

buildingSMART InfraRoom

Project Plan

Project Name:

IFC Infrastructure for Ports & Harbours (IPH)

General Information

InfraRoom

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GLOSSARY

Body	Abbreviation	Short summary
buildingSMART International	bSI	
Expert Panel*	EP	Brings in expert advice during the project, on a voluntary basis, during on average four meetings per year.
InfraRoom*	IR	Open forum within bSI responsible for the Infrastructure domain and all developments on IFC within this domain.
InfraRoom Project Steering Committee*	IRPSC	Body within the InfraRoom responsible for managing the InfraRoom projects, meets once a month and Project Lead presents the Project Dashboard during this meeting.
InfraRoom Steering Committee*	IRSC	Steers the InfraRoom and is responsible for setting out strategy, managing initiatives and liaison with other Rooms and bodies.
International Standardization Organization	ISO	Please follow this link for more information: http://www.iso.org/iso/home.html
Open Geospatial Consortium	OGC	Please follow this link for more information: http://www.opengeospatial.org/
Project Leader	PL	Responsible for managing the project and ensures the project is delivered within budget and on time.
Project Team*	PT	Executes a project based on a project plan and delivers the results according to plan.
Steering Committee**	SC	The senior governance body within bSI overseeing the standards process. It will comprise representatives from members and chapters.
Steering Committee Executive**	SCE	Establishes and manages the bSI standards process and addresses procedural and programmatic issues.

* For more information please see the InfraRoom Charter (v.11). The InfraRoom Charter describes the Governance of the Room and the responsibilities of the bodies within the InfraRoom; available online: <http://buildingsmart.org/wp-content/uploads/2016/03/Draft-Charter-v11-20160310.pdf>

** For more information please see the buildingSMART International Standards Process (v.6.2). This process describes the manner in which standards and other technical work is created and governed within buildingSMART International; available online: <http://buildingsmart.org/standards/standards-process/>

1 BACKGROUND

1.1 HISTORY

The creation of standardized Infrastructure asset & project data throughout the lifecycle of a facility is a key factor for the effective and efficient planning, design, construction, operation & maintenance Infrastructure. A comprehensive neutral data exchange model capable of representing both the semantic and geometric aspects of a give project or asset is a requirement for the open data exchange and effective data utilization in the context of developing, operating & maintaining maritime infrastructure.

The inclusion of Infrastructure elements within the IFC has both expanded and redefined the scope of IFC, moving its remit to include all aspects of the environment that are either built or managed. Several national standardization initiatives have emerged developing proposals for the extension of the standardized data exchange schema within different infrastructure domains. Examples are the Korean IFC-Road project, the Chinese IFC-Rail project, IFC-Bridge initiatives from the United States and France, and IFC-Tunnel from Germany. Issues with overlapping scope and an effort to internationalize these initiatives has resulted in the recent and planned work defining the overall architecture & common definitions, to provide a conceptual foundation to infrastructure developments.

1.2 OPPORTUNITY & INDUSTRY NEED

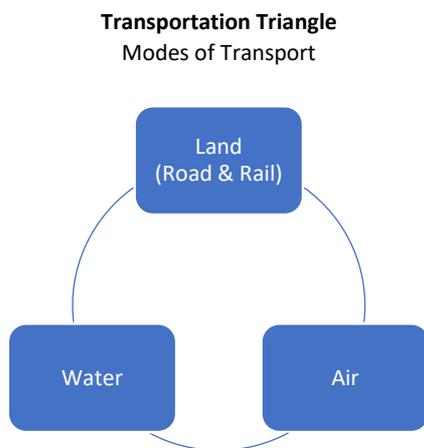


Figure 1 Transportation Triangle

Currently within the realms of transportation infrastructure the infrastructure room is engaged in the domains of road and rail transportation, with its common dependent of bridge engineering, in addition a separate BuildingSMART room has begun for airports, to address the unique place they sit between the buildings and infrastructure domain. These domains address two of the three major modes of transport for people, goods and services utilized in today's economy.

Sea transportation and maritime structures form a substantial part of the global economy and has been growing consistently over the past 20 years. Total transport capacity has steadily grown from 800 million tons in 2000 to 1200 million tons by 2010. The shipping industry within the UK alone is worth over £4 billion. Considering this identified gap in the coverage of IFC for Infrastructure, this

is a proposal to start the international development of IFC for open maritime infrastructure, beginning with its expansion to cover the domain of ports and harbour design, construction and operation.

This project will draw on the expert knowledge from the BuildingSMART international community and leading organizations in ports and harbour construction to provide a framework for open data standardization. This framework will include domain specific IFC schema extension, Model View Definition (MVD) development, software & model demonstration, documentation for the extensions and MVDs plus guidelines on use of the information. The project would align (and if requested assist) its efforts with the outcomes from the overall architecture project and concurrent developments of the common definitions project. As shown in Figure 1 the project would need to draw from and align its efforts with the work of IFC Rail and Road, to achieve full integration.

This document outlines the organization of work and development that is needed to engineer an extension to IFC plus supporting framework and documentation capable of exchanging and leveraging critical ports and harbour information.

1.3 PROJECT GOVERNANCE

The proposed project will be executed as a buildingSMART International project within the InfraRoom. Therefore, the project falls under the governance of the InfraRoom and will adhere to the governance process as described in the InfraRoom Charter (v. 11) available online:

<http://buildingsmart.org/wp-content/uploads/2016/03/Draft-Charter-v11-20160310.pdf>

In addition, the proposed project will adhere to all requirements coming from the Standards Process (v. 6.2) as described by buildingSMART International online:

<http://buildingsmart.org/standards/standards-process/>

1.4 Relationship to existing bSI Standards and Technical work

IFC for Ports & Harbours is an extension to the base IFC standard for the domain of Maritime infrastructure focusing on the largest part of this domain – namely Ports & Harbours Facilities, the base IFC will be the most current version of the IFC standard which is IFC4 RC3 which is expected to become IFC4.1 once it is moved to final standard state.

With regards to infrastructure room’s planned developments and organizations it is expected that an additional pillar named IFC-Maritime will be introduced into the original Leibach structure diagram (Figure 2 Extended Leibach diagram for IFC development Figure 2). This will provide the opportunity to align with and provide input into the common definition/schema project in the same manner as is expected by the four other developing domains, if such a collaboration is requested.

