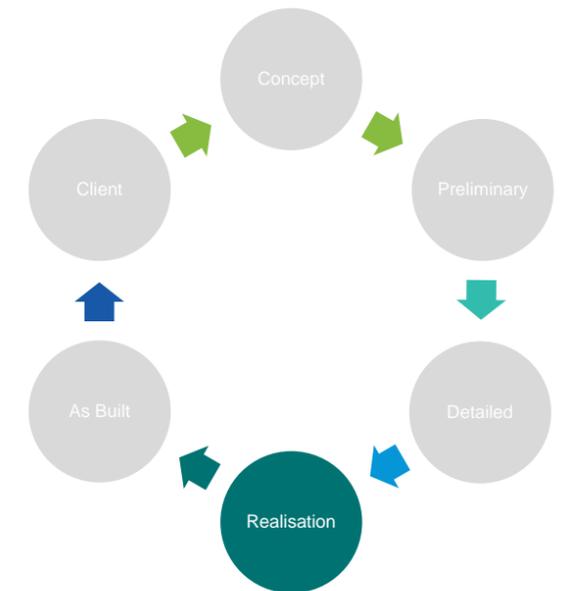
Allplan



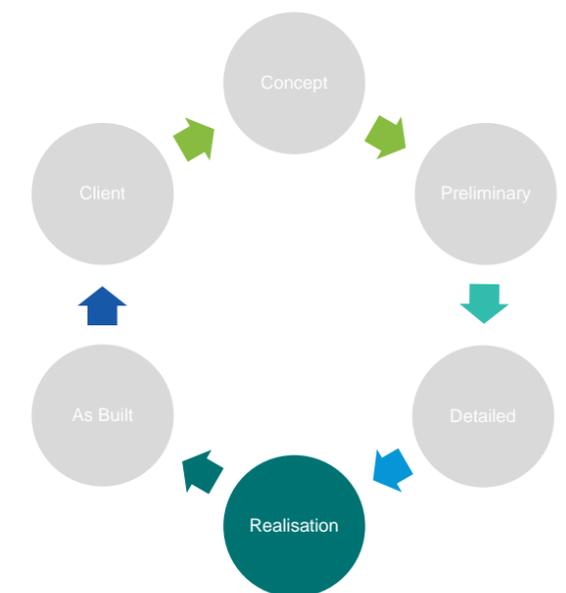
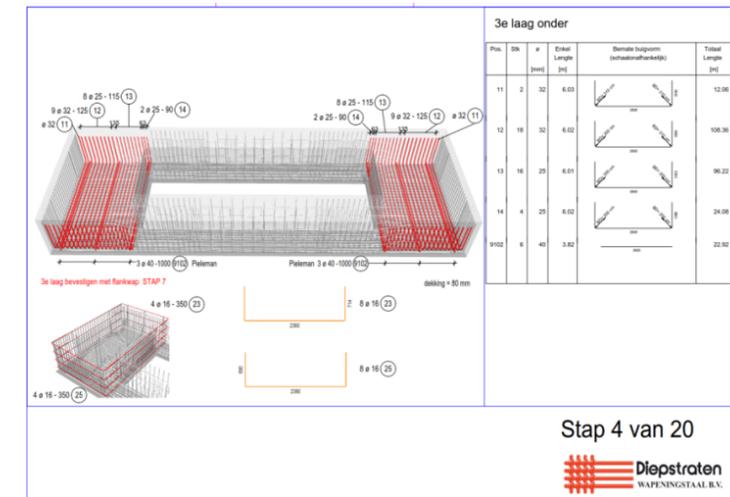
Pos.	Stk	ø [mm]	Enkel Lengte [m]	Bemate buigvorm (schaalafhankelijk)	Totaal Lengte [m]
88	2	16	2.53		5.06
89	2	16	2.57		5.13
90	2	16	2.60		5.19
91	2	16	2.61		5.22
92	2	16	2.64		5.28
93	2	16	2.67		5.34
94	2	16	2.71		5.43
95	2	16	2.74		5.48



