

Applying BIM to Infrastructure Refurbishment Projects



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Main areas of expertise

- Project organization and project management
- Building Information Modeling
- Lean Construction
- Public Private Partnerships

Professional career

Since 10/2014 Scientific assistant
University Stuttgart
Institute for Construction Management

2013 – 2014 Assistant lecturer
University of applied sciences Stuttgart

2011 - 2014 Project manager and project partner
Drees & Sommer Infra Consult und
Entwicklungsmanagement GmbH

2009 - 2010 Trainee, student trainee und diploma student
Porsche Consulting GmbH

2004 – 2010 University Stuttgart – industrial engineer

1999 – 2002 Joiner; cabinet maker

Personal reference projects (selection)

- Project management new Central Omnibus Station in Pforzheim
- Organization and project management – Consultation on decommissioning of nuclear power plants
- Project management consultancy on the construction of a nuclear waste repository
- Technical consultancy on the procurement of 4 PPP motorway sections



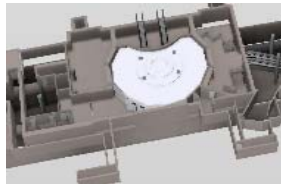
**Markus
Eiberger**

M. Eng. – International Project Management
B. Eng. – Infrastructure Management

Project Manager

Drees & Sommer Infra Consult und Entwicklungsmanagement GmbH
Untere Waldplätze 37
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Professional career

- | | |
|-------------|---|
| since 2012 | Project manager at Drees & Sommer Infra Consult und Entwicklungsmanagement GmbH |
| 2009 - 2012 | Student trainee at Drees & Sommer Infra Consult und Entwicklungsmanagement GmbH |
| 2009 | Trainee at Drees & Sommer GmbH |
| 1997 - 2003 | Joiner; interior finishing |

Personal reference projects (selection)

- Project manager– BIM pilot project station airport
- Deputy project manager– Stuttgart Airport underground station
- Deputy project manager– SFSU underground stations Stuttgart
- Cost and schedule control – Stuttgart 21 Team (megaproject)

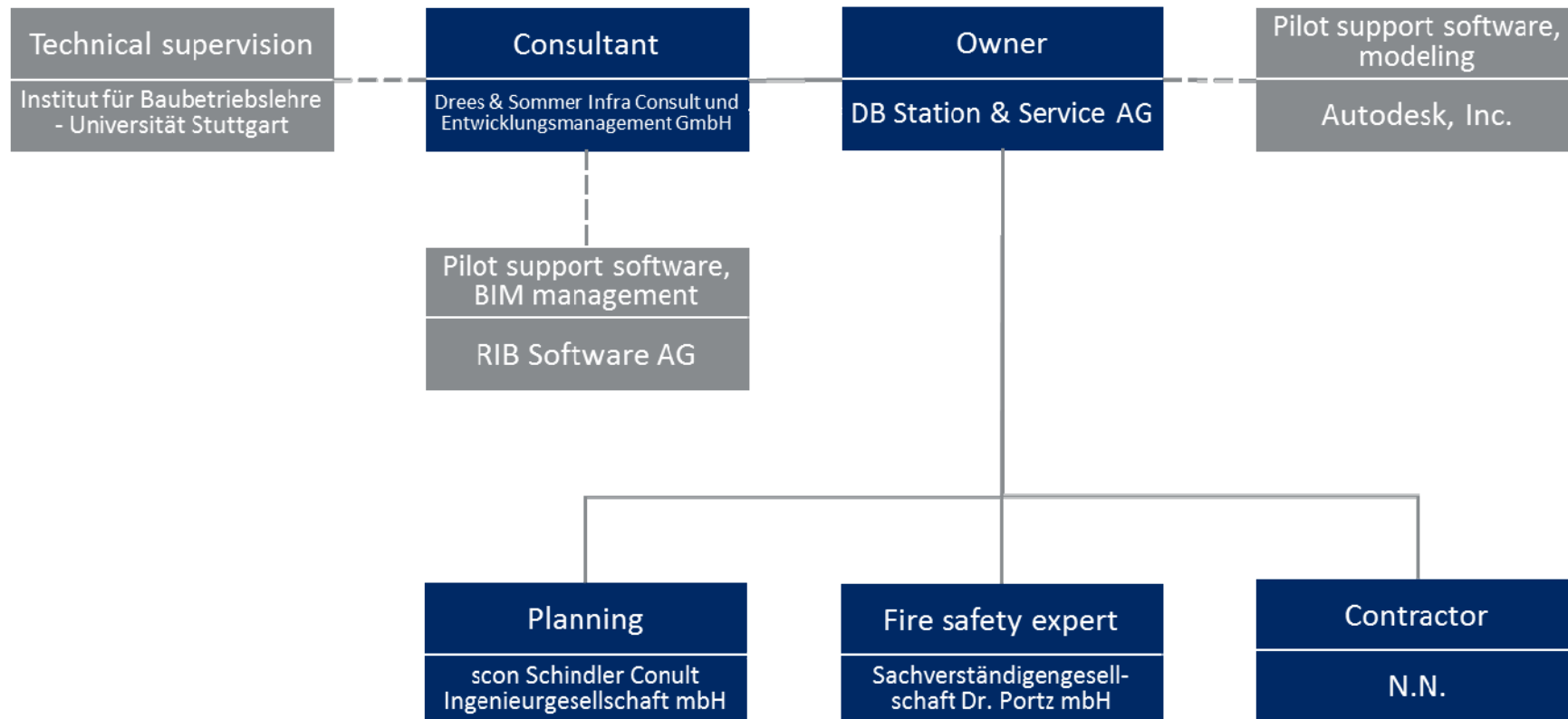
Other functions, main areas of expertise

