

# BIM in Public Tenders: Methodology for a Cost-Benefit Analysis



- RINA Consulting S.p.A (RINA) and its subcontractor B1P Group are responsible for the implementation of the service contract GRO-SME-F-101 "Methodology for cost-benefit analysis for the use of BIM in public tenders" awarded by the Executive Agency for Small and Medium Enterprises (EASME), acting under the powers delegated by the European Commission.
- The contract is funded by the contribution of COSME Programme of the European Union



#### **Project Details**

- Title: Methodology for cost-benefit analysis (CBA) for the use of Building Information Modelling (BIM) in public tenders
- Contract No.: GRO-SME-20-F-101
- Starting Date: 1<sup>st</sup> September 2020
- **Duration:** 9 months
- Main Contractor: RINA Consulting S.p.A. (Italy)
- **Sub Contractors:** B1P Group (Italy), Apollis (Italy)
- Funded by: Executive Agency for Small and Medium-sized Enterprises (EASME)
- Advisory Group: EASME, DG GROW and EU BIM Task Group

### **BIM in Public Procurements**



**BIM** is not obligatory, but it is **suggested** in the **EU directive** for Public Procurement in 2014\* The Commission is encouraging the use of BIM through **"soft policy"** and close collaboration with the EU BIM Task Group\* The Commission will provide a **recommendation** to promote BIM in public procurement for construction\*

EASME has set up a tender to develop a methodology for cost-benefit analysis for the use of BIM in public tenders

<sup>\*</sup> DG GROW, The Renovation Wave





Methodology to measure the costs and benefits of using BIM in public construction projects

Overview of the Approach

The proposed approach leverages on different phases: i) a **desk research phase**, ii) a **consultation phase** and iii) a **development phase** 

B

Methodology for Cost & Benefit Model validation and application

**Validation** of the Cost-Benefit model through the analysis of **6 case studies** chosen among EU tenders

C

Methodology for Handbook Creation The preparation of an informative, easy to read and **illustrative document** that will serve as a handbook **addressed to EU public entities** that wish to learn about the BIM cost benefit analysis

Methodology to measure the costs and benefits of using BIM in public construction projects





# Methodology to measure the costs and benefits of using BIM in public construction projects



BIP GROUP RI



## From Desk Research to the Selection of Indicators: Costs

- ✓ These indicators have been selected considering the findings of a **literature review process**
- ✓ The list is under validation through a survey submitted to a list of stakeholders
- The reported list might undergo changes reflecting comments and suggestions collected through the survey and basing on the measurability of the proposed alternatives

Cost indicators	Type of Indicators	
Public entity personnel labour cost increase during pre-tendering phase	Monetary	Dublic and surgest
Public entity personnel labour cost increase during tendering phase	Monetary	Public procurement process cost increase
Public entity personnel labour cost increase during post-award phase	Monetary	
Consulting costs increase for the public procurement process	Monetary	
Increase of the value of the contract when the public entity requires BIM	Monetary	Model creation cost
adoption (associated to the creation of the model)	Monetary	
Public entity hardware upgrade investment	Monetary	
Public entity software purchase/upgrade investment	Monetary	BIM associated
Personnel training costs	Monetary	investment
New employees cost required for BIM adoption in tenders (if necessary)	Monetary	

### From Desk Research to the Selection of Indicators: Benefits



- ✓ These indicators have been selected considering the findings of a **literature review process**
- ✓ The list is under validation through a survey submitted to a list of stakeholders
- The reported list might undergo changes reflecting comments and suggestions collected through the survey and basing on the measurability of the proposed alternatives

Benefit Indicators	Type of Indicators
Cost reduction due to early clash detection and construction phase change reduction	Monetary
Cost reduction associated to more precise quantity take-offs	Monetary
Cost reduction due to overall project duration reduction	Monetary
Cost reduction related to lower costs for litigations	Monetary
Annual contingency amount reduction	Non-monetary/Monetary
Public entity personnel labour cost reduction due to document analysis for facility management and maintenance	Monetary
Cost reduction associated to more efficient facility management	Monetary
Cost reduction associated to more efficient maintenance	Monetary
Cost reduction attributable to the government/society due to better Health & Safety	Non-monetary/Monetary
CO2 emission reduction due to reduced material wasted	Non-monetary/Monetary

Methodology to measure the costs and benefits of using BIM in public construction projects

All participants to the GA EU BIM Task Group are kindly invited to contribute by filling in the questionnaire

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it will be of help to have as much input as possible!

