PSC scope

Environment Agency
NEC4 professional services contract (PSC)
Scope

Project / contract Information

Project name	Smart Object Library
Project 1B1S reference	**ENVFCPAM00224B00C**
Contract reference	31485
Date	20th November 2020
Version number	1
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Revision history

Revision date	Summary of changes	Version number
10/11/2020	Draft	0.5
20/11/2020	Final	1

Details of the *services*

Details of the *services* are:

Introduction and objectives

To meet the *Client's* Asset Management ambitions there is a need to develop a Smart Object Library (SOL). A well-designed Smart Object Library will help the *Client* develop conceptual models for visualising, designing and analysing projects early in the development process. The analysis of the associated data will help the *Client* deliver our efficiency, sustainability and zero carbon targets. These models can be used in further analysis and for use by the supply chain in developing design and construction content.

A Smart Object Library will promote the use and re-use of content in a standard and easily consumable way such that time is saved in model development and rapid prototyping is enabled. These Objects can also be used by the supply chain with the same time savings and with additional benefits of standardised data structures such the information can be transferred alongside geometry. To achieve this, the CAMC DADI: CAD and Object Standard project has been implemented first such that any developed objects in a library are based on this Standard.

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As part of developing the Full Business Case (FBC) for the Smart Object Library a Proof of Concept piece of work was undertaken. This involved the exploration of three objects (embankment, wall and debris screen) and their use in different software. The lessons from this proof of concept have been fed into this scope. A quick video #_https://vimeo.com/448605406 is available which includes the outputs from the Proof of Concept.

This project is part of a wider investment that the *Client* is making in digital modernisation of Asset Management through a range of projects known as Digital Asset Data Information (DADI). DADI has a whole life focus across how the *Client* as an owner operator will digitally create, maintain and operate its asset estate in the future. DADI sit within the wider Creating Asset Management Capacity (CAMC) programme. CAMC sits within the Flood and Coastal Risk Management (FCRM) portfolio for the *Client* specifically within Asset Management. This 9 min overview https://adoddleak.asite.com/adoddlepublic/dpd/zx58nMySMKojbqS7RBg5 is available to provide further information on CAMC.

The ultimate vision of the DADI is "*For the Client and its partners to have information they can trust and rely on, even when it is produced by someone else, to make sound business decisions quicker and faster. Enabling Client staff and partners to be productive anytime, anywhere, from any device using the most appropriate technology. To use smart technology in a coherent way and build our capability to prepare for more digital working in the future*." This 6 min high level overview video https://vimeo.com/394514564/25eb6e111d is available to provide further information on DADI.

As a result of this project, the following should be achieved:

1. Creation of an Smart Object Library that promotes the use and re-use of design content in a standard way within the *Client* and the supply chain.
2. Objects created align with the *Client's* asset types and are compliant with the *Client's* Object Standard and in a format that can be used in the generation of strategic or conceptual designs supporting rapid prototyping and optioneering for strategic decision making. These objects should support associated Carbon and Cost decisions.
3. Where appropriate Objects can be used and enriched for outline or detailed design purposes.

The identified advantages of using a Smart Object Library that should be achieved are:

- **Efficiency, Speed, Cost, time:** Able to rapidly produce 3D content that allows potential project solutions to be visualised efficiently
- **Repeatability, consistency:** re-using a set of objects supports consistent results
- **Optioneering:** With rapid object and scheme development, there is more scope for optioneering, resulting in better potential solutions being found
- **Data value:** The analysis of the associated Object data will help deliver our efficiency, sustainability and zero carbon targets. Data will be available early in the design development process promoting an early understanding of the project for use in capital planning for example
- **Risk mitigation, Better certainty:** Assured and verified content that can be trusted reduces risk in the model development and outputs from the model can be trusted to give greater certainty in areas such as material quantification
- **Supporting quality in design development:** An Object produced early within the design process will support quality and improvement by providing a baseline for comparison for future more detailed design work. Standardised objects (in shape and

in data structure) provide opportunities for the Technical Authority to ensure consistency in approach and to spot deviation.
- **Greater stakeholder engagement and buy in:** The increased and rapid production of relatively cheap concept designs in a 3D context will improve engagement with the wide variety of stakeholders that are involved in project delivery.

With the development of a Smart Object Library the *Client* will expect the development of a conceptual 3D model to become business as usual. This will greatly help the teams understand the project in the context of its immediate surroundings, creating a collaborative 3D environment through which stakeholders can visually identify the complex issues.

Definitions

- A Smart Object contains dimensions which are adaptable to change the form to suit a particular purpose. Attributes that are interlinked automatically change their features.
- Before the advent of smart objects, a designer would have had to change the length, breadth and depth of a 3D solid to change its form, now they only have to change one, and the other two will be adjusted automatically.
- An intelligent object characterised by the presence of parameters which allow storing of graphical information, non-graphical information and documentation of a component – with the ability of easily modifying it and managing it.