- Member of Coordination Circle – BIM Cluster Region Stuttgart

Project description



Project organization

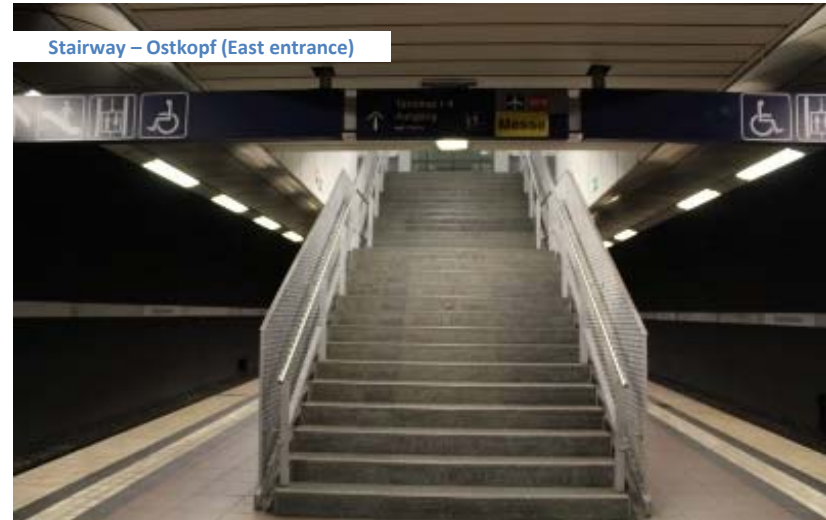


Project scope

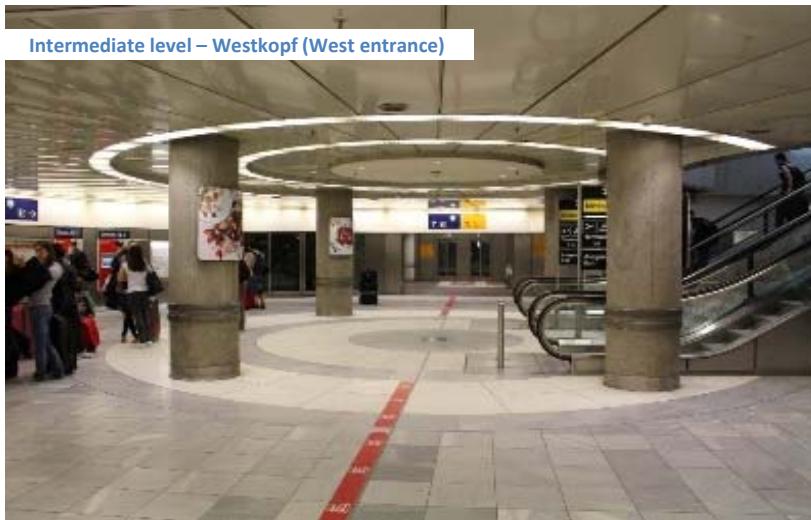
Station platform – Track 1



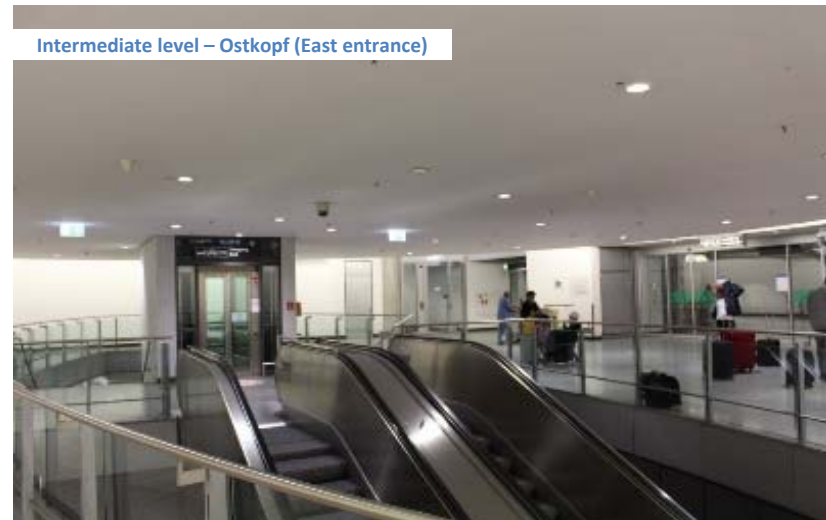
Stairway – Ostkopf (East entrance)



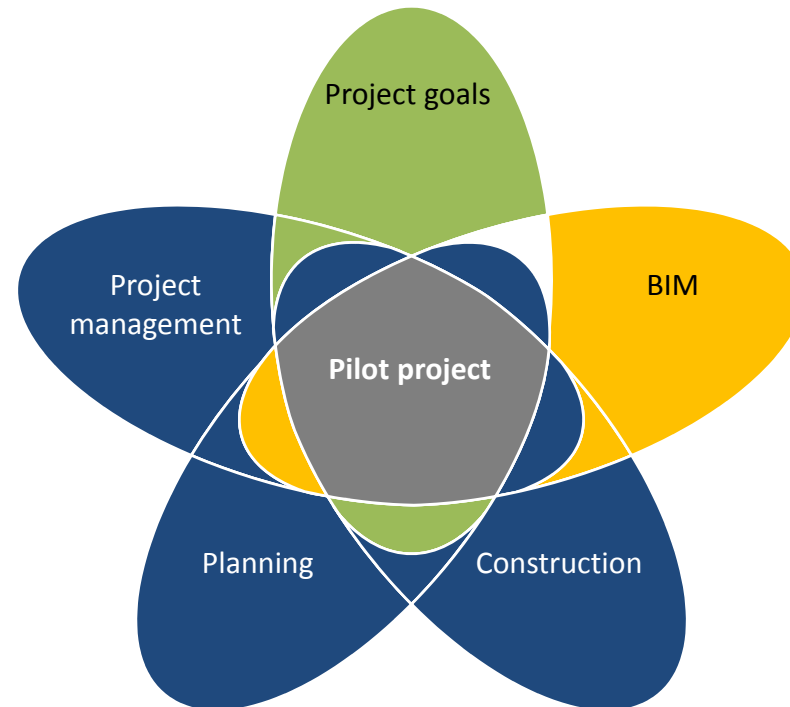
Intermediate level – Westkopf (West entrance)



Intermediate level – Ostkopf (East entrance)



