Framework:	**Mapping & Modelling Framework**
Supplier:	[redacted]
Company Number:	[redacted]
Geographical Area:	**National**
Project Name:	**NaFRA 2 Flood Model Data Quality Improvements**
Project Number:	**ENVFCPMM00265B01**
Contract Type:	**Professional Service Contract**
Option:	[redacted]
Contract Number:	[redacted]

Revision	Status		Originator		Reviewer		Date

PROFESSIONAL SERVICE CONTRACT under the Mapping and Modelling Framework
CONTRACT DATA

Project Name NaFRA 2 Flood Model Data Quality Improvements

Project Number ENVFCPMM00265B01

This contract is made on 08 December 2021
between the *Client* and the *Consultant*

- This Contract is made pursuant to the Framework Agreement (the "Agreement") dated 16th day of May 2019 between the *Client* and the *Consultant* in relation to the NGSA Mapping and Modelling Support Framework. The entire Agreement and the following schedules are incorporated into this Contract by reference

- Schedules 1 to 22 inclusive

- The following documents are incorporated into this contract by reference

Part One - Data provided by the *Client*

Statements given in all Contracts

1 General

The *conditions of contract* are the core clauses and the clauses for the following main Option, the Option for resolving and avoiding disputes and secondary Options of the NEC4 Professional Service Contract June 2017.

Main Option [redacted]

Option for resolving and avoiding disputes W2

Secondary Options

X2: Changes in the law

X9: Transfer of rights

X10: Information modelling

X11: Termination by the *Client*

X18: Limitation of Liability

Y(UK)2: The Housing Grants, Construction and Regeneration Act 1996

Z: *Additional conditions of contract*

The *service* is *The key objective is to improve the completeness and quality of data, metadata, rules and systems that will enable better data into the NaFRA2 process; and improve the quality of Flood Model output data (and metadata).*

The *Client* is [redacted]

Address for communications
Richard Fairclough House
Knutsford Road
Warrington
Cheshire
WA4 1HG

Address for electronic communications [redacted]

The *Service Manager* is [redacted]

Address for communications
Deanery Way
Bristol
BS1 5AH

Address for electronic communications [redacted]

The Scope is in
Bravo tender documentation visible to suppliers section

The *language of the contract* is English

The *law of the contract* is
the law of England and Wales, subject to the jurisdiction of the courts of England and Wales

The period for reply is 2 weeks

The *period for retention* is
6 years following Completion or earlier termination

The following matters will be included in the Early Warning Register
1
2
3
4

Early warning meetings are to be held at intervals no longer than 2 weeks

2 The *Consultant's* main responsibilities

The *key dates* and *conditions* to be met are

conditions to be met	*key date*
'none set'	'none set'
'none set'	'none set'
'none set'	'none set'

The *Consultant* prepares forecasts of the total *expenses* at intervals no longer than 4 weeks

3 Time

The *starting date* is 16 December 2021

The *Client* provides access to the following persons, places and things

access	*access* date

The *Consultant* submits revised programmes at intervals no longer than 4 weeks

The *completion date* for the whole of the *service* is ~~Task 1 to 2 - 31st March 2022~~

Task 1 to 2 dated 28th April 22

The period after the Contract Date within which the *Consultant* is to submit a first programme for acceptance is 4 weeks

4 Quality management

The period after the Contract Date within which the *Consultant* is to submit a quality policy statement and quality plan is 4 weeks

The period between Completion of the whole of the *service* and the *defects date* is 26 weeks

5 Payment

The *currency of the contract* is the £ sterling

The *assessment interval* is Monthly

The *expenses* stated by the *Client* are as stated in Schedule 9

The *interest rate* is 2.00% per annum (not less than 2) above the Base rate of the Bank of England

6 Compensation events

These are additional compensation events

1. 'not used'
2. 'not used'
3. 'not used'
4. 'not used'
5. 'not used'

8 Liabilities and insurance

These are additional *Client's* liabilities

1. 'not used'
2. 'not used'
3. 'not used'

The minimum amount of cover and the periods for which the *Consultant* maintains insurance are

EVENT	MINIMUM AMOUNT OF	PERIOD FOLLOWING COMPLETION OF THE WHOLE OF THE *SERVICE* OR TERMINATION
The *Consultant's* failure to	£ 5 Million	12 Years

use the skill and care normally used by professionals providing services similar to the service	in respect of each claim, without limit to the number of claims	
Loss of or damage to property and liability for bodily injury to or death of a person (not an employee of the *Consultant)* from or in connection with the *Consultant* Providing the Service	£ 5 Million in respect of each claim, without limit to the number of claims	12 Months
Death of or bodily injury to the employees of the *Consultant* arising out of and in the course of their employment in connection with the contract	Which ever is the greater of £5m or the amount required by law in respect of each claim, without limit to the number of claims	For the period required by law
The *Consultant's* total liability to the *Client* for all matters arising under or in connection with the contract, other than the excluded matters limited to		£ 5 Million