Users

The end users of the Smart Object Library will be any individual or organisation working on 2D or 3D content on behalf of the *Client*. This can include and is not limited to CAD Operators, Engineers and Operations Staff
Additionally, a Custodian will be required to govern the Objects and update as a result of new requirements or changes. For this the *Client* is to appoint a Smart Object Library Custodian whose role will include co-ordinating updates and managing use of the library.

Outcome Specification

As a result of the project it is expected that Smart Objects are implemented and used as part of 3D model production within or for the *Client* that conform to the CAD and Object Standards. Promoting model production in a standard and easily consumable way supporting clear, concise and focussed principles, designs and information, that is easily, securely and efficiently digitally accessible to suppliers and external stakeholders. The Smart Objects promote digital adoption, uptake use and reuse of objects and is suitable for incorporation into design processes.

All framework suppliers are able to apply these Objects into their processes to enable efficient presentation of the required information.

As a result of the Smart Objects, the *Client* will be able to produce high level conceptual models using Autodesk InfraWorks to develop indicative outlines of potential projects.

The Smart Object Library will deliver 27 Smart Objects for the most commonly used assets aligned to DRL and MEICA databases, giving the *Client* and the supply chain immediate access. These 27 objects are listed in

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Appendix A – Smart Object creation. This content will be in a format which can be used within Autodesk InfraWorks, in the generation of strategic or conceptual designs supporting rapid prototyping and optioneering for strategic decision making.

Outcomes required:

a) The *Consultant responsibilities*:

- Object development: Create a set of 27 3D Smart Objects (Appendix A) aligned to the *Client's* Data Requirements Library (DRL) [redacted] for use in Autodesk InfraWorks, Civil 3D and Revit. The DRL defines asset types and their elements. This will be expanded over time to include for example MEICA asset types.
- Level of Detail: Objects produced will represent a generalised representation of the objects (low level of detail) consistent with the primary role of the Objects during strategic and conceptual design. The opportunity and framework to deliver detailed objects should be facilitated.
- Granularity: Consistent with the generalised representation, a low level of granularity is preferred. For example, pumping stations would be represented by a simple building or manhole structure and not the full details of the pipework, pumps etc. However, consistent with the objectives, more detailed objects could be created by project teams. A method of implementing further granularity as part of the management of the library would be expected. Granularity would be considered on a case by case basis for the objects.
- Parametric Functionality: Development of parametric functionality that adopts to a controlled range of key dimensions where parameters are linked (e.g. where the width of a wall is linked to the height of the wall). It is recognised that parametric functionality is a key benefit in development of Objects at strategic and conceptual design. The approach ensures realistic parameters are adopted at an early stage and quality conceptual designs developed.
- Data to be associated with the objects: The potential use of data to be associated with the objects is captured in Appendix B. This table identifies the data that will be captured as part of this initial development of the objects as well as future opportunities
- Object review: Understand each of the objects that require development, the associated asset specific technical documentation and CAD and Object Standards
- Library development: Development and implementation of appropriate hosting strategy. Development and delivery of the required process and approach to the maintenance and management of the library. Engagement with appropriate *Client* staff and supply chain to embed the associated process for maintenance and management. Identifying a hosting platform for the Object Library which must be accessible to all *Client* staff and supply chain. The hosting platform should allow for the Object Library to be maintained and updated with new version releases of the platform. Best value proposition is requested. The hosting platform must also allow for measuring benefits and management.
- Stakeholder engagement and buy in: Engage with key stakeholders for buy in, confirm the outputs based on the feedback from stakeholders for a successful object, manage expectations, discuss and resolve any issues that are applicable to the use of Smart Object Library

