

## Lessons from the Liscate School Project applied to the TU Dublin Design+Construct Project

Louis Gunnigan  
Paolo Ettore Giana  
Orna Hanly



**5th CitA BIM Gathering Virtual Conference**

21 - 23 September 2021

12/10/2021



# The Authors

## Louis Gunnigan

Engineer

Programme Leader for Campus Development with TU Dublin

## Paolo Giana

Engineer

Research Associate at King's College London

## Orna Hanly

Architect

Head of School of Architecture with TU Dublin

TU Dublin Lead on Broombridge Project



# Things you will hear about today

- Need to address structure for collaboration
- The FAC-1 contract
- Use of FAC-1 as a BIM integrator on the Liscate project
- The TU Dublin Design+Construct Project
- How the TU Dublin project is learning from the Liscate project



# The impact of digitalization: towards a better collaboration

- The McKinsey Global Institute (2017) recommends that poor construction sector productivity requires us to *“rewire the contractual framework”* and a BIM protocol should sit at the heart of the contractual rewiring.



# The impact of digitalization: towards a better collaboration

## ➤ ISO 19650:2018

- provides a new international standard for information management in the context of digital transformation which focuses repeatedly on collaboration.
- states that *“Collaboration between the participants involved in construction projects and in asset management is pivotal to the efficient delivery and operation of assets”*.
- Clause 5.1.8 describes the *“project’s information protocol”* as a means to integrate all team members’ appointments.



# Origins of FAC-1

- Misunderstandings arise from vague and conflicting guidance as to collaborative alliances, despite the evidence of improved value and reduced risk
- Bespoke alliance contracts are hard to understand, can attract high risk premiums and do not improve consistency or achieve lasting industry changes



# Origins of FAC-1

- Over 12 months' consultation
  - over 120 clients, consultants, contractors, lawyers and academics
  - 14 jurisdictions
  - agreement on the features of a flexible standard form alliance contract suitable for any type of project in any jurisdiction
- FAC-1 Framework Alliance Contract published June 2016
- Adopted on procurements worth over £50 billion in 4.5 years, with early evidence of improved value



# FAC-1 as a contractual umbrella/ integrator

- **FAC-1** operates as an *'umbrella'* contract that connects, integrates and governs shared activities, shared learning and improved performance
- **FAC-1** integrates the contracts (e.g. FIDIC/ICC/JCT/NEC/PPC/TAC contract forms) awarded by one or more clients to one or more consultants and/or contractors and/or suppliers
- **FAC-1** supports and integrates:
  - A programme of related/ unrelated projects, and/or
  - The contracts for different components and phases comprising
  - Any project including a project using BIM
- **FAC-1** has been translated, adapted and published for use in Spain and also in Brazil, Bulgaria, Germany, Italy, Peru, Chile and Russia





# FAC-1: the first standard form designed to plan and integrate multiple contracts

- **FAC-1** “*Alliance Members*” include the “*Client*”, an in-house or external “*Alliance Manager*” and any combination of selected consultants/ contractors/ suppliers/ providers, with the facility to add “*Additional Alliance Members*” (clauses 1 and 3 and Appendix 2)



# FAC-1: the first standard form designed to plan and integrate multiple contracts

## FAC-1 states:

- why the alliance is being created, stating agreed “*Objectives, Success Measures, Targets and Incentives*” (clause 2 and Schedule 1)
- how work will be awarded to *Alliance Members*, under a “*Direct Award Procedure*” and/or “*Competitive Award Procedure*” and under early standard form “*Orders*” (clauses 4, 5 and 7, Schedule 4 and Appendix 3)
- how the *Alliance Members* will manage risks and avoid disputes using a shared “*Risk Register*”, “*Core Group*” governance, “*Early Warning*” and options for an “*Independent Adviser*” and alternative dispute resolution (clauses 1, 3.3, 9 and 15 and Schedule 3)



# FAC-1: Supply Chain Collaboration and Improved Value

*Supply Chain Collaboration* could enable the agreement and delivery of other *Improved Value* comprising:

- Improved *Sustainability* looking at whole life value, including agreement of increasing warranty for material
- Improved quality control through joint risk assessments and integrated team agreement and monitoring work on site
- Lean programming of individual tasks leading to time savings and cost control
- Innovation through collaborative working, for example to increase recycling and reduce landfill
- Timely and consistent creation, sharing, agreement and use of *BIM* information



# FAC-1 and BIM

- ISO 19650 BIM stresses that *'Collaboration between the participants involved in construction projects and in asset management is pivotal to the efficient delivery and operation of assets'*
- **FAC-1** creates BIM data transparency through collaborative systems of data exchange and team integration, which provide clarity as to BIM data and reliance on that data
- **FAC-1** provides agreed BIM deadlines, gateways and interfaces in its multi-party *Timetable* , with flexibility to bring in BIM contributions from specialist sub-contractors, suppliers, manufacturers and operators through *Supply Chain Collaboration*
- **FAC-1** supports BIM with direct mutual licences of *Intellectual Property Rights* (FAC-1 clause 11) and provides for clash resolution by *Early Warning* and the *Core Group*



# Liscate School – Milan, Italy

Construction Value - €5,000,000

Student population - 150





# Liscate school alliance (Italy) using FAC-1 with BIM

- Liscate Municipality applied for the first time **FAC-1** outside UK, governing integrated use of BIM on high school project with Euros 5 million.
- **FAC-1** used as a **BIM integrator** to connect two-party contracts and BIM model contributions of the client, contractor, design team, subcontractors, construction manager and safety coordinator.
- **FAC-1 alliance activities** included data sharing, BIM model management and maximum involvement of subcontractors and suppliers.
- An introduction to **FAC-1** was achieved through several meetings to align the approaches of different parties. The alliance provided a common structure for managing activities among different parties.





# Liscate school alliance (Italy) using FAC-1 with BIM

- Definition of the *Timetable (schedule 2)* to integrate the parties so as to minimising risk related to lack of communication. The coordination of activities across the contract allowed the interaction of different parities to support subcontractors.
- Definition of the *Risk Register (schedule 3)* to prepare the parties in dealing with risks typical of the project with predefined measures. Risks were identified with a 0-5 range according to their probability and impact. Parties were identified as responsible for controlling and reporting to the *Core Group*.
- Alliance structure enabled integration of BIM models using guidelines as framework documents that were embraced by all the parties.