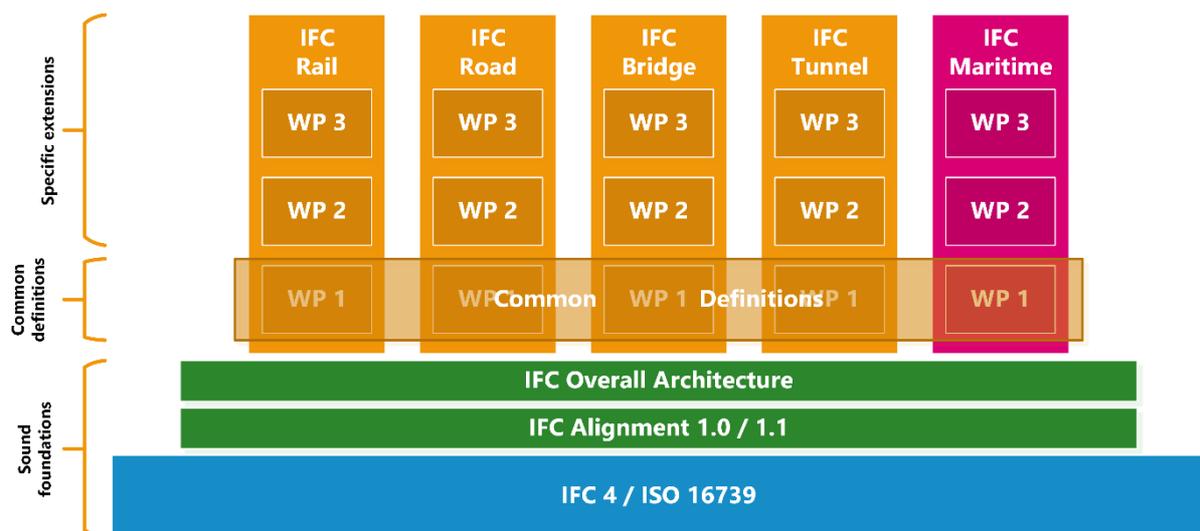


Figure 2 Extended Leibach diagram for IFC development

Though in terms of development IFC-Maritime will exist as an additional development pipeline. Its dependency relationship with the other developments is somewhat different as is noticeable within the Open Maritime Infrastructure scope defined later. the scope of a maritime facility can exist to include elements such as roads, railways, buildings, bridges, and tunnels (Figure 3). Therefore with 4

out of 5 of these domains still under development collaboration with these projects is vital to avoid unnecessary rework/duplication and insure the smooth integration of these domains as part of the harbour facility whole.

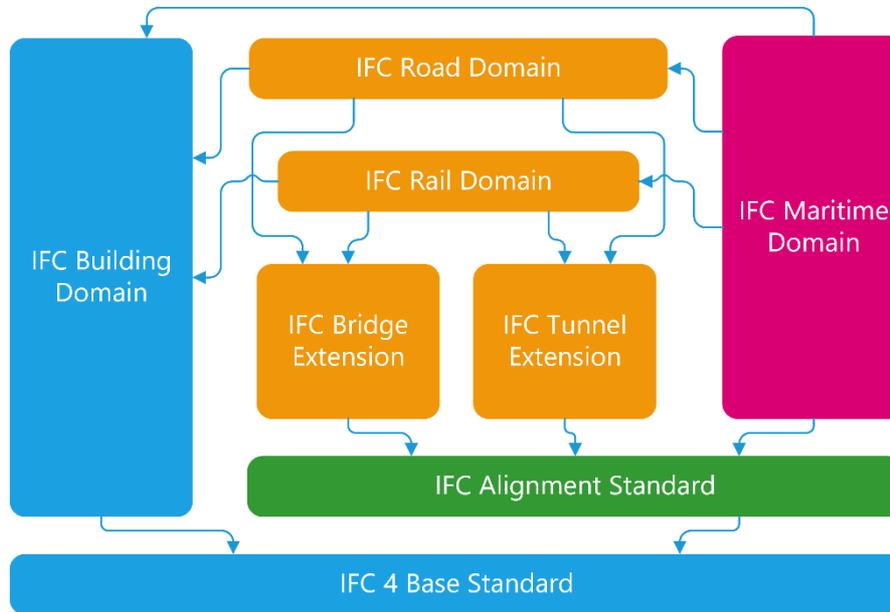


Figure 3 Maritime Domain dependencies within IFC (arrows represent dependency or inclusion)

Maritime elements for example breakwaters could take advantage of the IFC-Alignment subset to simplify the definition of these structures that can sometimes be linear in structure. Some cases will require the inclusion of bridges along the breakwater structure to allow the passage of maritime traffic. In addition, the breakwater may host a road or railway element in a similar manner to a tunnel and bridge, therefore it is vital to use the same or similar best practices and the definition of spatial & element breakdown structures.

The Common definitions project is expected to begin to address the areas subgrade, earthworks, geology, and drainage, and the IPH project will aid and input if requested. Therefore, this project hopes to draw on these developments to further specialise these areas for the Maritime domain and will be used heavily in the cases of coastal defences, land reclamation, earth-based levies & breakwaters.

The Project will also utilise the developments from the overall architecture in the case of modelling guidelines and new spatial structures. The recommendations of this project will be followed, and the subsequent extension will be built accordingly.

It is expected that this extension will form part of the next major release of IFC if the time frame allows.

2 SCOPE & OBJECTIVES

2.1 SCOPE STATEMENT

The scope of the work covers the semantic description of locations, assets and operations relating to the design, construction & operation of maritime facilities. The extent of maritime infrastructure and the constituent elements that form maritime facilities are depicted in Figure 4.

(please note Offshore wind turbines/platforms & subsea cables/pipelines are not included within this project but do form part of the maritime infrastructure domain).