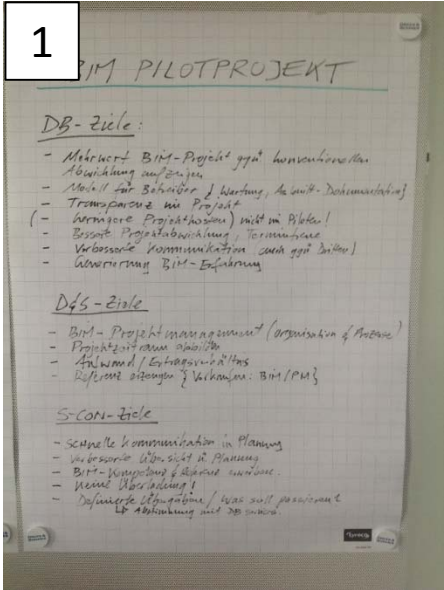
BIM motivation



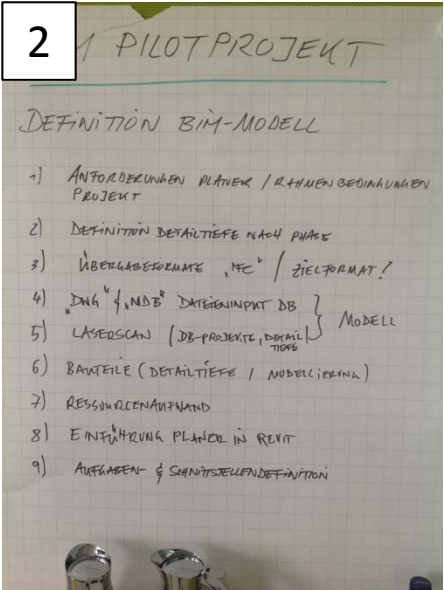
Learning
Adapting
Identifying

Primary workshop results

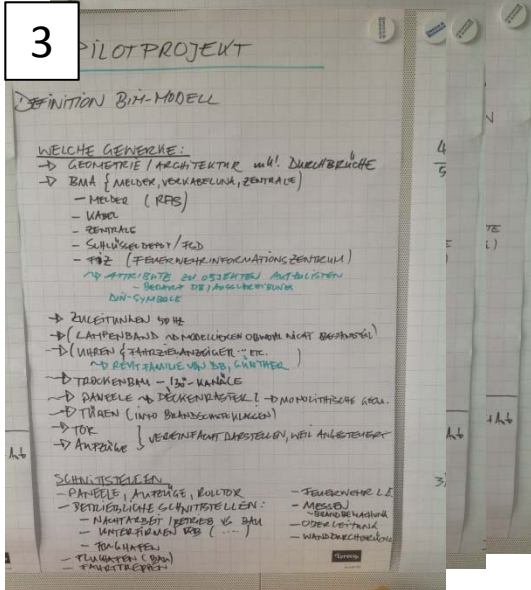
1



2

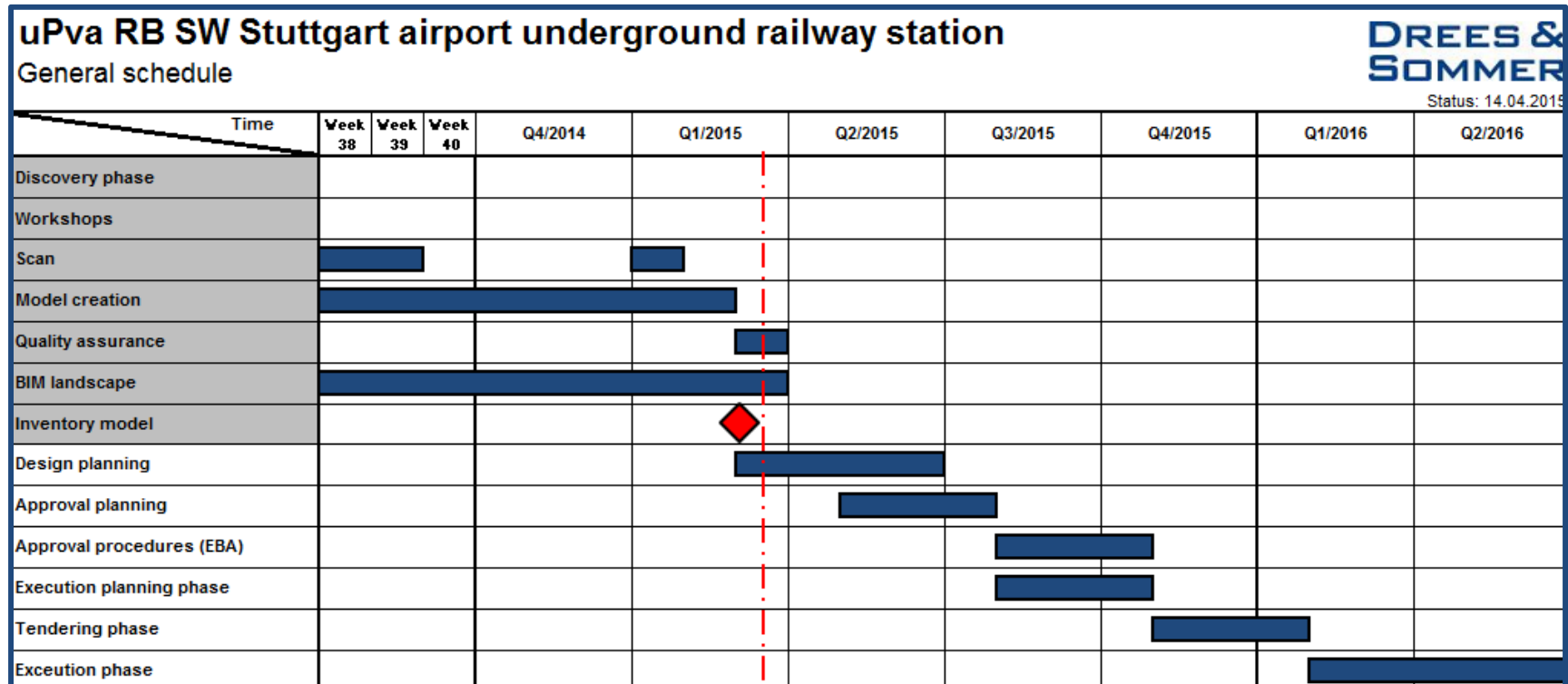


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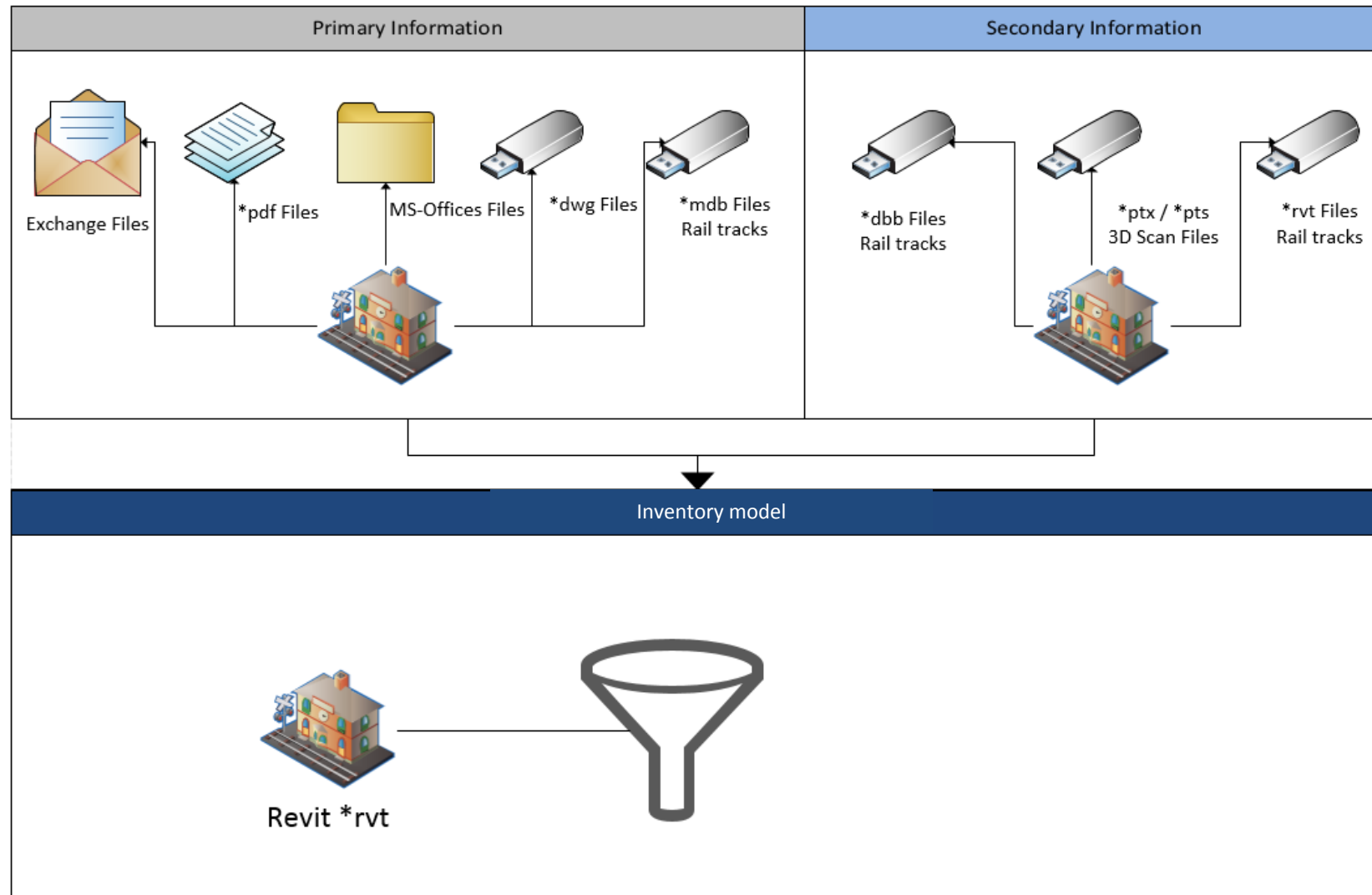