# Liscate school alliance (Italy) using FAC-1 with BIM

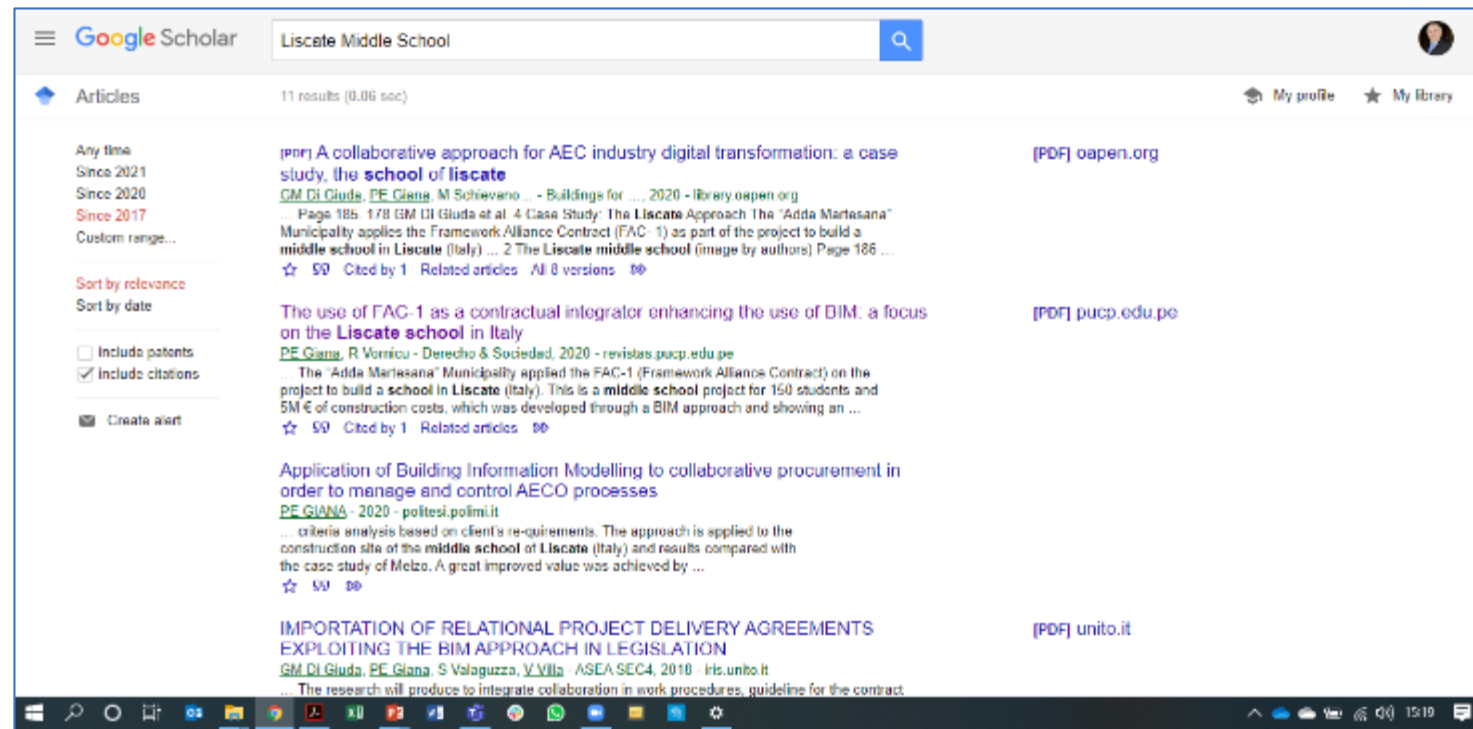
- Milan Union of Municipalities Adda Martesana created the first **FAC-1** contract in Italy, governing construction of a school and civic centre
- **FAC-1** alliance members were the client, contractor, design team, construction manager, safety coordinator and sub-contractors
- **FAC-1** alliance activities included data-sharing, BIM model management and maximum supply chain involvement
- **FAC-1** enabled agreement of **6.8% cost savings** and **48% time savings** plus design innovations with sub-contractor input, improved health and safety and effective joint risk management on site





# Further information on the Liscate School

- YouTube video '*Delivering a BIM Alliance in Milan*' at <https://www.youtube.com/watch?v=g1hLNEAVOLU&t=5s>
- Search Google Scholar for Liscate Middle School





# Principal Lessons Learned - 1

- Familiarise the market with the form of contract under consideration, with specific emphasis on the use of the contract as a tool to address the project objectives of all parties
- Involve the market in the development of the contract awarding methodology
- Set out transparent processes that will regulate the contract awarding process.
- Develop a clear series of annexes that will support the use of FAC-1, (e.g. for: risk management, programme, mutual IP rights, dispute resolution, etc. )
- In drawing up the FAC-1 agreement, involve all parties who can influence the outcome of the contract, i.e, the client, the consultants, the contractors and their supply chain.