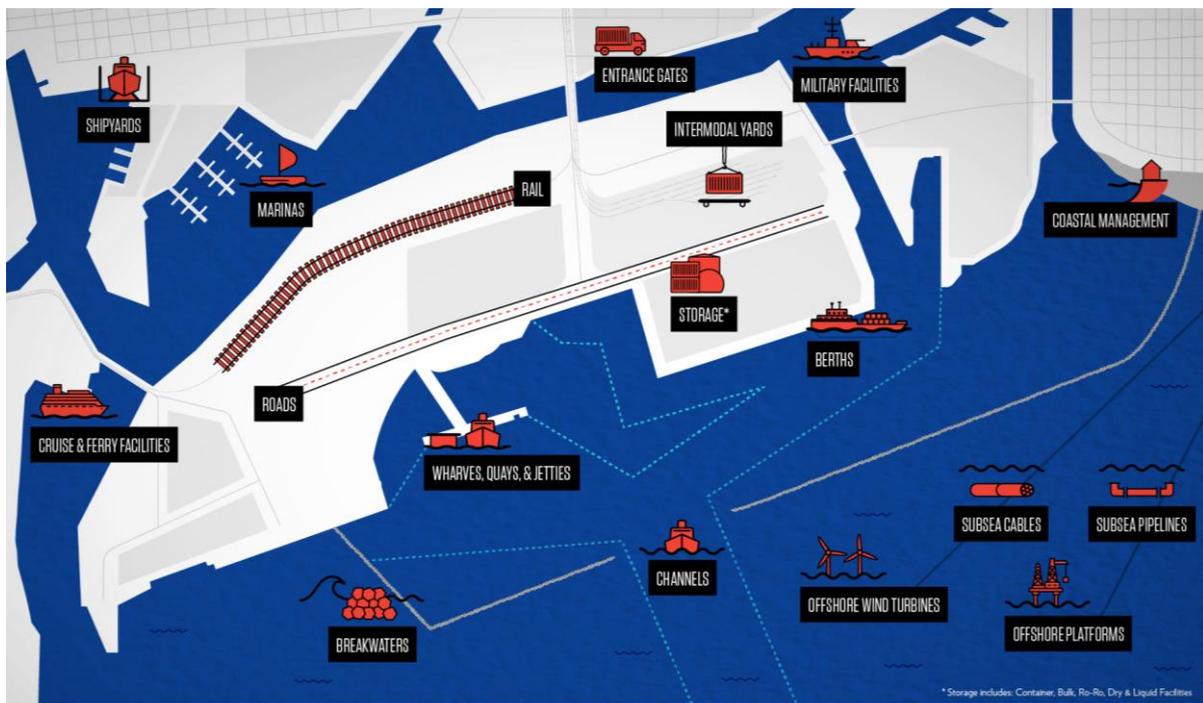


Figure 4: Harbour and port locations

Locations

Locations describe the different functional areas that are combined to form a harbour or port facility, but equally can exist as individual facilities or assets themselves. Figure 4 depicts how a combination of locations within a network of waterways can be combined to form a modern port facility. Locations within ports are broken down into two main areas water locations and land locations.

1. Land Locations
 - a. Cruise & Ferry facilities
 - b. Shipyards
 - c. Military Facilities
 - d. Freight Facilities (bulk, containerized & Roll-on-Roll-off (Ro-Ro) cargo)
 - e. Transition Zones – where people, goods & services move from water to land or vice versa
 - i. Wharfs
 - ii. Berths

- iii. Marinas
 - f. Access & transport- for movement around and through the Facility
 - i. Roads*
 - ii. Rail*
 - iii. Tunnels*
 - iv. Bridges*
 - v. Entrance Gates
 - g. Intermodal yards and storage
 - h. Coastal management
2. Water Locations
- a. External Waters
 - i. Harbour Access
 - ii. Outside Anchorage
 - b. Harbour Waters
 - i. Harbour Channels
 - ii. U-Turn Waters
 - iii. Harbour Anchorage
 - iv. Basins

* These locations are referenced as forming a part of a port but are developed by the other existing BuildingSMART projects.

offshore wind turbines/platforms & subsea cables/pipelines are deemed out of scope due to them not generally forming part of a port facility and associated assets.

Products and Physical Entities

These are the physically built components (grouped as products and systems) of a port or harbour facility this is a list of items that will be considered within the project, this is not a comprehensive list of all physical entities within a port facility.

1. Vehicles, goods & Cargo
2. Operable Equipment
 - a. Locks
 - b. Tidal gates
 - c. Cranes
 - d. Ship-lifts
3. Man-made Structures
 - a. Breakwaters
 - b. Quays, Jetties, piers, pontoons
4. Enhanced natural features such as geo-strengthening
5. Natural Features
6. Geology & Strata (interfaces)
7. Hydrology & Tides
8. Flora and Fauna

Processes

Whilst the modelling of construction and operational processes to be used are already within the existing scope of IFC, additional consideration is needed to the dynamic nature of interfaces with oceans and seas and the effect it has on geology, an initial breakdown identifies:

1. Metocean concepts
 - a. Tides
 - b. Waves
 - c. Wind
2. Geology
 - a. Silting/deposition
 - b. Erosion/deposition
 - c. Water Tables
3. Operable equipment
 - a. Locks, tidal gates, cranes & ship-lifts
 - b. Vehicles & ships
4. Pontoons and floating harbour structures



Figure 5: Harbour facility (IDP, Brazil)

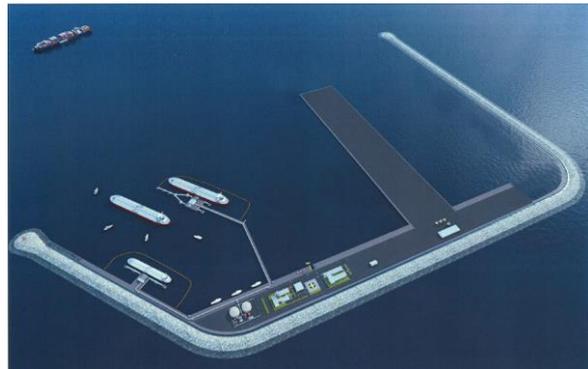


Figure 7 Offshore Deepwater Container Terminal (Venice, Italy)



Figure 6 Container Terminal (Zhuhai, China)



Figure 8 Liquid Chemical Terminal 2 (Zhangzhou, China)

2.2 OBJECTIVES

The IFC for Ports and Harbours Project is set to achieve:

- Define the use cases for the development, operation & maintenance of Ports & Harbours considering existing use cases developed during the Overall Architecture and other related initiatives.
- Set out the data exchange requirements for the use cases to be implemented within the Ports & Harbours project.
- Develop & document the IFC Infrastructure for Ports and Harbours data exchange standard to be known as IPH 1.0.
- Development of modelling guidelines, and a IPH IDM & MVD.
- Provide planning for Deployment of IPH 1.0 and highlight future developments for IPH vNext and Maritime Infrastructure.
- Develop (or extend existing) tool to view/edit IPH 1.0 models and create example models

In addition to these objectives the following is recognised:

- Integration of IFC Road, IFC Rail & IFC Buildings is a key component to the overall domain of Ports and Harbours and needs to be considered (for more information please see the *Scope of Work* section).
- Engagement with the common definitions project is important as the base definitions being developed under this project are important elements of Ports & Harbours projects.

2.3 Achievements

The Project outline states the following main achievements to fulfil the stated objectives for the IFC Infrastructure for Ports and Harbours.

- A Clear definition of Scope for Ports & Harbours
- Process Maps and Use case definitions for Ports & Harbours
- Draft Conceptual model and IFC Extension for the exchange of Ports & Harbours data.
- A Ports & Harbours Model View Definition (MVD) and supporting Information Delivery Manual (IDM)
- Modelling Guidelines for Ports & Harbours datasets
- An IFC Viewer and example model for demonstration and validation
- Deployment Plan & Future Developments for IFC Infrastructure for Ports & Harbours
- Engagement and collaboration with currently running BuildingSMART projects & Initiatives
- Facilitation of Expert Panel Reviews and collaboration with Infrastructure Room steering Committee

3 DELIVERABLES

WP0 – Project Execution Planning

Based on this project proposal presented to the Infrastructure room and feedback and comments for the BuildingSMART Infrastructure room and project steering committee a full project execution plan must be developed, providing finalised details of work packages, deliverables, work schedule, budget plan, project team and project organisation in terms of the responsibilities, reporting structure and governance.