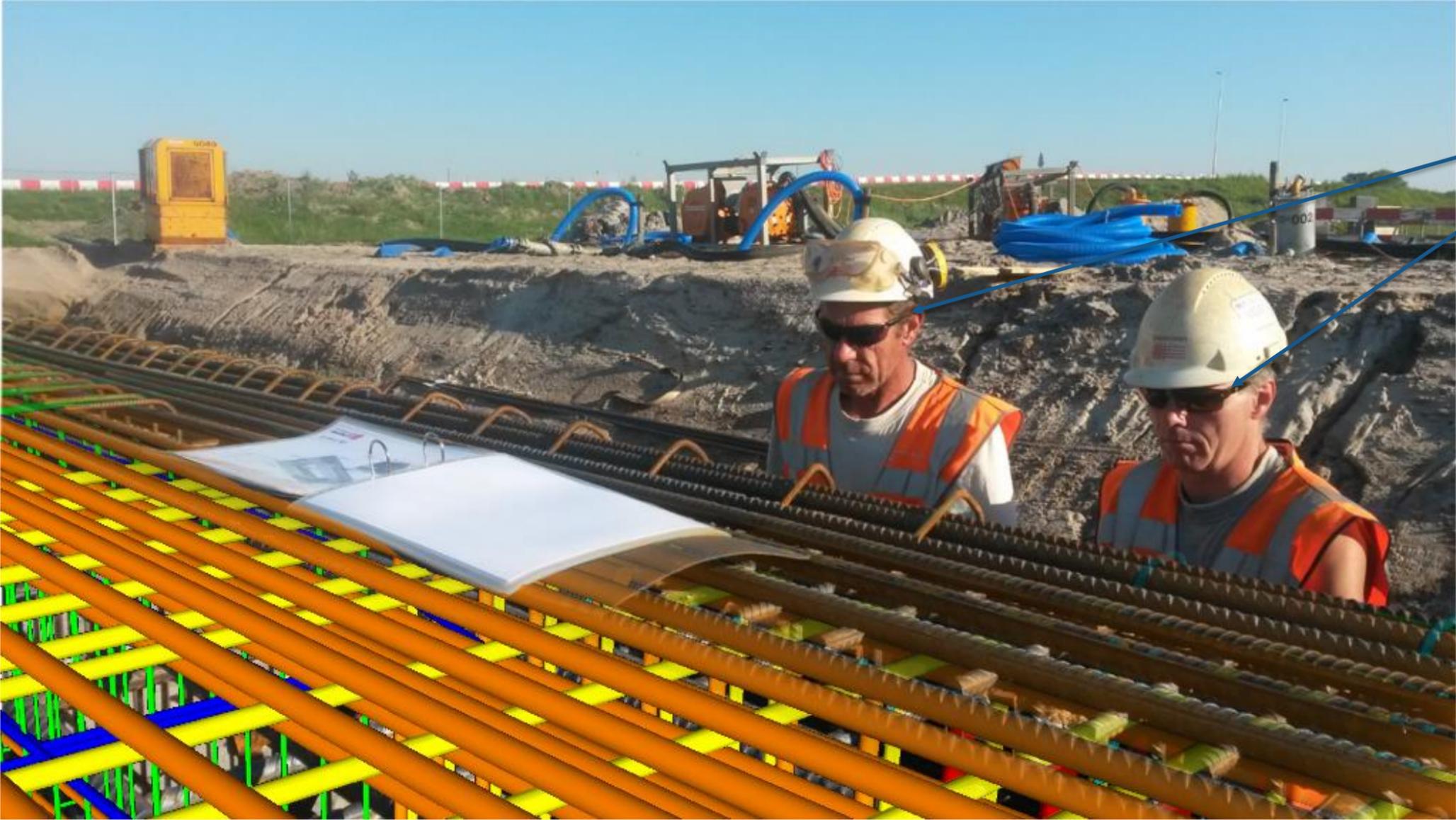
Stap 19b van 20



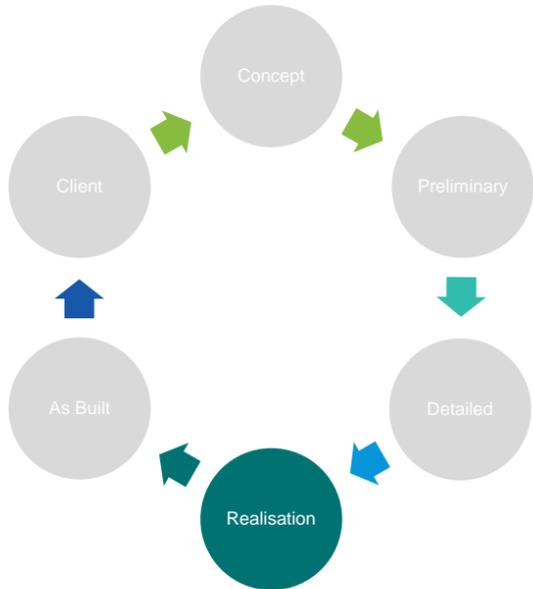
# 3D rebar



# 3D rebar



?