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- Identify and deliver appropriate communication with stakeholders. Preparation of communication material that engages and buys in stakeholders and the target audience in the activity e.g. but not limited to FCRM Needs to Know communications letter. Allowance should be made within stakeholder plans and schedules for approaches that are effective with the use of webinars and conference facilities. Development, management and implementation of a stakeholder management and engagement plan within 2 weeks of award. This is to include the creation and engagement of a Smart Object Library steering group to ensure the buy in and support in embedding the library.
- Maintain an open approach to the development of the Smart Object Library with CDF suppliers. Prepare and deliver communication to the *Client's* supply chain both through the use of knowledge sharing workspaces on Asite and through the delivery of updates once every month to the Digital Community of Practice (DCoP).
- Development of the objects in line with the CAD and Object Standards, verification for compliance, workflow for push pull into Infraworks, Civil 3D, Revit and Navisworks.
- Employers Information Requirements (EIR)/ Minimum Technical Requirements (MTR's): Preparation, engagement and review with *Client* staff on an update to the EIR to include the use of the Smart Object Library.
- Preparation of training manual user guide and storyboard for use of the Smart Object Library. Further details listed below.
- Smart Objects should be aligned to the stage information requirements dynamically defined in the DRL. Objects should be defined at outline and detail designs stage.
- Be responsible for ensuring pro-active management in the delivery of these requirements.
- Change management, handover and embedment: Implementation of methods to maximise the embedment and use of the objects. Develop and implement a handover plan ensuring embedment of the library into business as usual. Provide support and training to the *Client's* library manager.
- Assess, review and measure initial use of objects on 4 projects. Ensuring the embedment of the use of the library in project delivery. This review should include:
    - Are the deliverables from the Object Library functioning as expected?
    - Are users adequately trained and supported?
    - Are the necessary controls and systems in place, are they working properly?
    - If any problems have been identified, how will these be addressed?
    - Have end users' needs been met?
    - If key individuals aren't satisfied, how should this be addressed?
    - Lessons learned.
    - Identification and benefits of what additional objects and/ or the further development of the initial 27 objects may deliver greater benefits as a potential subsequent phase.
- Prepare and deliver a case study to showcase the use of the library in business as usual. Delivery of a webex to showcase the use of the Smart Objects Library.

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- Any outcome associated with providing capability for further objects as part of this procurement

b) The following products are expected upon completion of the project:

1) **Smart Objects**. The InfraWorks, Civil 3D and Revit Smart Objects will be constructed in compliance with the *Client's* CAD and Object Standards. These objects must meet the required outcomes and software formats defined in this specification and its appendices. (Appendix A)

2) **Change management, handover and Communication.** Production of communication material produced that relates to each activity within the Scope of the activities listed within these requirements that pro-actively buys in and engages stakeholders throughout the delivery of this service. Case studies to promote benefits that relate to stakeholders, application. Production of documentation to support handover and management of the library. Prepare and lead training with the *Client's* Library Manager to deliver an effective handover. Communications plan is requested with 2 weeks of award

3) **Training material**. Two layers of knowledge sharing outputs to be provided by the *Consultant* which adhere to and contain the learning outcomes as stated below. In the preparation of the learning content the latest version of the following documents should be referenced:

- BS 1192:2007 + A2:2016
- BS 1192-2: 2013
- BS 1192-3: 2014
- BS 1192-4: 2014
- BS 1192-5: 2015
- BS 1192-6: 2018
- PAS 128
- TSA Utility Survey Guidance
- BS 6100 – Dictionary for civil engineering terms
- BS 8541: 2012 Library objects for AEC
- Uniclass 2015
- CAD and Object Standard
- Data Requirements Library

Training – First Output

Target Audience: All stakeholders involved in managing and delivering Capital and Operational projects, including *Client* internals, supply chain and general audience as well as those managing the library.

Output: One storyboard that meets but is not limited to the learning outcomes below. This will be prepared in collaboration with the education and skills provider appointed independently by the *Client* to produce the E-Learning. This will include the development of a description with an outline of images to be used and any script for voice over. Approval of the storyboard by Learning and Development and the appropriate responsible manager with feedback sessions and iterations if required

Learning Outcomes:

The minimum but not limited to learning outcomes for the eLearning modules are given below:

- Understand the use of Smart Objects in a conceptual design workflow.
- Describe what a Smart Object is.

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- Describe its application and the benefits of an object library that are relevant to the target audience within the *Client* and supply chain.
- Be able to identify when and where the Smart Object Library would be beneficial and should be utilised in the delivery of a project.
- Utilise the created Smart Objects within the relevant software to the object.
- Be able to provide feedback for improvements or updates to the process.
- Be able to update the instance of the Object within the relevant software to the object with new data or change its geometrical appearance through those parameters.
- How to use services associated with the implementation of the Smart Object Library as part of project delivery with Client Delivery Framework and or other Frameworks that may be appropriate.

Training – Second Output

Target Audience: Specialist CAD Users

Output: One user guide outlining the usage of the Object Library, descriptive information of a "how to" guide to specialist CAD users based on the learning outcomes below. Approval of the user guide by Learning and Development and the appropriate responsible manager with feedback sessions and iterations if required

Learning Outcomes:
The minimum but not limited to learning outcomes for the User Guide is are given below:

- A 'how to' guide for users with a reasonable working knowledge of the software platform, informing them:
  - How to gain access to and use the hosting platform
  - How to download and use the Smart Object Library in the relevant CAD software platform
  - How to vary any of the unfixed Parameters
  - Any procedures required to ensure that objects are kept up-to-date
  - How to append (and alter) any data that is not an inherent property of the model (such as details of material types)
- Know how to provide feedback for improvements or updates to the process.