Tasks:

- T0.1 Organisation/Appointment of Project Team
- T0.2 Recruitment of expert Panel Members
- T0.3 Setup of Collaboration & Communication Protocols
- T0.4 Development of Project Execution Plan (Inc. Budget)
- T0.5 Agreement of Project Execution Plan (Inc. Budget)
- T0.6 Approval by Standards Committee

Deliverables: D0.1 Project Execution Plan @M0

Milestones: M0 09.03.2018

WP1 – IFC Common Schema

To achieve the objective of engagement and contribution to the common schema project the IPH project proposes the following tasks to address the work that is required to create the common schema for infrastructure.

Tasks:

- T1.1 Participate in IFC Common Schema PT Meetings
- T1.2 Contribute to IFC Common Schema Definition
- T1.3 Contribute to IFC Common Schema Development
- T1.4 Participate in IFC Common Schema Summit Sessions
- T1.5 Participate in IFC Common Schema Expert Panel

Deliverables: D1.1 IFC Common Schema Definition @M9
D1.2 IFC Common Schema Extension @M10

Milestones: M9 27.04.2018
M10 01.11.2019

WP2 – Requirements Analysis and Existing Review

Analyse the requirements of the planning, design, construction, operation and maintenance of a port/harbour facility. Using example models, documentation and domain experts, typical user scenarios and use cases must be captured about the domain. Identification of the current content and favourable content of harbour models is required to finalize the scope of the delivered package. Existing data exchange standards that are relevant to the domain need to be taken into consideration, plus engagements with concurrent projects that have an overlapping scope. The methods of the Information Delivery Manual (IDM) are used to analyse example projects, to create process maps and exchange requirements from identified user requirements or information exchanges. Providing a documented reasoning for the development of new locational, physical and process entities, and documenting the domain specific use.

Tasks:

- T2.1 Identify and Obtain appropriate example projects and facilities data.
- T2.2 Dictionary and Classification Semantics

- T2.3 Identify use-cases & develop process maps & ERs
- T2.4 Review of Existing representations
 - T2.4.1 Overall architecture & common definitions
 - T2.4.2 GML Representation
 - T2.4.3 Hydrology, tidal and operational resources – Metocean
 - T2.4.4 Consideration of IFC Quay for reuse (TU/e, Netherlands 2012)
 - T2.4.5 EU Inspire & Rotterdam harbour
- T2.5 Compilation and drafting of Requirements Analysis Report
- T2.6 Final Report from Review & Expert Panel

Deliverables: D2.1 Requirement analysis & final scope definition @M1

Milestones: M1 26.10.18

WP3 – IFC Schema Extension and Modelling

The scope of the modelling is defined from the outcome of WP1. A model extension will be defined as a conceptual schema using the Unified Modelling Language (UML) as a graphical representation. The corresponding EXPRESS, XSD and OWL schemas are derived from the conceptual schema. The development will be staged and incrementally improved with feedback from an expert panel. The Extension will be modelled from the baseline of the newest release available of the IFC specification (published by BuildingSMART International).

- Tasks:**
- T3.1 Develop Conceptual Schema – Entities Types
 - T3.2 Develop additional Characteristics (property sets)
 - T3.3 Develop Draft IFC extension
 - T3.4 Develop Draft MVD from extension for Ports & Harbours Exchange
 - T3.5 Develop Final IFC extension
 - T3.6 Develop Final IFC Infrastructure for Ports & Harbours (IPH) MVD

Deliverables:

- D3.1 Draft conceptual extension @M2
- D3.2 Draft IFC extension @M3
- D3.3 Draft IFC Ports & Harbours MVD @M4
- D3.4 Final IFC extension @M5
- D3.5 Final IFC Ports & Harbours MVD @M5

Milestones:

- M2 25.01.2019
- M3 26.04.2019
- M4 26.07.2019
- M5 25.10.2019

WP4 – Documentation & Guidelines

Documentation of the main IFC extension via available tools (such as IFCDoc) and in line with BuildingSMART documentation standards and outcomes from the requirements analysis. Development of modelling guidelines to advise in the intended and recommended application of the ports and harbours extension.

- Tasks:**
- T4.1 Develop Draft Documentation for IFC extension
 - T4.2 Develop Outline Modelling Guidelines for IFC Ports & Harbours
 - T4.3 Develop FINAL Documentation for IFC extension
 - T4.4 Develop Draft IFC Ports & Harbours IDM
 - T4.5 Develop Draft Modelling Guidelines for IFC Ports & Harbours

	T4.6	Develop FINAL IFC Ports & Harbours IDM	
	T4.7	Develop FINAL Modelling Guidelines for IFC Ports & Harbours	
Deliverables:	D4.1	Draft IFC extension Documentation	@M5
	D4.2	Outline IFC Ports & Harbours modelling guidelines	@M5
	D4.3	Final IFC extension Documentation	@M6
	D4.4	Draft Ports & Harbours IDM	@M6
	D4.5	Draft IFC Ports & Harbours modelling guidelines	@M6
	D4.6	Final Ports & Harbours IDM	@M7
	D4.3	Final IFC Ports & Harbours modelling guidelines	@M7
Milestones:	M6	24.01.2020	
	M7	24.04.2020	

WP5 – Software Deployment & Validation

Enhance the existing tools to read and write IFC Ports & Harbours data to the scope defined in the requirements analysis, for demonstration of project outcomes. Create sample datasets for demonstration and use during deployment phase. Develop IFC Ports & harbours 1.0 Deployment phase.

Tasks:	T5.1	Extend/Develop IFC viewer software for IFC Ports & Harbours	
	T5.2	author IPH 1.0 example models from examples used in WP1	
	T5.3	Develop Draft IPH Deployment & Future Developments Plan	
	T5.4	Develop FINAL IPH Deployment & Future Developments Plan	
Deliverables:	D5.1	IFC Ports & Harbours Viewer/Editor	@M5
	D5.2	IFC Ports & Harbours Example Models	@M5
	D5.3	Draft IPH 1.0 Deployment & Future Developments Plan	@M6
	D5.4	Final IPH 1.0 Deployment & Future Developments Plan	@M7
Milestones:	M5	25.10.2019	
	M6	24.01.2020	
	M7	24.04.2020	

WP6 – Facilitate Expert Panels and Engagement in other Initiatives

Facilitate the expert panels, via online and/or in person meetings to validate work as it develops. This includes regular communication updates via communication platforms. In addition, this work package includes any coordination and engagements with other projects be that via expert panel participation or direct project development work. (EPR - Expert Panel Review).