# Principal Lessons Learned - 2

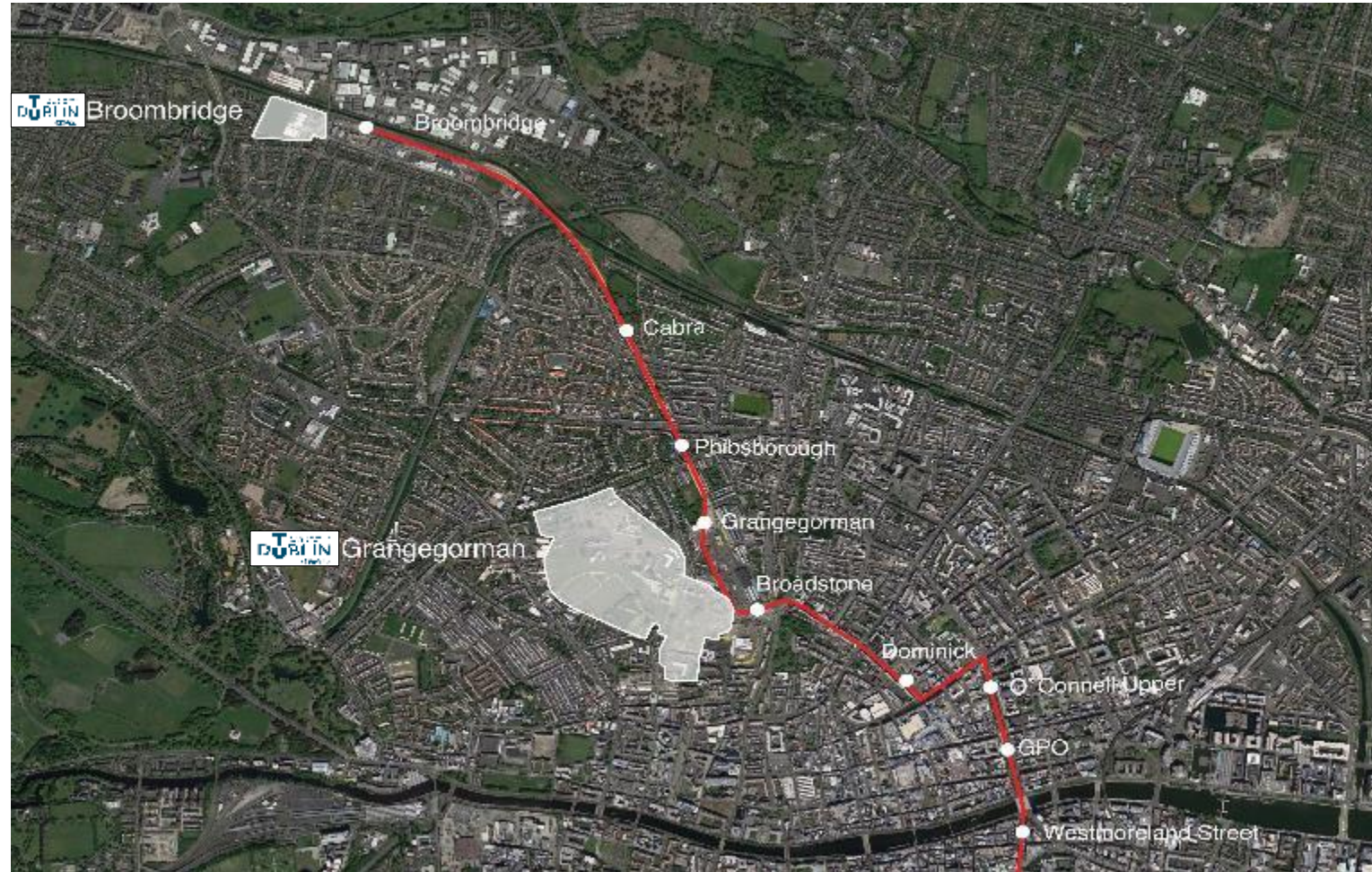
- Legally define the accountabilities and responsibilities of all parties
- Follow a joint risk monitoring and management approach where all parties in the contract have equal input to the decisions reached.
- Manage all information through a Common Data Environment to which all parties have live, real-time access.
- All decisions agreed are updated immediately on the Building Information Model, so that all parties are accessing the same live information at all times.





# TU Dublin Design + Construct Project

## Site location







# Design+Construct Site

Entrance is off the junction of Bannow Road and Broombridge Road, adjacent to the Broombridge Station

Site is bounded on the north east by the rail line (Luas, main line and commuter trains) and the Royal Canal and on all other sides by residential areas.



12/10/2021





## People

Fostering Individual  
Talents in an Ever  
Changing World

### Creating a place of imagination and inspiration

- Provide a 'living lab', flexible and adaptable education spaces, workshops and laboratories to facilitate active learning via problem-solving, task- and project-based learning methods
- Equip graduates with essential skills that can be immediately applied in the workplace of the future through meaningful engagement with industry and enterprise in the co-creation of educational offerings
- Develop an integrated campus approach to include research, innovation, industry and enterprise collaboration, education, recreation, sports and social/community engagement contributing to urban regeneration and development in the surrounding area

## Planet

A Powerhouse for Living  
& Breathing Sustainability

### Being a beacon for sustainability

- Drive cooperation and collaboration to deliver on the Green agenda
- Demonstrate our commitment to real action on sustainability and the circular economy
- Contribute to achievement of targets through digital construction research, innovation, education and training