1. **Aims of the project participants:** Learning about BIM, applying BIM,
2. **Defining scope of project and collaboration**
3. **Definitions and requirements:**
 - Software, formats and interfaces
 - General level of detail
 - Content and project segments
 - Required resources
 - Tasks and milestones

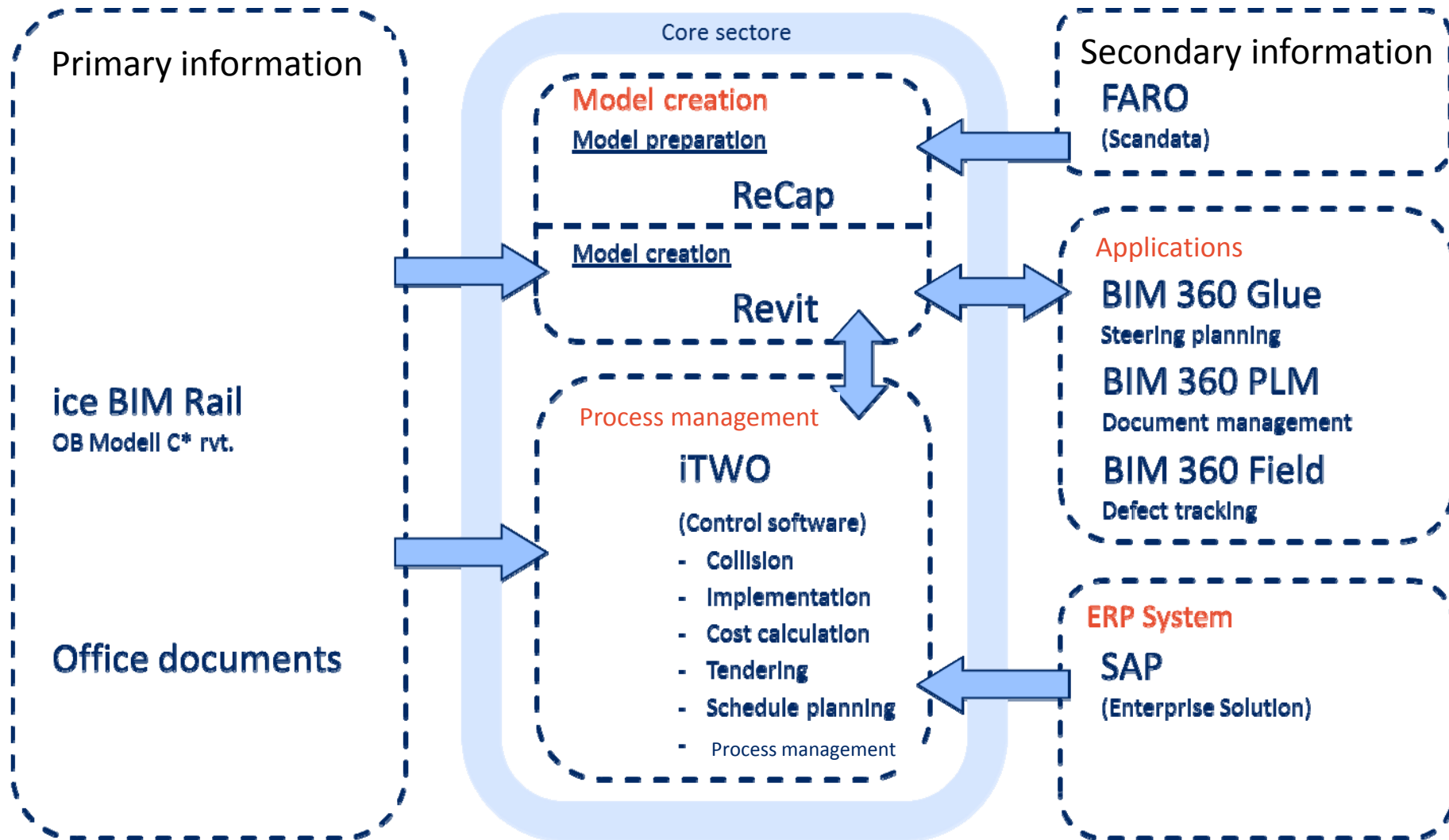
Project schedule



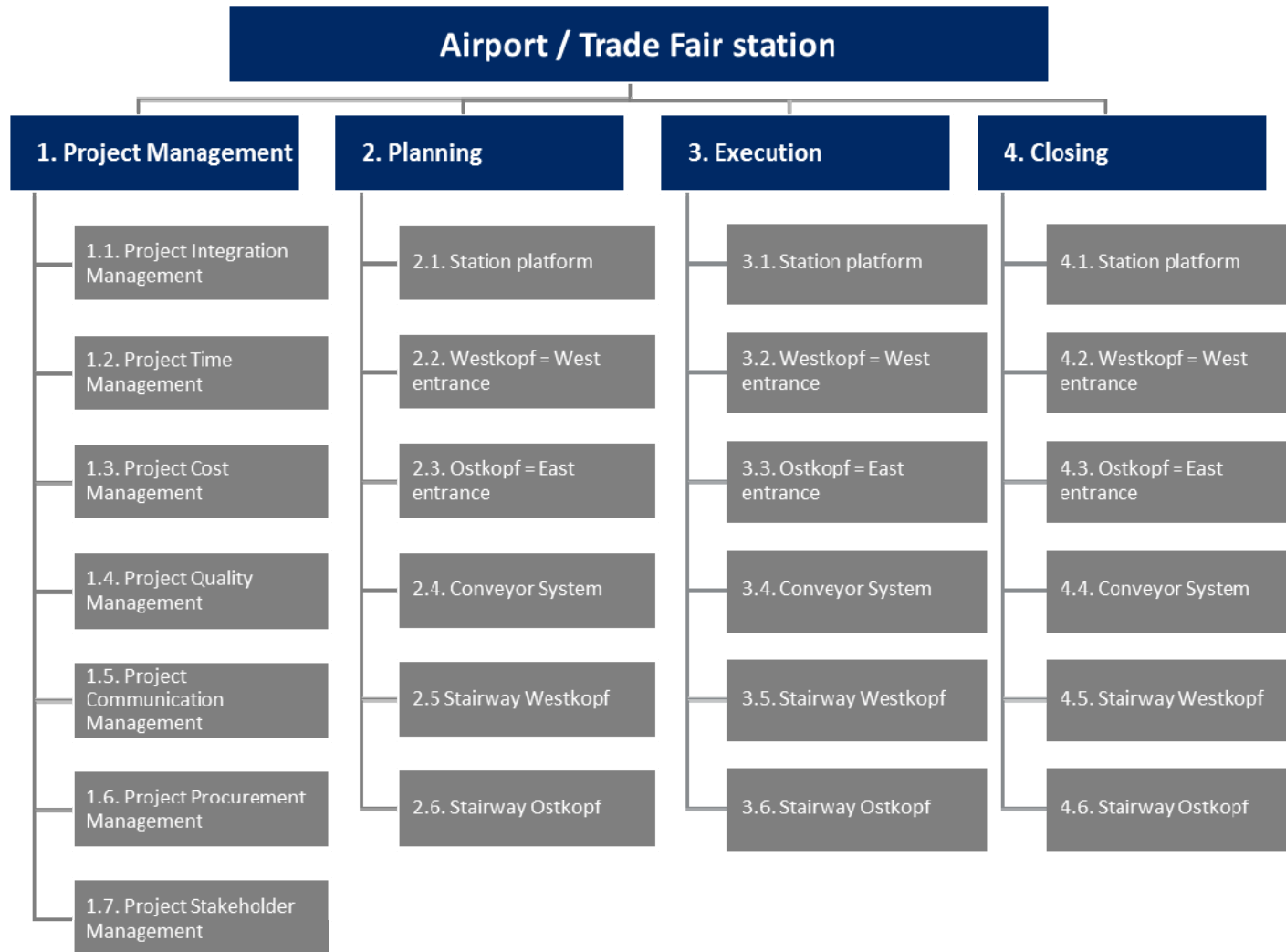
Collection of information



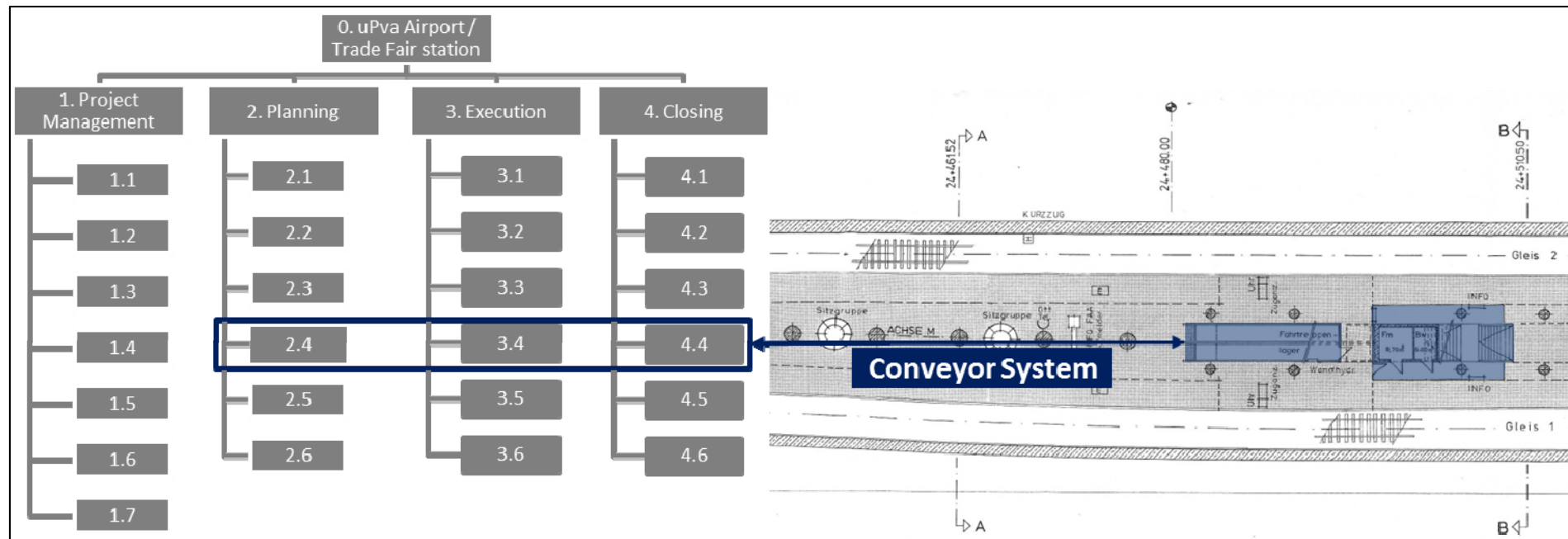
Software landscape



Work Breakdown Structure

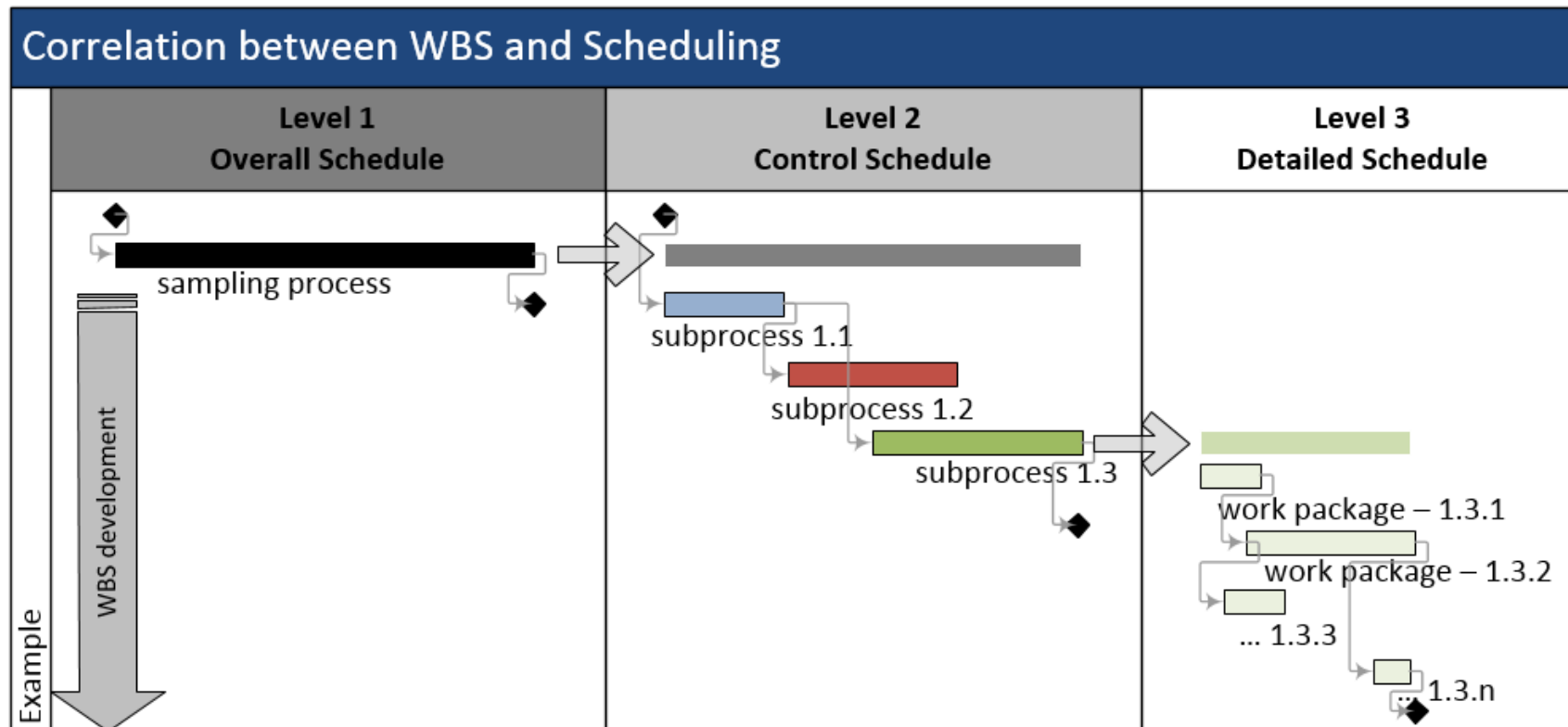


Work Breakdown Structure – Link to objects