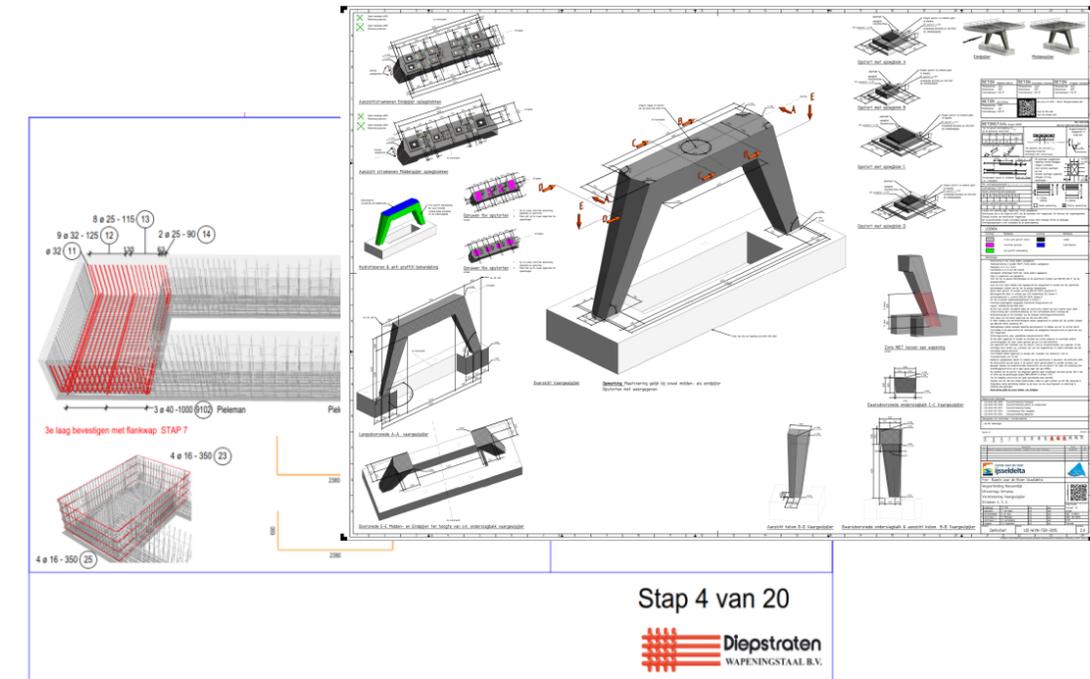


# As-built

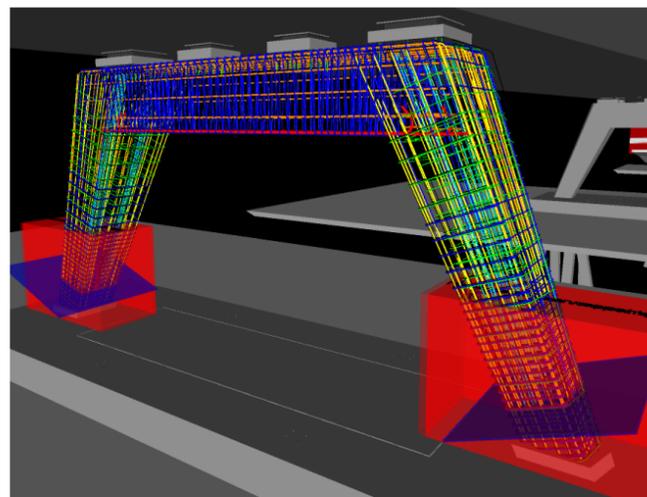


# As built / deliverables

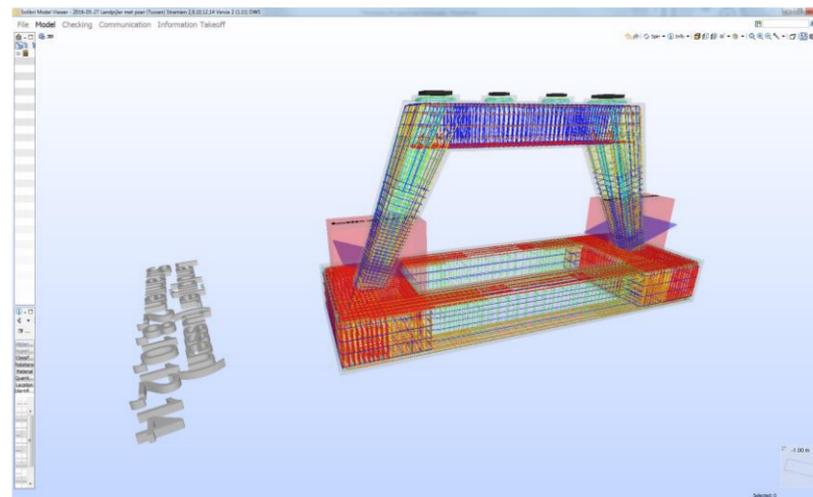
- 3D deliverables
  - Exchange without data-loss
- Coins