Resolving and avoiding disputes

The *tribunal* is	Litigation in the courts
The *Adjudicator* is	'to be confirmed'
Address for communications	'to be confirmed'
Address for electronic communications	*'to be confirmed'*
The *Adjudicator nominating body* is	The Institution of Civil Engineers

Z Clauses

Z1 Disputes
Delete existing clause W2.1

Z2 Prevention
The text of clause 18 Prevention is deleted.
Delete the text of clause 60.1(12) and replaced by:
The *service* is are affected by any of the following events
• War, civil war, rebellion, revolution, insurrection, military or usurped power;
• Strikes, riots and civil commotion not confined to the employees of the *Consultant* and sub consultants,
• Ionising radiation or radioactive contamination from nuclear fuel or nuclear waste resulting from the combustion of nuclear fuel,
• Radioactive, toxic, explosive or other hazardous properties of an explosive nuclear device,
• Natural disaster,
• Fire and explosion,
• Impact by aircraft or other aerial device or thing dropped from them.

Z3 Disallowed Costs
Add the following in second bullet of 11.2 (18) add:
(including compensation events with the sub contractor, i.e. payment for work that should not have been undertaken).
Add the following additional bullets after 'and the cost of ' :
• Mistakes or delays caused by the *Consultant's* failure to follow standards in Scopes/quality plans.
• Reorganisation of the *Consultant's* project team.
• Additional costs or delays incurred due to *Consultant's* failure to comply with published and known guidance or document formats.
• Exceeding the Scope without prior instruction that leads to abortive cost
• Re-working of documents due to inadequate QA prior to submission, i.e. grammatical, factual arithmetical or design errors.
• Production or preparation of self-promotional material.
• Excessive charges for project management time on a commission for secondments or full time appointments (greater than 5% of commission value)
• Any hours exceeding 8 per day unless with prior written agreement of the *Service Manager*
• Any hours for travel beyond the location of the nearest consultant office to the project unless previously agreed with the *Service Manager*
• Attendance of additional individuals to meetings/ workshops etc who have not been previously invited by the *Service Manager*
• Costs associated with the attendance at additional meetings after programmed completion, if delay is due to *Consultant* performance.
• Costs associated with rectifications that are due to *Consultant* error or omission.
• Costs associated with the identification of opportunities to improve our processes and procedures for project delivery through the *Consultant's* involvement
• Was incurred due to a breach of safety requirements, or due additional work to comply with safety requirements
• Was incurred as a result of the *Client* issuing a Yellow or Red Card to prepare a Performance Improvement Plan
• Was incurred as a resulting of rectifying a non-compliance with the Framework Agreement and/or any call off contracts following an audit

Z5 Secondments
When appointing *Consultants* on a secondment basis only:

Add clause 19
19.1 The *Client* will from starting date to Completion Date indemnify the *Consultant* against any and all liabilities, proceedings, costs, losses, claims and demands whatsoever arising directly or indirectly out of the activities of the *Consultant* in providing the services save where such claims, in the reasonable opinion of the *Client* , arise from or are contributed to by:
19.1.1 Misrepresentation or negligence by or on behalf of the *Consultant* ;
or
19.1.2 The *Consultant* has acted contrary to the *Service Manager's* reasonable instructions or wholly outside the scope of the *Consultant's* duties as defined by the *Service Manager* .

Z6 The Schedule of Cost Components
The Schedule of Cost Components are as detailed in the Framework Schedule 9.

Z24 Requirement for Invoice

Add the following sentence to the end of clause 51.1:
The Party to which payment is due submits an invoice to the other Party for the amount to be paid within one week of the *Service Manager*'s approval of a fee note.
Delete existing clause 51.2 and replace with:
51.2 Each certified payment is made within one week after the paying Party receives an invoice from the other Party and
If a certified payment is late, interest is paid on the late payment. Interest is assessed from the date by which the late payment should have been made until the date when the late payment is made, and is included in the first assessment after the late payment is made

Secondary Options

OPTION X2: Changes in the law

The *law of the project* is the law of England and Wales, subject to the jurisdiction of the courts of England and Wales

OPTION X10: Information modelling

The period after the Contract Date within which the *Consultant* is to submit a first Information Execution Plan for acceptance is

OPTION X18: Limitation of Liability

The *Consultant's* liability to the *Client* for indirect or consequential loss is limited to

£5,000,000.00

The *Consultant's* liability to the *Client* for Defects that are not found until after the *defects date* is limited to

£5,000,000.00

The *end of liability date is* 6 Years after the Completion of the whole of the *service*

Y(UK2): The Housing Grants, Construction and Regeneration Act 1996

The period for payment is 14 days after the date on which payment becomes due

Part Two - Data provided by the *Consultant*

Completion of the data in full, according to the Options chosen, is essential to create a complete contract.