Link to questionnaire: https://apollis.limequery.com/447 598?lang=en



### Methodology for costs and benefits model validation and application





every EU public entity

follows the same workflow for each EU public entity



В		Main challenges & solutions				
	Challenge	Solution				
	Identification of the "costs" of a 3D BIM Model		3D Modeling of Public Tenders to be used as Case Studies			
	Identification of the QtO/MtO benefit using BIM		Merge and Match of the QtO/MtO from the Case Studies tender documents Lev. 0 and the QtO/MtO exported from the 3D Model			
	Identification of the Benefit of using BIM for Lev 2 & 3 implementation		Analysis of BIM Lev. 1 Public Tenders to inspect the Benefits of using BIM for the next Level of implementation			





Case study independent from the geographical location





#### Case Study: BIM lev 1 - Renovation and construction of the PALM site



COMMISSION EUROPÉENNE OFFICE POUR LES INFRASTRUCTURES ET LA LOGISTIQUE - BRUXELLES

OIB 02 - Budget, finances et marchés publics

Annexe 3 du cahier des charges de la procédure restreinte n° OIB/2019/RP/0024

Travaux de rénovation, de construction et d'aménagement du site Palm, sis avenue Palmerston 6–14 et rue des Éburons 77–79, 1000 Bruxelles, destiné à être aménagé en crèche et garderie postscolaire.

- 1	lord	lereau d	e soumesa	n financi	ere - BIM

Description +	Type pri -	Unité	Quantité	Prix Unitaire	Prix Total
Elaboration d'un BEP (BIM Execution Pian) pour la phase d'exécution et pour la fourniture des données as-built (y compris les réunions internes et externes,).	FF		1		0.00€
Transposition des plans de conception existants pour Tarchitecture, la stabilité, les installations techniques, etc. en leurs modèles de discipline respectifi avant le début des travaus, y compris la sinataire existanté a conserver. Ces modèles sont conçus en fonction d'un dossier d'exècution.	FF		1		0.00€
Elaboration et gestion d'une plate-forme de collaboration et Common Data Environment (CDE), frais de licence inclus.	FF		1		0.00€
Les modèles de discipline BIM 3D (architecture, stabilité, installations techniques,) suivent la progression des travaux et sont actualisés en permanence.	FF		1		0.00€
L'utilisation du système de classification UniClass 2015.	FF		1		0.00€
L'attribution d'informations aux objets selon le LOI (Level Of Information) demandé dans le Protocole.	FF		1		0.00€
Elaboration et gestion d'une plate-forme as-built (intégré dans le Common Data Environment (CDE) ou coopère harmonieusement avec lui) avec système d'approbation, gestion de version et historique des remarqueses, voir également le paragraphe 6.3 du protocole BIM, frais de licence inclus.	Ħ		1	1	0.00€
Dossier as-built qualitatif: modèles as-built, plans et documents, nomenclature et structuration de tous les fichiers du dossier as-built complét, y compris tous les documents (plans, fiches techniques, notes de calcial, manuels, documents de mise en service,) de toutes les disciplines comme demandés dans les spécifications techniques respectives des disciplines concernées, usivant modaités du protocole BIM et ses annexes.	FF		ï		0.00€
Généralités BIM : toutes les matières non spècifiées ci-dessus, nécessaires pour réaliser les objectifs du protocole BIM ; voir	PM				

#### PLANNING DIRECTEUR

(Annexe 2.1)

Appel d'offres n° OIB/2019/RP/0024

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#### Case Study: BIM lev 1 - Renovation and construction of the PALM site



Currently working on the Structural and Architectural elements









Case Study: BIM lev 0 - Works of conformity and infrastructural upgrading of the port



#### Currently working on the Structural elemer









#### Checking each element that can be found on the sheets and that will be 3D modeled



Management system for electrical and water services, consisting of a remote workstation including a console for programming transponder keys. applications for managing ports and systems. Including installation, configuration and staff training.

B

Supply and installation of ceiling light fixture for LED emergency light. For ceiling or wall installation. Degree of protection: IP40 - Power: 11 W. Complete with inverter power supply unit with batteries and flushmounting kit.

Minimum autonomy 120 min. Cat 11 - Pier above breakwater and dock between dock and root above breakwater - electrical, lighting and water system. Local safety lighting

## Methodology for Handbook Creation





#### Main challenges



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Provide a clear description of the new BIM cost benefit methodology



Provide the support to enable Governments and public sector clients to transition construction to the digital era



Provide a practical and easy to understand guide for assessing Costs & Benefits of using BIM in public projects

## Methodology for Handbook Creation





## Methodology for Handbook Creation







#### Contacts





Alessandro Bozzolo – Project Manager E-mail: <u>alessandro.bozzolo@rina.org</u> Tel.: +39 010 3196840



Manuela Gussoni – Task 1 Leader E-mail: <u>manuela.gussoni@rina.org</u> Tel.: +39 0187 511149



Matteo Proia – Task 2 Leader E-mail: <u>m.proia@b1pgroup.com</u> Tel.: +39 340 3083746



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