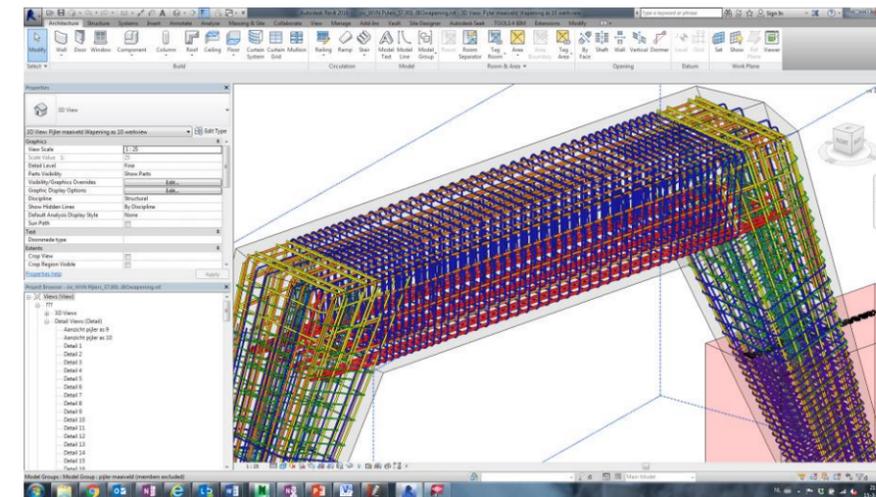
PDF



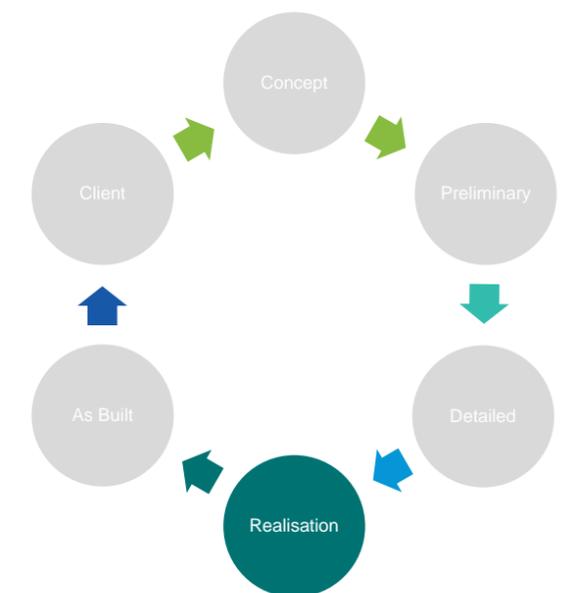