1 General

The *Consultant* is

Name

Address for communications

Email address

The *fee percentage* is

The *key persons* are

Name (1)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (2)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (3)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (4)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (5)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (6)
Job
Responsibilities
Qualifications
Experience

The *key persons* are

Name (7)

Job
Responsibilities
Qualifications
Experience

The following matters will be included in the Early Warning Register
Three line items identified in Appendix 2 of "Q21-1687 - NaFRA2

5 Payment

The *activity schedule* is
See "Q21-1687 – NaFRA 2 Flood Model Data Quality Improvemer

The tendered total of the Prices is
[redacted]

Resolving and avoiding disputes

The *Senior Representatives* of the *Consultant* are

Name (1) [redacted]
Address for communications
[redacted]
Address for electronic communications
[redacted]

Name (2)
Address for communications

Address for electronic communications

X10: Information Modelling

The information execution plan identified in the Contract Data is
To be provided within 2 weeks following project start-up meeting

Contract Execution

Client **execution**

Signed under hand by [redacted] for and on behalf of the Environment Agency

Signature [redacted] Role

Consultant **execution**

Consultant **execution**

Signed under hand by [redacted] for and on behalf of [redacted]

Signature [redacted] Role

PSC scope

NEC4 professional services contract (PSC)

Environment Agency

Project / contract Information

Project name	NaFRA 2 Flood Model Data Quality Improvements
Project 1B1S reference	**ENVFCPMM00265B01**
Contract number	[redacted]
Date	Sept 2021
Version number	4.0
Author	[redacted]

Revision history

Revision date	Summary of changes	Version number
[redacted]	[redacted]	[redacted]

Details of the *services*

Details of the *services* are:

1. Description of the work:

Objective

This project is being commissioned by the National Flood and Coastal Risk Management (FCRM) Portfolio, which is working to supporting preparatory work for the new National Flood Risk Assessment (NaFRA2).

NaFRA2 will provide the information needed to guide and support flood risk management decisions and investment in a transparent and understandable way. It will be an online system for its core users that gives a dynamic, single story of flood risk for a location, for all sources of flooding, now and in the future, considering asset performance and regardless of scale. Unlike previous versions, NaFRA2 will take a bottom up approach, making the best use of local modelling and therefore improving credibility and confidence.

The objective of this project is to produce data that is compliant with applicable data standards/quality for flood models post-1 April 2019 –30 June 2021. This will ensure all users have access to model quality metadata and condition scores to drive business decisions e.g. NaFRA2 or during incidents.

Outcome Specification

Making the best use of local modelling requires the Environment Agency (EA) to leverage more data from its extensive stock of existing detailed local flood models, requiring a precise understanding of the provenance of data from those models and the extraction of vector, raster (grid) and time based data from flood models.

The overall workflow for producing this data NaFRA 2 ready outputs:

a) Review Gap Analysis that compares the flood model output data already processed and stored in MapEdit (corporate GIS) against the data contained within each flood model.
b) Undertake Resource Estimation.
c) Where a MapEdit data is incomplete, the Consultant is required to **process data** from the Flood Model into a MapEdit Geodatabase to our processes and standards
d) Undertake Quality Control (primary and secondary) using our standard approach (including use of an automated tool that is provided by the EA).
e) Undertake Quality Standards Assessment using the Fluvial Modelling Assessment (FMAT) Tool for fluvial models only (non-real time). For identified coastal and estuarine models, using the appropriate Assessment Tool upon further discussion with the *Client.*

A systematic programme of data improvements across operational Areas have been uploaded into MapEdit which have focused on models delivered before April 2019. However, the *Client* also require the models delivered in the 2 years after that date to be addressed as part of an overall programme of work, see Task 1 and 2. To note, further flood models may be brought

into scope to allow for any additional requirements or metadata dependent on NaFRA 2 requirements.