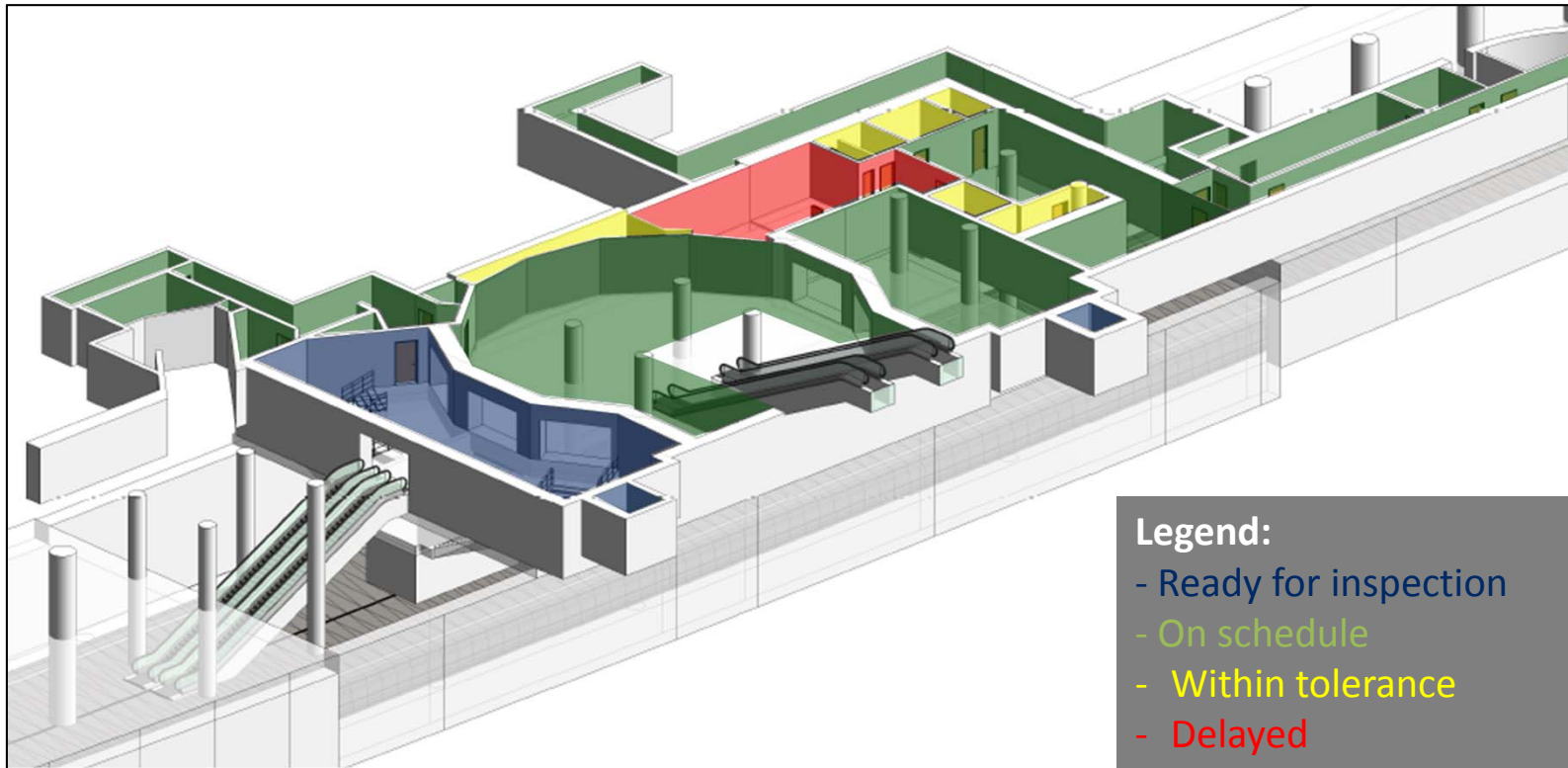
- Geometrical elements are linked to the relevant work packages
- Information contained in the individual work packages is also integrated into the model
- The execution of a work package or a set of work packages is contractually assigned to one of the project participants