## Partnership

Delivering Shared Impact

**Gathering21**  
Construction Innovations  
for Future Generations

### A tightly connected network

- Network and engage with strategic educational partners, stakeholders, with industry, the professions and the wider community
- Develop digital and virtual analytics, communications, knowledge and information-sharing platforms
- Collaboration and interdisciplinary across sectors industry, government and academia, policy makers
- Develop Regional Technology Cluster for Construction as a national resource to improve commercial competitiveness and productivity





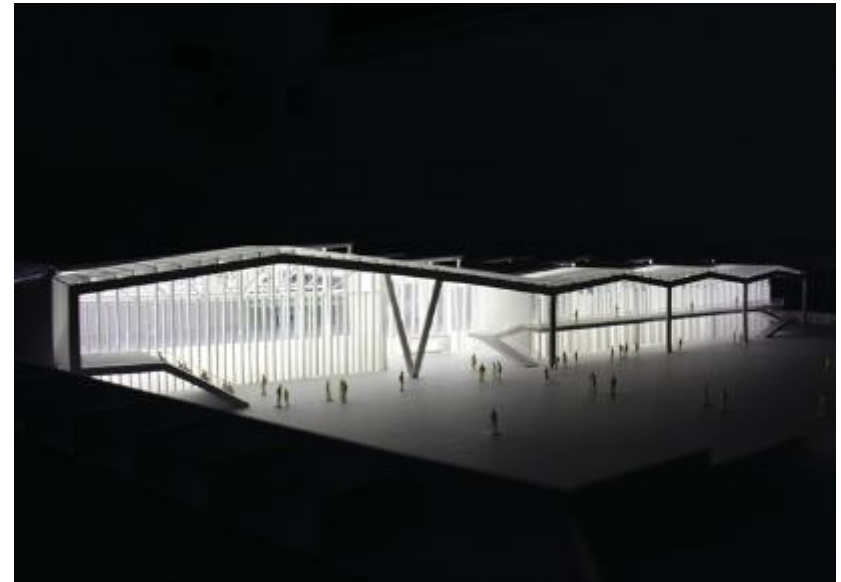
# Aspirations





# Grouping of Spaces (m<sup>2</sup>)

- Design+Construct – 3900
- Social/Student Areas – 1210
- Sports – 2200







# Project Status

- Initial end-user consultation completed
- Strategic brief approved
- Preliminary Design stage about to commence
- Detailed End-User consultation about to commence
- Procurement Strategy now being developed



# Market Soundings on Procurement Strategy

Progress to date:

- Due to Covid restrictions, all discussions to date have been online
- Discussions have been held with Office of Government Procurement, Grangegorman Development Agency, Lean Construction Ireland and with key experts from professional bodies and construction law practices.
- Further discussions are planned with construction organisations, supply chain, regulatory bodies, etc.



# Initial Results

- Considerable caution exists for the use of a collaborative approach as would be provided through FAC-1
- The Project Team has been challenged to show:
  - what, precisely, the GCCC contracts cannot deliver?
  - what would a collaborative contract be required to deliver and how would it do so?
  - how would risk be managed differently and how would the State's interest be protected in such an environment?



# Next tasks

- Development of procurement Strategy
- Finalisation of the Project Brief
- Approval to proceed to Stage 2 of CWMF
- Appointment of Design Team



# Conclusion

- The Liscate project showed that a collaborative contract approach can:
  - Maximise benefits of BIM
  - Create a better environment for risk management
  - Promote innovation in all stages of project development
  - Maximise the knowledge and agility of the whole supply chain
  - Reduce costs
  - Increase quality
- TU Dublin is exploring how to do this in an Irish context



# Key Question

- How will the Irish construction industry get over its reluctance to use collaborative contracts?



## Author Contact Emails

Louis Gunnigan

[Louis.Gunnigan@TUDublin.ie](mailto:Louis.Gunnigan@TUDublin.ie)

Paolo Ettore Giana

[Paolo.Giana@kcl.ac.uk](mailto:Paolo.Giana@kcl.ac.uk)

Orna Hanly

[Orna.Hanly@TUDublin.ie](mailto:Orna.Hanly@TUDublin.ie)