NWC



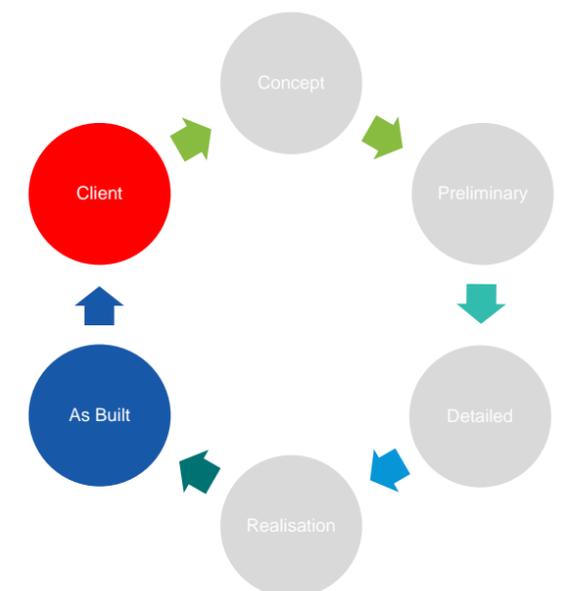
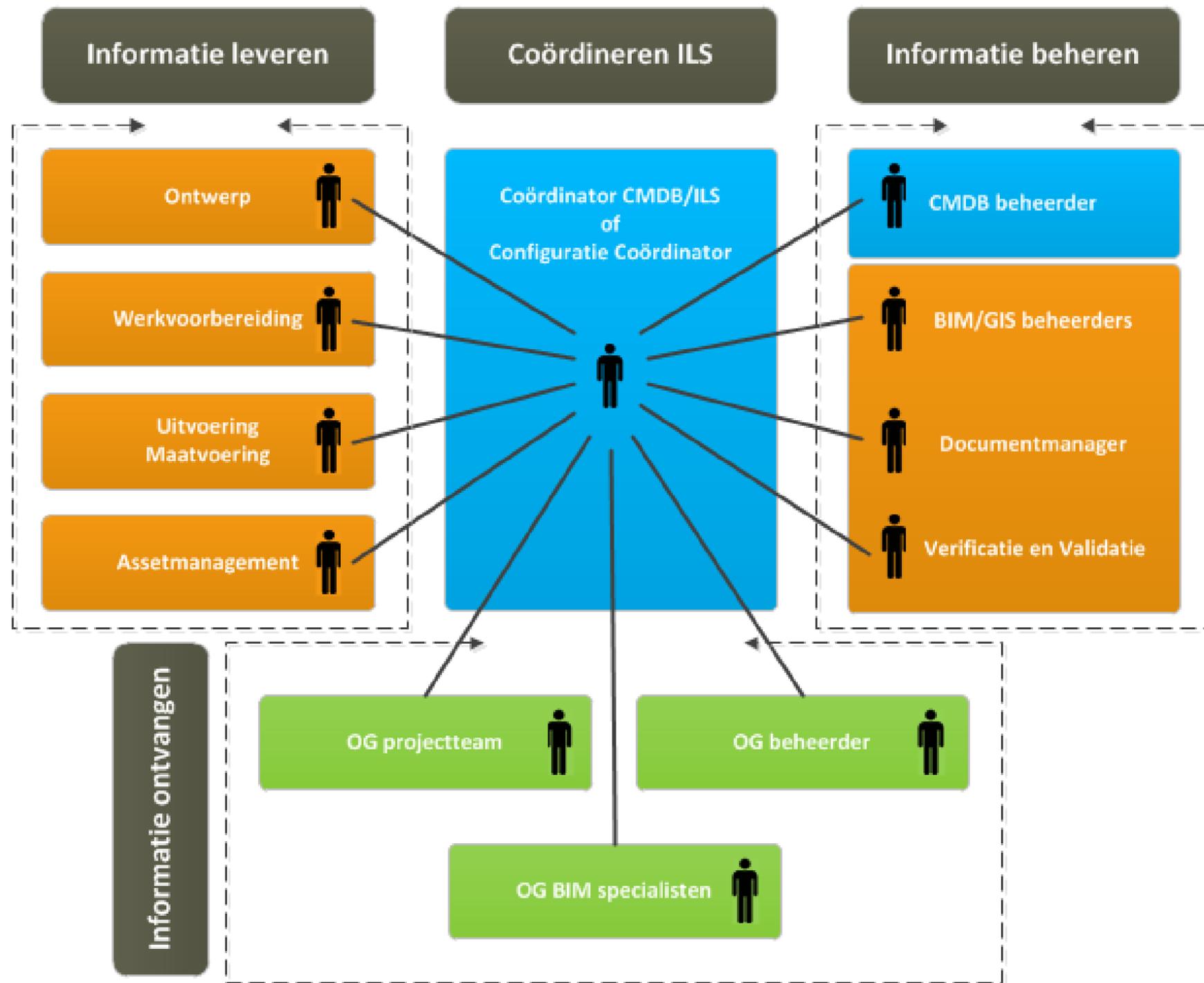
IFC