Tasks:	T6.1	Management of Expert Panel Meetings	
	T6.2	BuildingSMART Summit Sessions Organisation	
	T6.3	Coordination and Engagement with other Projects	
Deliverables:	D6.1	EPR 0 - Project Start Discussion	@M0
	D6.2	EPR 1 - Requirements & UCs	@M1
	D6.3	EPR 2 - Validate Conceptual Schema	@M2
	D6.4	EPR 3 - Validate Draft IFC extension	@M3
	D6.5	EPR 4 - Review of IPH MVD	@M4
	D6.6	EPR 5 - Validate Final IFC extension & MVD	@M5
	D6.7	EPR 6 - IFC Docs & modelling Guidelines	@M6
	D6.8	EPR 7 - Project Review	@M7

D6.10	BSS 2 - bSI Summit @Paris, France	@Mar-2018
D6.11	BSS 3 - bSI Summit @Tokyo, Japan	@Oct-2018
D6.12	BSS 4 - bSI Summit @Germany	@Mar-2019
D6.13	BSS 5 - bSI Summit @TBC	@Oct-2019
D6.14	BSS 5 - bSI Summit @TBC	@Mar-2020

Milestones: M0 to M7

WP7 – Project Management

Manage the development work of the project, including reporting to the steering committees according to the defined project governance. Author quarterly reports on project and inform stakeholders of developments. Engage with the infrastructure room project steering committee project representative. Maintenance of external & internal communication channels & repositories. Management support for meetings and additional communications.

Tasks:

T7.1	Project Leadership & Management
T7.2	Project Team Meetings (Skype)
T7.3	Travel Meetings (Wuhan/UK)
T7.4	bSI InfraRoom & Standards Liaison
T7.5	Management Support (Documentation)
T7.6	Maintenance of communication channels & repositories

Deliverables:

D7.1.x	Quarterly project progress reports	@Mx
D7.2.x	Meetings Documentation	@Mx

Milestones: M8 29.05.2020

4 RESOURCES & PROJECT EXECUTION

4.1 RESOURCES AND SKILLS

Major skills that are needed for development and supporting the IPH project are:

- Domain knowledge for Maritime Facilities and Waterways Engineering
- Project Management Skills
- Schema Modelling Skills in UML, EXPRESS, XML and Linked data technologies
- IFC Structure and Design Knowledge
- Administrative and Documentation Skills.

Resources required will comprise of A Project Lead & Team, expert panel, and InfraRoom Liaison. In addition, computing facilities for the development of UML, EXPRESS and XML will be required to develop the candidate standard. Lastly communication technologies such as Project data repository, website, communication platform and web meeting technologies will be needed.

4.2 PROJECT EXECUTION

The IFC Ports and Harbours project will be executed according to the BuildingSMART International standards Process. The need has been identified by third party work between Cardiff University, AEC3, China Communications Construction Company and Dalian University of Technology (China). In reviewing the current Ports and Harbours Industry and current IFC capabilities within the domain. This project proposal and evolution into project plan will complete the initiation phase depending on approval by the steering committee of the infrastructure room and the stakeholders of the project. This project proposal outlines the work to be covered in the solution development phase.

The Project Team will be comprised of a core team responsible for the delivery of the project with a Project Leader (CCCC) & a Project Investigator (CU) responsible for leading the project team, coordinating with the project steering committee of the Infrastructure Room, coordinate with the BuildingSMART Standard Committee Executive. In addition, an extended project team will be employed to work on the delivery of key individual packages/ specialist subjects.

(PLEASE NOTE: these appointments are provisional and open to suggestions)

InfraRoom Project Steering Committee

The IFC IPH project with agreement from the IRSC appoints the following stakeholders to sit on the InfraRoom Project Steering committee and steer the project.

- Li QIAN – CCCC
- Nick NISBET – AEC3 (UK) Ltd.

Project Lead: Ziyu SUN - CCCC

primarily responsible for providing efficient coordination of the project work, facilitating the execution of the work packages and ensuring on-time delivery of the various components. The project leader has a broad understanding of both IFC and the domain of Ports and Harbours being addressed

Technical Lead: Haijiang LI – Cardiff University

primarily responsible for the execution of the IFC Ports & Harbours Developments specified within

the work packages. The Technical lead requires a deep knowledge of the structure of the IFC Schema and the methods for its extension

The IFC IPH project will include the following members to form its **core development team**. The project team a responsible for the execution of assigned tasks within the project:

Core Team

- Ziyu SUN – CCCC (SunZiyu@ccccltd.com)
- Li QIAN - CCCC(QianLi@ccccltd.com)
- Song LIU - CCCC (LiuSong@ctesi.com.cn)
- Honglei QIN - CCCC (qinhonglei@ctesi.com.cn)
- Xi WEN - CCCC (WenXi@ctesi.com.cn)
- Haijiang LI - Cardiff University (LiH@Cardiff.ac.uk)
- Alex BRADLEY - Cardiff University (BradleyA@Cardiff.ac.uk)
- Mohamed BINESMAEL - Cardiff University (BinesmaelM@Cardiff.ac.uk)
- Shaohua JIANG - Dalian University of Technology (shjiang@dlut.edu.cn)
- Nicholas NISBET - AEC3 (UK) Ltd. (nn@AEC3.com)
- Daniel PEEL - Royal HaskoningDHV (Daniel.peel@rhdhv.com)
- Mike RAMSAY - Royal HaskoningDHV (Mike.Ramsay@rhdhv.com)
- Mark GREATIX - Waldeck Consulting (Mark.Greatix@WaldeckConsulting.com)
- Veronica Ruby - Waldeck Consulting (Veronica.Ruby@WaldeckConsulting.com)
- Kyle Moss - Waldeck Consulting (Kyle.Moss@WaldeckConsulting.com)
- Laura MOL – Gobar Consulting (l.mol@gobar.nl)

IFC IPH Expert Panel

The IPH project will employ the process of an expert panel to provide international consensus. The Project Initiators are in the process of recruiting relevant representatives from the domain of Maritime Infrastructure through contacts and conferences.

In addition, the Project requests the InfraRoom, IRSC, SCE, SC and Chapter Organisations to engage with the bSI community to invite and recommendation members for the expert panel.

Support from InfraRoom Administrator

the proposed Project requests management support from the InfraRoom Administrator and expects the following tasks to be performed by L. Mol (InfraRoom Administrator):

- Organize and facilitate online/live meetings
- Minute taking
- Update online project resources such as Google Drive
- Create project documentation such as Draft Agenda
- Communicate with the Expert Panel, IRSC and IRPSC on behalf of the Project Team, such as sending out notifications when documentation is available.

4.3 Liaison

If it is deemed as relevant and required, the IFC IPH projects requests the InfraRoom Steering Committee aids in the appointment of a liaison for the IFC Road project from the following organizations: 1. OGC & 2. ISO

IRPSC and BuildingSMART Liaison: Nicholas Nisbet – AEC3 (UK) Ltd.

IRSC and BuildingSMART Liaison: Li QIAN – CCCC

4.4 Collaboration & Communication

File Storage

BuildingSMART provided infrastructure in the form of Citrix ShareFile will be used for document and data versioning, exchange and storage. In addition, ShareFile's work flow functionality will be utilized for document review and approval.