Specifications or standards to be used

In the preparation of the content above the latest version of the following documents should be referenced in accordance with the *Client's* Employers Information Requirement and the following standards.

Document	Object Library
BS 1192:2007 +A2:2016	✓
BS 1192-2: 2013	✓
BS 1192-3: 2014	✓
BS 1192-4: 2014	✓
BS 1192-5: 2015	✓
BS 1192-6: 2018	✓
PAS 128	✓

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TSA Utility Survey Guidance	✓
BS 6100 – Dictionary for civil engineering terms	✓
BS 8541: 2012 Library objects for AEC	✓
Related Water treatment CAD standards	✓
Uniclass 2015	✓
Data Requirements Library	✓
CAD and Object Standards	✓

Table 1: Reference documentation to be used in the production of the Object Library

Specific Project Requirements

Acceptance of the products will be based on compliance with standards listed in Table 1 and Table 2 as well as that listed below.

The InfraWorks, Civil 3D and Revit objects must:

- Conform to the CAD and Object Standards
- Be aligned to the assets within the DRL and MEICA
- Enable the transfer of content into Civil 3D for detailed development

Resource Requirements

Specific skillsets are required to complete the project and any prospective team should include the following as a minimum:

Discipline	Capability / Responsibility	Qualifications/ Experience
Project and Change Management	Pro-actively manage the delivery of the service and responsible for meeting these requirements.	Project and Change management experience preferably in the development of technical standards. PRINCE2 or equivalent qualifications. Desirable change management qualifications/ experience.
CAD and Object Development specialist	Author the Smart Object Library	Must have experience in the development of BIM Objects standards at a company or regional capacity. Membership of a steering group around 3D modelling is desired. Understanding of Autodesk InfraWorks, Civil 3D and Revit is critical. Understanding of interoperability and parametricpractical application within the BIM authoring tools, minimum 4 years' experience. Membership of a professional body e.g. Institution of Civil Engineers
Civil, structural and mechanical engineers	Technical interpretation of documentation for object creation	Membership of a professional body e.g. Institution of Civil Engineers Understanding of Civil, structural or mechanical assets in a water industry, preferably within the *Client's* projects, minimum 10 years' experience.
Stakeholder relationship manager	Manage the stakeholder relationship	3 years minimum prior experience in stakeholder management

Reporting Requirements

The *Consultant* should comply with the requirements of the below:

a) *Consultant* should comply with the requirements of clause 31 and 32. Programme update on award within 4 weeks. Programme to be provided in Microsoft Project (and PDF)

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to include as a minimum a Ganntt Chart with Task Name, Duration, Start, Finish, Predecessors, Resource Names and associated costs

b) 1 x Brief summary weekly written report update on programme including completed tasks, communication undertaken, stakeholder engagement, financial until contract completion. This is expected to be no longer than a page

c) 1 x 2 hour Bi-Weekly DADI Programme call.

d) 1 x Monthly report to project board on progress. Preparation of slides providing a summary of schedule, financial update, stakeholder engagement, risks, issues and communication activities and any associated feedback from that engagement and communication. (Powerpoint and PDF) and update report (Word and PDF) to be supplied to the project team 5 working days before the board for review. Report and slides should include progress against schedule, financial update, stakeholder engagement, risks, issues and communication activities and any associated feedback from that engagement and communication.

e) Update to the National Engineering and Innovation Panel. Up to 3 hour call every 3 months.

Services and other things provided by the *Employer*

For the production of the Smart Object Library the *Client* will provide access to the following:

Document	Object Library
• *Client's* Address standard	✓
• *Client's* Country Standard	✓
• *Client's* Date Time Standard	✓
• *Client's* Language Standard	✓
• *Client's* Location Standard	✓
• *Client's* Units Standard	✓
• *Client's* Security Classification 527_14	✓
• *Client's* Survey Specification	✓
• Access and use of Asite	✓
• Access to the Information Delivery Plan tool	✓
• *Client's* MEICA asset documents	✓
• *Client's* CAD & Object Standards	✓
• Data Requirements Library	✓

Table 2: Documentation that the *Client* will provide access to.

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Appendix A – Smart Object creation

The table below details each of the DRL and MEICA major asset types and defines the specific object to be created.

Object Title	Software at Outline Design	Level of Information at Outline Design	Level of Detail at Outline Design	Parametric at OD	Software at Detailed Design	Level of Information at Detailed Design	Level of Detail at Detailed Design	Parametric at DD	Comments
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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Appendix B – Data to be associated with the Objects

Application	Approach or tool used to deliver output	Data Required	Included in the initial development of objects?	Value
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted] areas are discussed below.

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