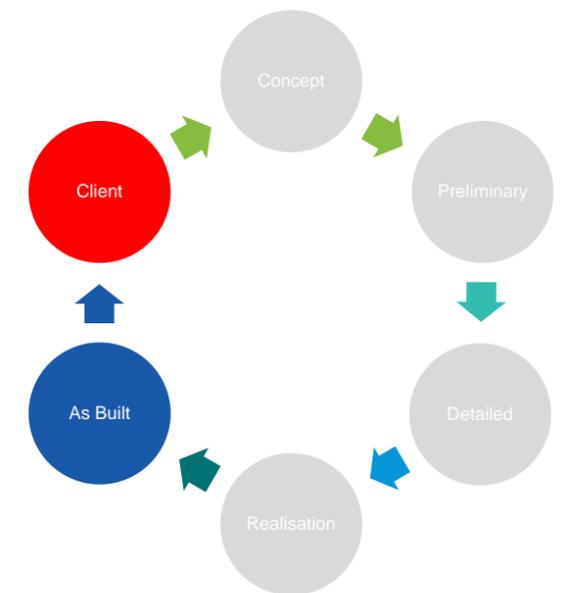
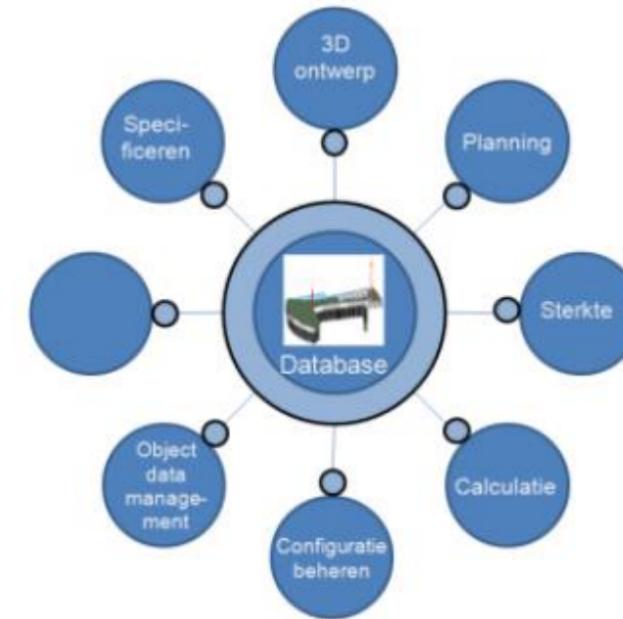
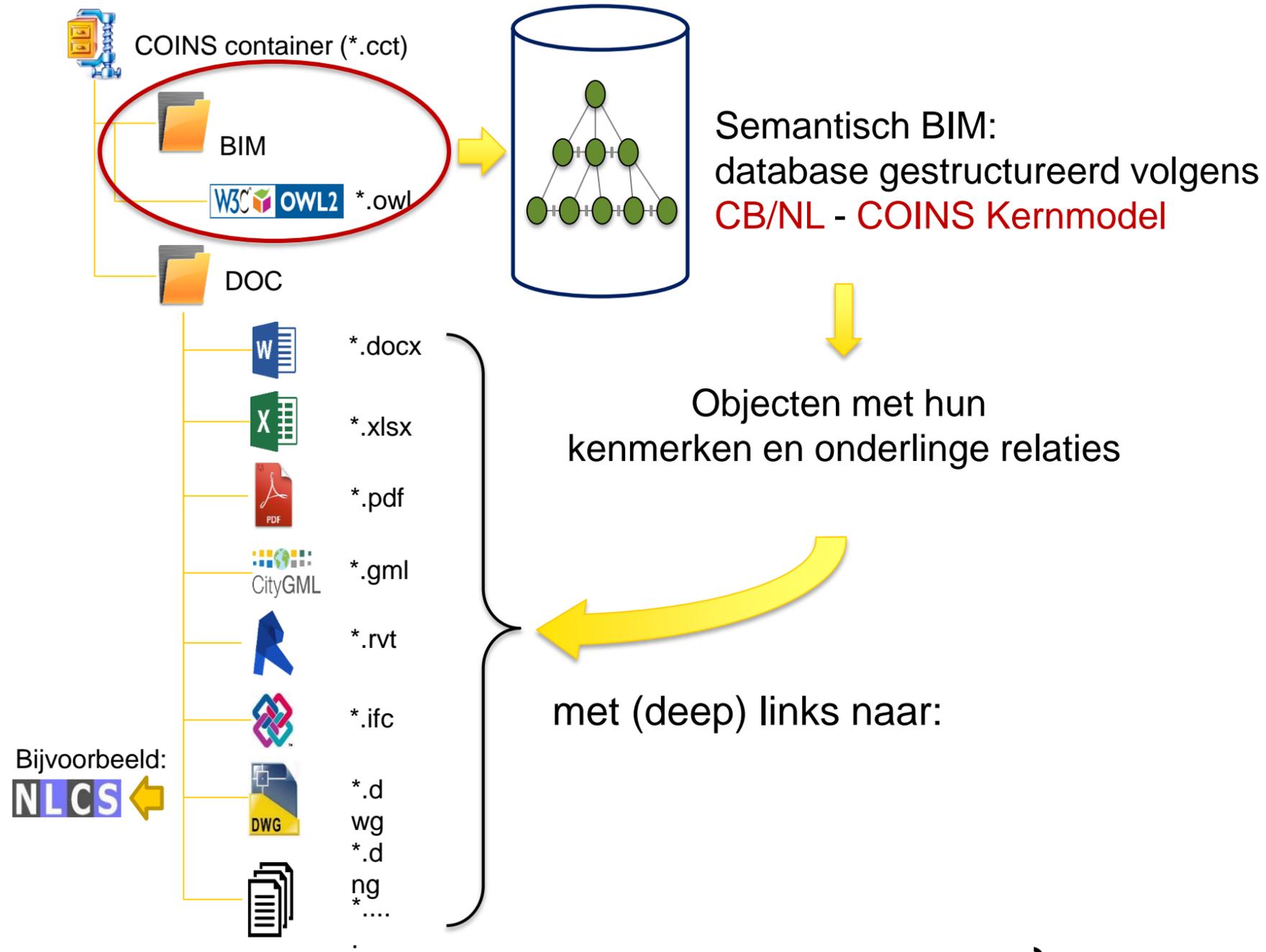
RVT