Naming Conventions

The Following Conventions will be used regarding ShareFile:

1. ShareFile tracks previous versions and dates automatically, therefore documents are named **WITHOUT** version & **WITHOUT** dates.
 - a. **Exception** – Meeting minutes & agendas can contain dates.
2. Document Status is conveyed by the directory in which it sits, therefore documents are named **WITHOUT** status descriptions
 - a. WIP – WIP documents maybe worked on locally or stored in a 'Personal Folder'
 - b. Shared – All work within the WP folders is considered shared information or developed deliverable.
 - c. Published - finalised/finished/frozen documents will be in a distinct directory named 'Published'. The visibility of any 'Published' directory is still restricted.
3. The Convention for document naming consists of the following 4 fields with a separator in the form of a **Hyphen (-)**:
 - a. The abbreviation of the responsible BuildingSMART committee e.g. IR
 - b. The abbreviation of the project or task e.g. HP
 - c. The abbreviation of any sub-project or sub-task e.g. WP1
 - d. The descriptive content in CamelCase – ProjectContactList
4. Naming Examples for Ports & Harbours are as follows:
 - a. IR-PH-WP2-RequirementAnalysisReport.docx
 - b. IR-PH-PT-20180131-Minutes.docx
 - c. IR-PH-SUM-SummitPresentation.docx

5 WORK & TIME SCHEDULE

The project is expected to commence in November 2017 and Run for total 2 years. The last few months of the project are set as contingency time to cover any unforeseen delays. The project milestones are built as such to allow packages of work to conclude (with additional contingency) in time for both international summits and the proposed InfraRoom summits. The Following outlines the major milestones for the project followed by an overview Gantt chart for the project (FIGURE). A more detailed project Gantt can be found in appendix I.

Planning & mobilization: Q4 2018
Start: 31st January 2019
Finish: 29th May 2020 (M8)

Milestones:

M0	09.03.2018
M1	26.10.2018
M2	25.01.2019
M3	26.04.2019
M4	26.07.2019
M5	25.10.2019
M6	24.01.2020
M7	24.04.2020
M8	29.05.2020

Provisional EPR Schedule

EPR 1	18.10.2018
EPR 2	30.01.2019*
EPR 3	08.05.2019*
EPR 4	31.07.2019*
EPR 5	23.10.2019*
EPR 6	15.01.2020*
EPR 7	08.04.2020*

*Provisional To be Confirmed

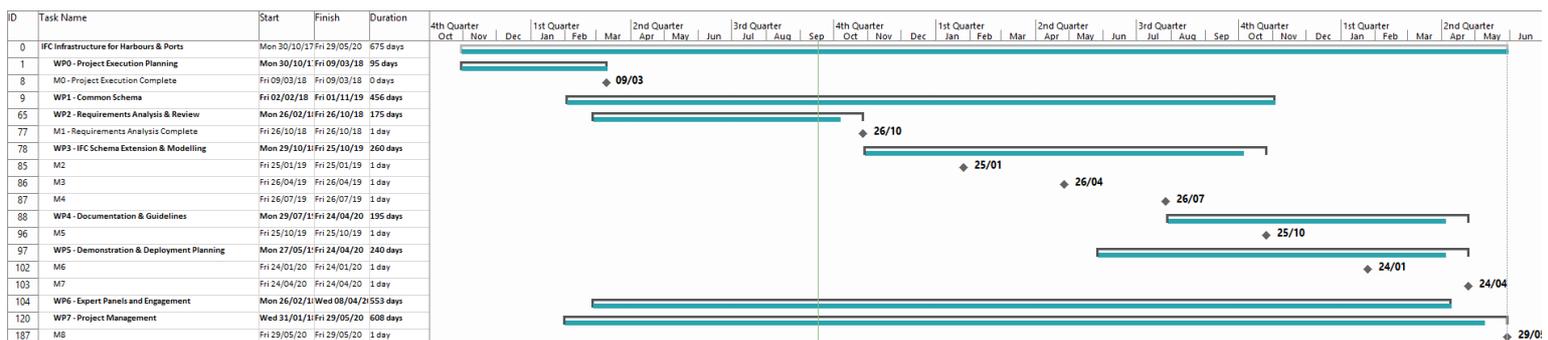


Figure 9 IFC IPH Project Overview Time plan

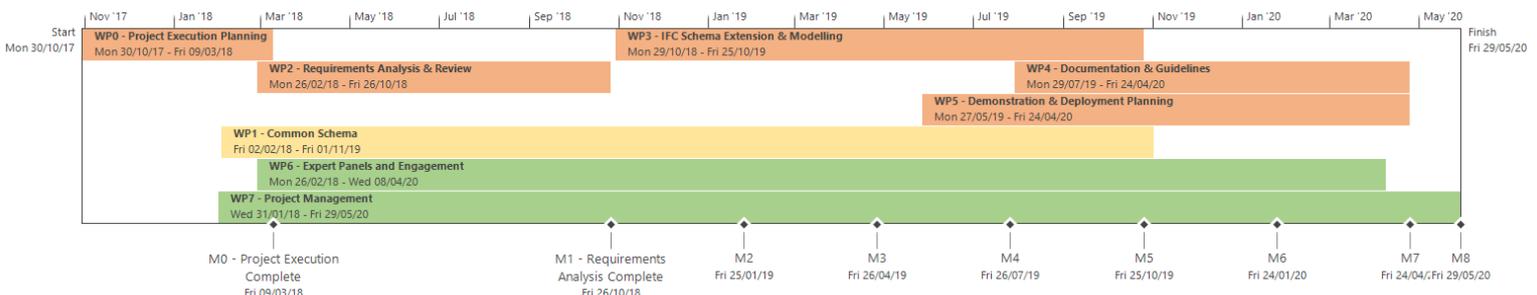


Figure 10 IFC IPH Project Timeline

6 Budget & Funding

This chapter describes how the project resources and skills are allocated in a budget per deliverable, known as a work effort breakdown. In addition, this chapter describes the cost and funding distribution of the project, including the division of in-kind and direct cash funding being supplied.

THIS IS AN ESTIMATE – CURRENTLY UNDER REVIEW AND ADJUSTMENT CORRECT AS OF JULY 2018

6.1 Work Effort Breakdown

Please see Annex 2 for the detailed Work Effort Breakdown, below is a summary of the days and costs per work packages.

Table 1 Work Effort Breakdown overview for IFC IPH Project

Work Package		Total (d)	Cost (£)
WP0	Project Execution Planning	25	€ 20,707.34
WP1	Common Schema	53	€ 42,115.71
WP2	Requirements Analysis & Review	172	€ 151,295.29
WP3	IFC Schema Extension & Modelling	84	€ 66,825.40
WP4	Documentation & Guidelines	99	€ 87,667.21
WP5	Demonstration & Deployment Planning	56	€ 46,770.97
WP6	Expert Panels and Engagement	35	€ 26,663.19
WP7	Project Management	80	€ 62,709.27
Totals		604	€ 504,754.37

6.2 Financial distribution

The table below depicts the financial distribution of funds amongst the consulting parties participating on the project. In addition, a contingency is provided against the cash funding component of the project to mitigate the risk of overspend.