Work Breakdown Structure and Scheduling



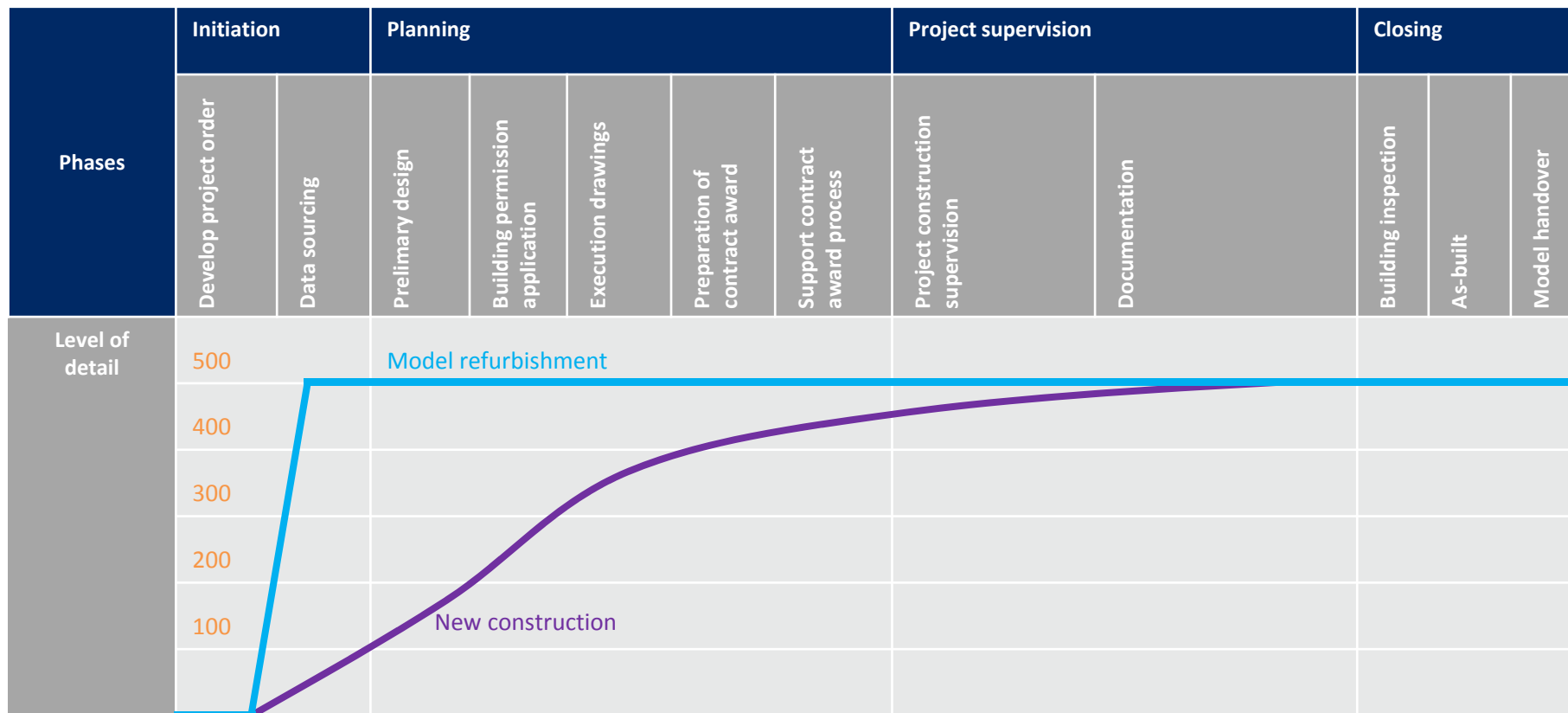
- The project phases and individual work steps and content are defined via the WBS.
- Scheduling is undertaken by assigning defined times.
- Further detail is added as more information becomes available.

Object-oriented Time Management



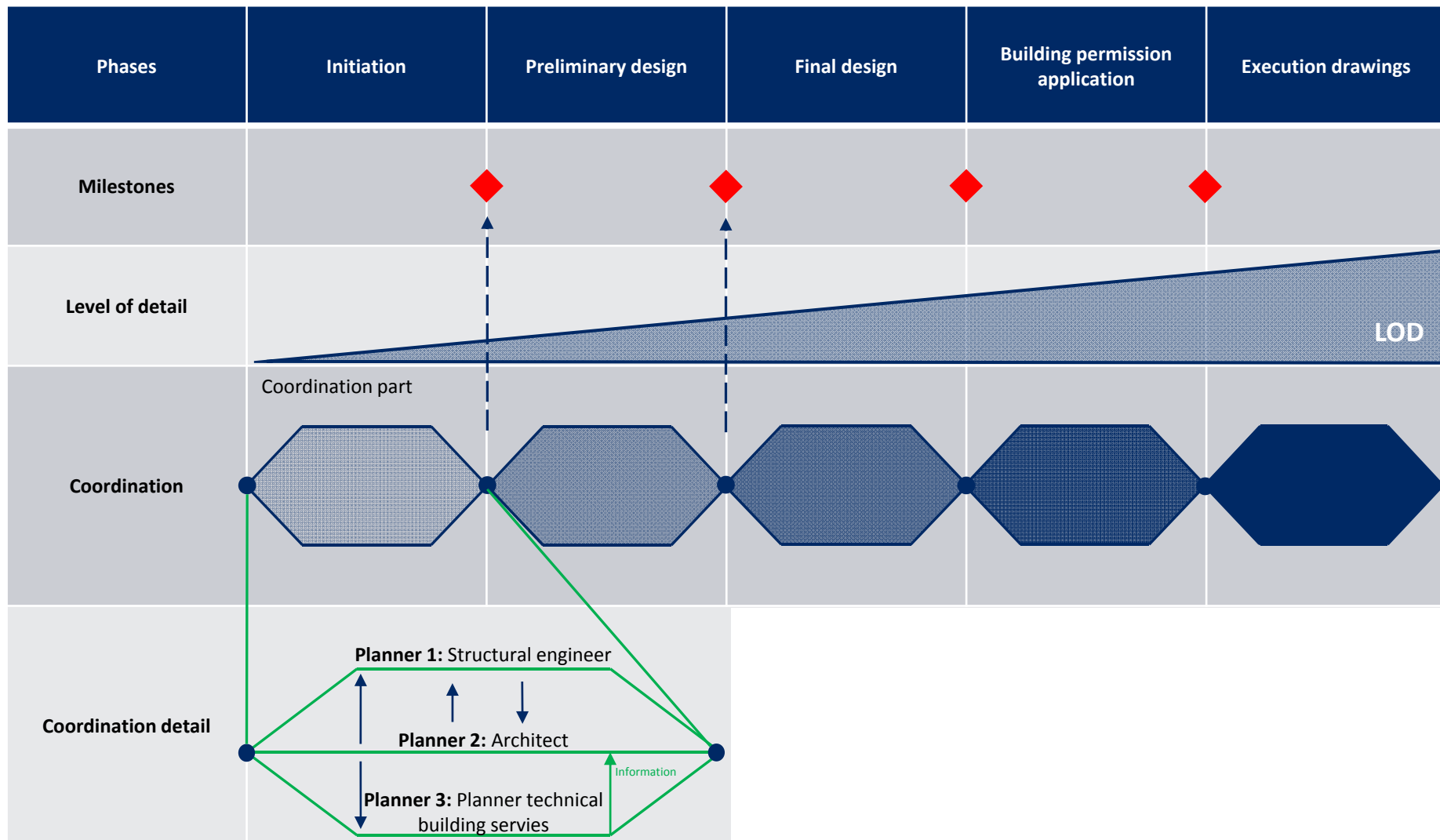
- Actual progress is compared to planned progress for individual work packages.
- Project progress can be represented visually by different colors.
- The current status of the project can be seen at a glance.