# CMDB



# COINS



}

# COINS

COINS Navigator [http://saa.rws.nl/testcasemodel.owl]

Bestand Bewerken View Help

Lagen Objectenboom Index

Functieervullers  Toon documenten  Toon eisen

- [270361008] wegvak (0)
- [271361040] wegvak (0)
- [272361029] wegvak (0)
- Infrastructuur assets (0)
  - Rijksweg 1 WD Amsterdam (0)
    - Overige wegbeheerobjecten (0)
      - Geleideconstructie objecten Rijksweg 1 (0)
      - Kleine kunstwerk objecten Rijksweg 1 (0)
      - Licht objecten Rijksweg 1 (0)
        - [KERNGIS\_DNH\_ILicht\_Export.2] Lijnverlichting (0)
        - [KERNGIS\_DNH\_ILicht\_Export.3] Lijnverlichting (0)
        - [KERNGIS\_DNH\_ILicht\_Export.5] Lijnverlichting (0)
        - [KERNGIS\_DNH\_ILicht\_Export.6] Lijnverlichting (0)
        - [KERNGIS\_DNH\_ILicht\_Export.7] Lijnverlichting (0)
        - [KERNGIS\_DNH\_ILicht\_Export.8] Lijnverlichting (0)
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        - [KERNGIS\_DNH\_pLicht\_Export.14] EUI (0)
        - [KERNGIS\_DNH\_pLicht\_Export.15] EUI (0)

Voeg toe Verwijd...

Model geladen: http://saa.rws.nl/testcasemodel.owl

**Bouwdeel [KERNGIS\_DNH\_pLicht\_Export.14] EUI (0)**

Identificatie Specificatie

Aansluitingen Algemene eisen

Taken Catalogusonderdelen Geometrie

Toestanden Functies Prestaties Decompositie

Catalogusonderdelen

Type -777 (0)

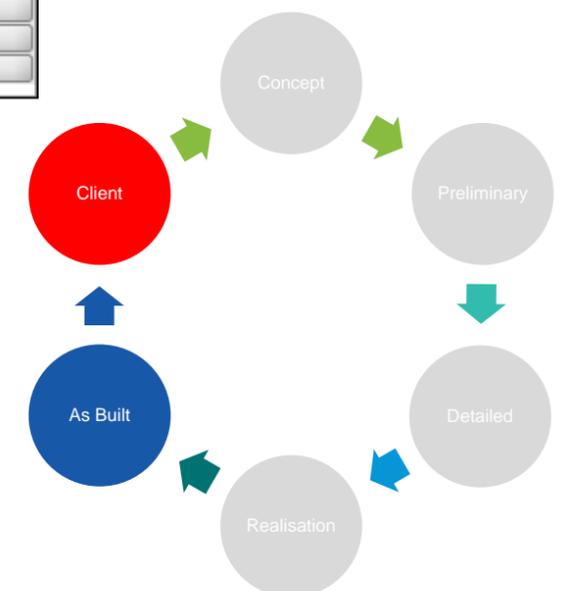
Codering	Catalogus...	Hoeveelheid	Eenheid	Navig...
	EUI			→

Creëer Verwijd...