Table 2 Financial distribution table for the IFC IPH Project

	Financial Distribution						
	OMI (CU)	CCCC	DUT	RHDHV	WDC	AEC3	BuildingSMART
Daily rate	€ 793.99	€ 797.42	€ 797.42	€ 998.16	€ 998.16	€ 793.99	€ 600.00
Consulting Services	€ 158,797.80	€ 94,892.81	€ 52,629.62	€ 74,861.82	€ 68,872.87	€ 39,699.45	€ 15,000.00
Travel Expenses						€ -	
Subtotal							€ 504,754.37
BuildingSMART contingency 15%							€ 2,250.00
Total							€ 507,004.37

6.3 Funding distribution

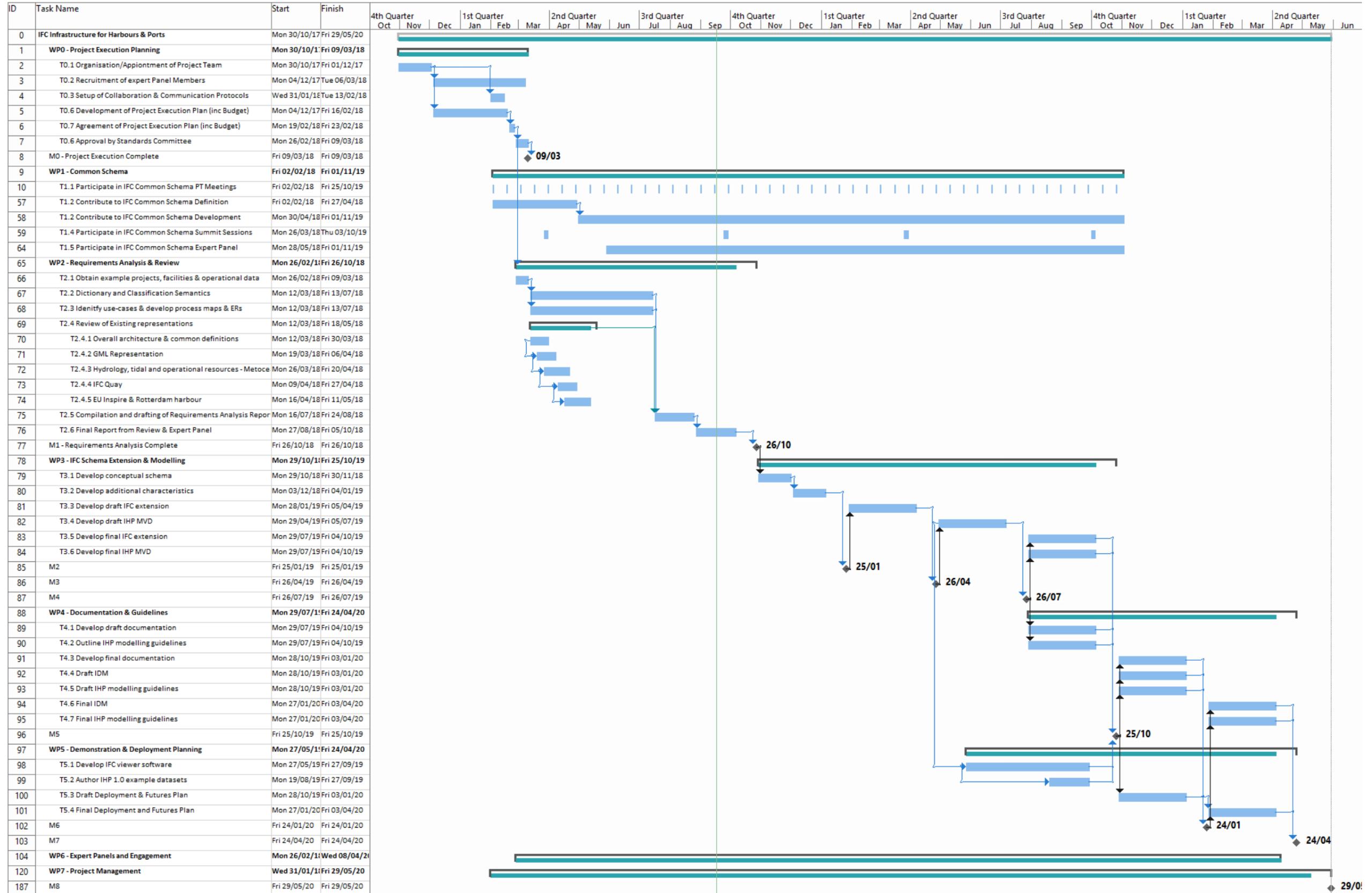
The table below depicts the funding provided to the project. This funding can be either in cash or in-kind (where a regional funder pays for the consulting services of a Project Team member).

Table 3 Funding distribution for IPH Project

	Funding Distribution					Total
	OMI (CU)	CCCC	DUT	RHDHV	WDC	
In-kind resources	€ 158,797.80	€ 94,892.81	€ 52,629.62	€ 74,861.82	€ 68,872.87	€ 450,054.92
Cash resources	€ -	€ 57,877.15*	€ -	€ -	€ -	€ 57,877.15
Total Funding						€ 507,932.08
Project Cost						€ 507,004.37
Project Balance						€ 927.70