Level of detail

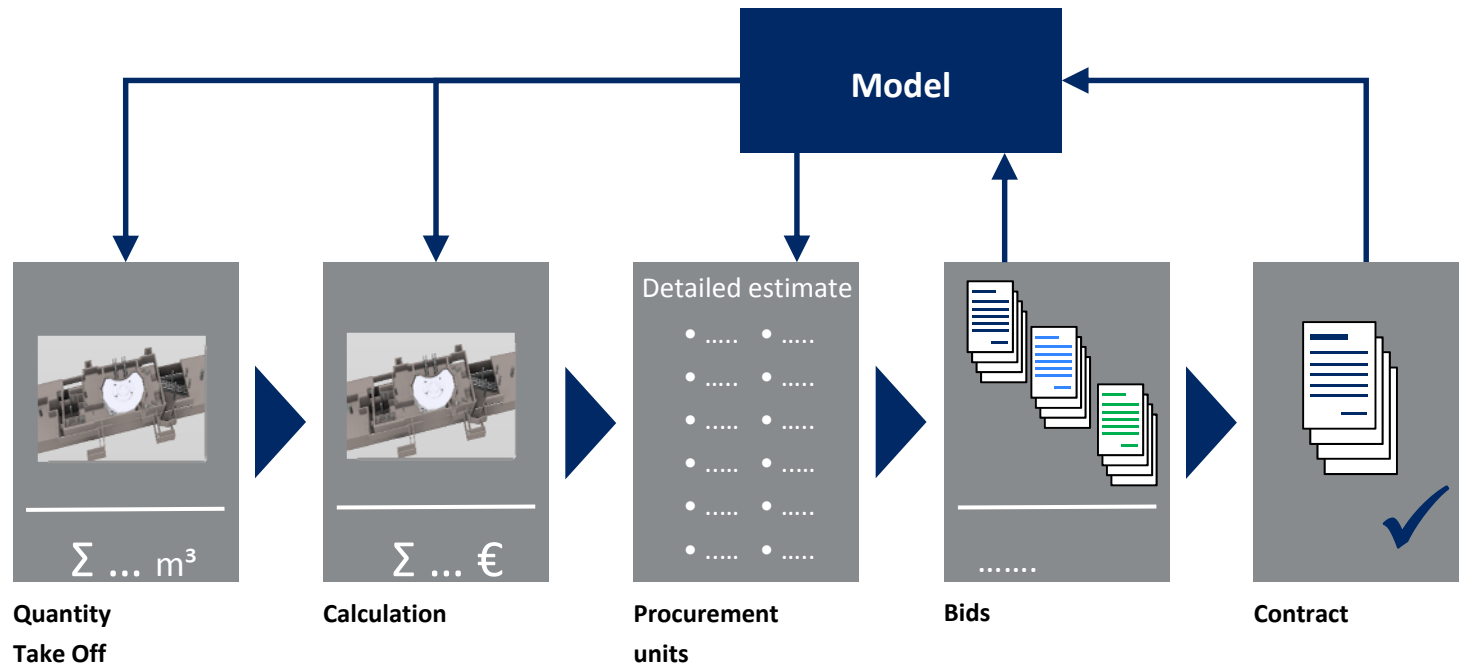


- The current status is to be reflected in the model at the start of planning. This represents as-built documentation.
- The level of detail increases during the course of the project.

Planning and model coordination



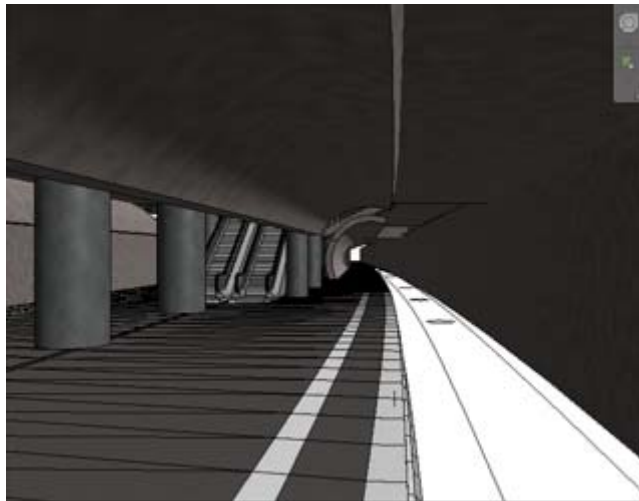
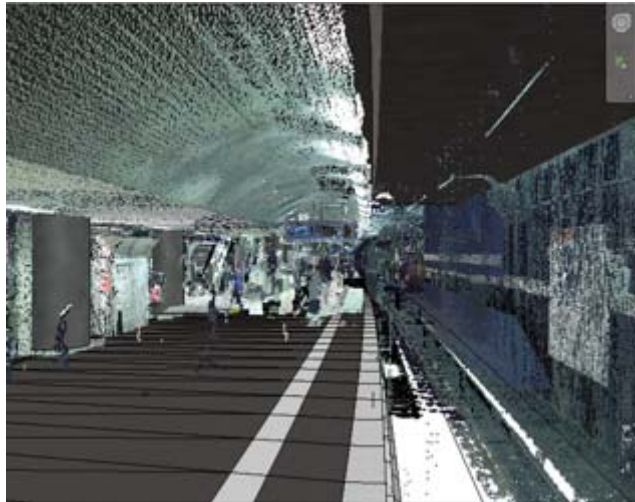
Project Procurement Management



Expected advantages:

- BIM enables automatic calculation of quantities
- Work packages are aggregated to procurement units
- The various bidders and bids are captured digitally
- Price comparisons and comparative lists are generated for key items
- Various execution scenarios can be simulated to identify the best possible tender
- Current contract award status (prices and items) can be represented in the model

Conclusion



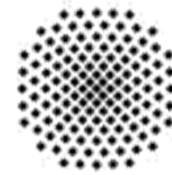
Lessons learned:

- BIM can be used for established properties.
- BIM requires clear structures and specifications.
- Disciplined and structured work and good methods and software skills are basic requirements for BIM projects.
- Appropriate qualification of project participants must be ensured through systematic training measures.

Outlook:

- The procedure (from client perspective) used during the pilot project is a good starting point for future projects.
- Further progress towards a holistic approach can be made if other project participants' perspectives and experiences are examined as well.
- A perceptible improvement is expected in the areas of communication and management as the result of using BIM.

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