Eigenschappen Locator

Eigenschap	Waarde	Eenheid
ArmatuurType	SRS201	
Beheerder	RWS420	
Besteknummer		
Code		
DTB_ID	0	
DatumAanleg	1899-12-30	
DatumInwin	2010-04-21	
DatumMutatie	2010-11-04	
DatumOpname	1899-12-30	

EigenschapsType	Waarde	Eenh...	Navigeer
ArmatuurType	SRS201		→
Beheerder	RWS420		→
Besteknummer			→
Code			→
DatumAanleg	1899-12-30		→
DatumInwin	2010-04-21		→
DatumMutatie	2010-11-04		→
DatumOpname	1899-12-30		→
DTB_ID	0		→
Eigenaar	RWS420		→
Foto	-999		→
GarantieTot	1899-12-30		→
Hoogte			→
Hyperlink	-999		→
Inwinner			→
KastNummer	87V6003		→
LampAantal	1		→
LampType	SOX E91W		→
Lengte	0.0		→
Lichtpunthoogte	10.0		→
LijnlichtCode			→
LO_lengte			→
MastNummer	C27		→
MastType	EUI		→
Materiaal	AL		→
Muteerder	jansene01		→
Niveau	0		→
Nummer			→
ObjectCode			→
OBJECTID	KERNGIS_DNH_pLicht_Ex...		→
ObjectTekst	Lichtmast		→
Onderhouder	RWS420		→
OudeDBWaarde			→
Shape_Len			→
Status	false		→
Tekening			→
Type			→



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## VolkerWessels:

**Autodesk Kennis**  
Home Recent Community

Home

Wat vind ik hier?  
 Algemene vragen  
 Autodesk gebruikers  
 Discussie groepen  
 Ondersteuning  
 Bibliotheek

**VolkerWessels** Autodesk Software link

Welkom bij het VWinfraNL Autodesk Kennisportaal.

Via deze pagina's is alle Autodesk gerelateerde informatie te vinden. Denk aan installatie details, veelgestelde vragen betreffende licenties en rechten, een discussie forum en ondersteuning en trainingmogelijkheden.

Met deze pagina ben je altijd op de hoogte van het laatste nieuws, interne ontwikkelingen en heb je een enkele ingang voor al je Autodesk gerelateerde vragen en antwoorden.

Hiernaast vind je onder de grote Autodesk knop een link naar het applicatie overzicht met een inzicht in gebruik, link naar een wiki en kosten van alle Autodesk producten.

Deze site wordt onderhouden door de Stuurgroep BIM. Opmerkingen zijn welkom via de mail onder "contactgegevens".

**News**

+ new announcement or edit this list

Title	Modified
Nieuwe Website - September 2016	September 8

**Social**

Autodesk Twitter

**In geval van een technisch probleem, contacteer de servicedesk :**

Online  
Open incident ticket  
via mail  
servicedesk@vwinfra.nl

**VolkerWessels** AUTODESK SOFTWARE

All VolkerRail Vialis KWS VHB

**3ds Max**  
Powerful, integrated 3D modeling, animation, and rendering tools.

**A360 Team**  
View, share, review and find all your project data in one place

**Advance Concrete**  
Advance Concrete software for concrete design and detailing is conveniently built on AutoCAD.

**Advance Steel**  
Advance Steel is a 3D structural steel detailing software which helps reduce time to fabrication.

**AutoCAD**  
TYPE: Desktop  
STATUS: Direct access  
COST: 300 Tokens/24 uur  
LINKS: Wiki Page, Download/Install, Demo Video, Additional Plugins, Manual/Workflow, Contact List

**AutoCAD Inventor LT Suite**  
3D mechanical design, product simulation, documentation and visualization for manufacturers.

**AutoCAD LT**  
Speed design and collaboration with AutoCAD LT® drafting software for Windows and Mac.

**AutoCAD MEP**  
AutoCAD MEP software helps you draft, design, and document building systems.

**AutoCAD Map 3D**  
TYPE: Desktop  
STATUS: Direct access  
COST: 8 Tokens/24 uur  
LINKS: Wiki Page, Download/Install, Demo Video, Additional Plugins, Manual/Workflow, Contact List

**AutoCAD Mechanical**  
AutoCAD® Mechanical design and drafting software is AutoCAD® software for manufacturing.

**AutoCAD Utility Design**  
TYPE: Desktop  
STATUS: Direct access  
COST: 8 Tokens/24 uur  
LINKS: Wiki Page, Download/Install, Demo Video, Additional Plugins

**AutoCAD Raster Design**  
Add powerful raster editing and raster-

**AutoCAD for Mac**  
Design and shape the world around

**Bridge Module**  
Model bridges and bridge components

**C4R**  
Get centralized access to BIM data in



**Thursday**  
**3:00 pm – 4:00 pm**

**TR21303**

**Lido 3001B**

## **Coordinate the Design and Execution Phase of a Multidisciplinary Project**

**Jeroen Tishauser**  
Sr. Specialist, Volker InfraDesign

**Cristian Otter**  
BIM Specialist, Geonius

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