*Under negotiation

Annex 1: Detailed Gantt Chart



Annex 2: Detailed Work Effort breakdown

WP	Task	Description	In-kind contribution					Paid contribution		TOTAL
			OMI (CU)	CCCC	DUT	RHDHV	WDC	AEC3	BuildingSMART	
WP0	Project Execution Planning		8	3	3	3	3	4	2	26
	T0.1	Organisation/Appointment of Project Team	1							1
	T0.2	Recruitment of expert Panel Members	1	1	1	1	1	1	1	7
	T0.3	Setup of Collaboration & Communication Protocols	1						1	2
	T0.4	Development of Project Execution Plan (inc Budget)	3	1	1	1	1	1		8
	T0.5	Agreement of Project Execution Plan (inc Budget)	1	1	1	1	1	1		6
	T0.6	Approval by Standards Committee	1					1		2
WP1	Common Schema		30	0	0	0	0	0	0	30
	T1.1	T1.1 Participate in IFC Common Schema PT Meetings	5							5
	T1.2	T1.2 Contribute to IFC Common Schema Definition	10							10
	T1.3	T1.2 Contribute to IFC Common Schema Development	10							10
	T1.4	T1.4 Participate in IFC Common Schema Summit Sessions	5							5
	T1.5	T1.5 Participate in IFC Common Schema Expert Panel								0
WP2	Requirements Analysis & Review		28	0	0	36	35	0	0	99
	T2.1	Obtain example projects, facilities & operational data	1			12	10			23
	T2.2	Dictionary and Classification Semantics	5			8	10			23
	T2.3	Identify use-cases & develop process maps & ERs	10			16	15			41
	T2.4	Review of Existing representations	8	0	0	0	0	0	0	8
	T2.4.1	Overall architecture & common definitions	2							2
	T2.4.2	GML Representation	2							2
	T2.4.3	Hydrology, tidal and operational resources - Metocean								0
	T2.4.4	IFC Quay	2							2
	T2.4.5	EU Inspire & Rotterdam harbour	2							2
	T2.5	Compilation and drafting of Requirements Analysis Report	3							3
	T2.6	Final Report from Review & Expert Panel	1							1
WP3	IFC Schema Extension & Modelling		40	0	0	0	0	0	0	40
	T3.1	Develop conceptual schema	8							8
	T3.2	Develop additional characteristics	2							2
	T3.3	Develop draft IFC extension	10							10
	T3.4	Develop draft IHP MVD	10							10
	T3.5	Develop final IFC extension	5							5
	T3.6	Develop final IHP MVD	5							5
WP4	Documentation & Guidelines		26	0	0	24	20	0	0	70
	T4.1	Develop draft documentation	5							5
	T4.2	Outline IHP modelling guidelines	5							5
	T4.3	Develop final documentation	2							2
	T4.4	Draft IDM	1			6	5			12
	T4.5	Draft IHP modelling guidelines	8			6	5			19
	T4.6	Final IDM	1			6	5			12
	T4.7	Final IHP modelling guidelines	4			6	5			15
WP5	Demonstration & Deployment Planning		25	0	0	5	6	0	0	36
	T5.1	Develop IFC viewer software	12							12
	T5.2	Author IHP 1.0 example datasets	1							1
	T5.3	Draft Deployment & Futures Plan	8			4	5			17
	T5.4	Final Deployment and Futures Plan	4			1	1			6
WP6	Expert Panels and Engagement		18	0	0	2	0	0	8	28
	T6.1	Expert panel meetings	8	0	0	0	0	0	0	16
	T6.2	BuildingSMART Summit Sessions Organisation	5	0	0	2	0	0	0	7
	T6.3	Coordination and Engagement with other Projects	5							5
WP7	Project Management		25	5	5	5	5	5	15	65
	T7.1	Project Leadership & Management	12							12
	T7.2	Project Team Meetings (Skype)	5	5	5	5	5	5	5	35
	T7.3	Travel Meetings (Wahan/UK)	4							4
	T7.4	bSI InfraRoom & Standards Liaison								0
	T7.5	Management Support (Documentation)	2						5	7
	T7.6	Maintenance of communication channels & repositories	2						5	7
	T7.7	Travel Costs								
	T7.6.1	Travel Meetings (Wahan/UK)								
	T7.6.2	bSI Summits								
	T7.6.3	bSI InfraRoom Meetings								
Total days per consultant (d)			200.0	8.0	8.0	75.0	69.0	9.0	25.0	394.0
Total days in-kind/paid (d)				360.0				34.0		

OMI (CU)	In-kind contribution					Paid contribution		TOTAL
	CCCC	DUT	RHDHV	WDC	AEC3	BuildingSMART		
€ 6,351.91	€ 2,392.26	€ 2,392.26	€ 2,994.47	€ 2,994.47	€ 3,175.96	€ 1,200.00	€ 21,501.32	
€ 793.99	€ -	€ -	€ -	€ -	€ -	€ -	€ 793.99	
€ 793.99	€ 797.42	€ 797.42	€ 998.16	€ 998.16	€ 793.99	€ 600.00	€ 5,779.13	
€ 793.99	€ -	€ -	€ -	€ -	€ -	€ 600.00	€ 1,393.99	
€ 2,381.97	€ 797.42	€ 797.42	€ 998.16	€ 998.16	€ 793.99	€ -	€ 6,767.11	
€ 793.99	€ 797.42	€ 797.42	€ 998.16	€ 998.16	€ 793.99	€ -	€ 5,179.13	
€ 793.99	€ -	€ -	€ -	€ -	€ 793.99	€ -	€ 1,587.98	
€ 23,819.67	€ -	€ -	€ -	€ -	€ -	€ -	€ 23,819.67	
€ 3,969.95	€ -	€ -	€ -	€ -	€ -	€ -	€ 3,969.95	
€ 7,939.89	€ -	€ -	€ -	€ -	€ -	€ -	€ 7,939.89	
€ 7,939.89	€ -	€ -	€ -	€ -	€ -	€ -	€ 7,939.89	
€ 3,969.95	€ -	€ -	€ -	€ -	€ -	€ -	€ 3,969.95	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ 22,231.69	€ -	€ -	€ 35,933.67	€ 34,935.52	€ -	€ -	€ 93,100.88	
€ 793.99	€ -	€ -	€ 11,977.89	€ 9,981.58	€ -	€ -	€ 22,753.46	
€ 3,969.95	€ -	€ -	€ 7,985.26	€ 9,981.58	€ -	€ -	€ 21,936.78	
€ 7,939.89	€ -	€ -	€ 15,970.52	€ 14,972.36	€ -	€ -	€ 38,882.78	
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€ 793.99	€ -	€ -	€ -	€ -	€ -	€ -	€ 793.99	
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€ 14,291.80	€ -	€ -	€ 1,996.32	€ -	€ -	€ 4,800.00	€ 21,088.12	
€ 6,351.91	€ -	€ -	€ -	€ -	€ -	€ 4,800.00	€ 11,151.91	
€ 3,969.95	€ -	€ -	€ 1,996.32	€ -	€ -	€ -	€ 5,966.26	
€ 3,969.95	€ -	€ -	€ -	€ -	€ -	€ -	€ 3,969.95	
€ 19,849.73	€ 3,987.09	€ 3,987.09	€ 4,990.79	€ 4,990.79	€ 3,969.95	€ 9,000.00	€ 50,775.43	
€ 9,527.87	€ -	€ -	€ -	€ -	€ -	€ -	€ 9,527.87	
€ 3,969.95	€ 3,987.09	€ 3,987.09	€ 4,990.79	€ 4,990.79	€ 3,969.95	€ 3,000.00	€ 28,895.65	
€ 3,175.96	€ -	€ -	€ -	€ -	€ -	€ -	€ 3,175.96	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ 1,587.98	€ -	€ -	€ -	€ -	€ -	€ 3,000.00	€ 4,587.98	
€ 1,587.98	€ -	€ -	€ -	€ -	€ -	€ 3,000.00	€ 4,587.98	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -	
€ 158,797.80	€ 6,379.35	€ 6,379.35	€ 74,861.82	€ 68,872.87	€ 7,145.90	€ 15,000.00	€ 337,437.09	
€ -				€ 315,291.19	€ -	€ 22,145.90	€ -	