Specific expertise required:
Knowledge of:
ARC GiS
Infoworks
SWAN
MIKE
Flood Modeller
FME
ESTRY-TUFLOW
HEC-RAS
JFLOW

The *Consultant* is expected to have a strong understanding of flood modelling and have expertise in ArcGIS, and data management (preferably a working knowledge of MapEdit and/or NFCDD data structures).

Tasks (in sequential order)

The *Consultant* shall:

Receive a list of 135 post-1 April 2019 –30 June 2021 flood models, (see Appendix A1) along with the metadata analysis completed for each flood model.

Provide a resource estimate and schedule to undertake Tasks 1 and 2 as listed below.

The metadata spreadsheet for each geographical area is provided separately via a Sharefile link. The flood model list should be used in conjunction with the metadata spreadsheets to identify information for each flood model. The flood models can also be identified by column 'AI' and to filter by 'NaFRA2 project (post April 2019) within each metadata sheet.

The *Client* believe the aforementioned list is a suitable list following various discussions with Technical Leads across all geographical areas. The *Client* will provide the data and files for each flood model as listed in Appendix A-1.

Approximately 39 flood models (post 1 April 2019-30 June 2021) will be issued to the successful tenderer via a Compensation Event (CE), subject to satisfactory EA internal analysis.

The *Client* will permit subcontracting of the Task 1 and 2 and agree to any sub-management costs, via Compensation Events (CE's) subject to *Consultant* proposal and *Client* review/approvals. The *Client* may request by exception, deliver models that do not exist within EA archives.

Task 1: Processing and Quality Control

a) Processing data

Processing flood model data requires the export of data from flood model output files and then the transformation and transposition of this data into a MapEdit Geodatabase using our processing and standards documentation. This also includes conversion of 2D model outputs into Geotiff and Netcdf and transformation of existing records in MapEdit to meet current MapEdit schema. Processing may also include scenarios delivered in MapEdit (or NFCDD) format (and not uploaded into MapEdit) and / or scenarios delivered in non-standard GIS Geodatabases or files (and not uploaded into MapEdit).

The *Client* will provide a download from MapEdit, including relevant flood model files. The *Consultant* will incorporate any missing records identified.

For each individual flood model, data processing is complete when all scenarios that are found to be in scope are processed into the MapEdit Geodatabase and have passed Secondary Quality Control (QC), see below.

It is imperative that the *Consultant* already has appropriate GIS and Data Management expertise and experience.

b) Quality Control

The *Client* will provide a Quality Control (QC) tool (Sharefile link to be provided) which automates much of the checking required to ensure processed data meets the defined data quality standards and therefore MapEdit system standards. The QC tool will generate a report indicating why and where data has failed to meet the standards. Should any hard fails be reported, the data must be re-processed and QC repeated until no hard fails are reported, and logged in the Mapping Adjustment Log (see Appendix A-2).

The automated tool will also be supported by a manual assessment for a number of data quality standards, including the justification of soft rule failures reported from the QC tool. The quality control process must be undertaken on the processed models and (where applicable) downloaded existing data. Soft rule failure acceptance examples are provided in Data Quality Standards, Excel (see Appendix A-3).

The *Consultant* shall undertake a secondary QC review to check for any inaccuracies prior to handing over the final deliverables to the *Client.* Any adjustments to be recorded in the Mapping Adjustment Log. *The Client* will undertake random checks to ensure the QC is to the expected level prior to final acceptance.

In-house training will be provided via webex recordings on how to undertake QC, supported by a Work Instruction (see Appendix A-4).

c) Undertake Quality Standards Assessment using the Fluvial Modelling Assessment Tool (FMAT). For guidance see Task 2.

Task 1 deliverables in the following order:

The deliverable for each Flood Model in the following order:

- Processed 1D data in MapEdit Geodatabase and 2D data (Geotiff and Netcdf files), including blockages, breaches and asset failures. (Internal EA PSO teams will upload 1D and 2D data for their own geographical areas).
- A QC Certificate (produced from Environment Agency QC Tool) demonstrating all data quality rules have been sufficiently met.
- A record of adjustments undertaken to fulfil data quality standards as part of QC.
- Deliverables for Task for 2, see below.

Task 2 Quality Standards Assessment

The *Consultant* will use the FMAT tool (Appendix B-1) and guidance (Appendix B-2 and B-3) to assess the Quality and current Condition of flood models (specifically fluvial non-real time models) from the flood model list provided (Appendix A-1). Not all of the models will be fluvial so the FMAT will not be applicable. For identified coastal models, using the appropriate Assessment Tool upon further discussion with the *Client.*

To enable efficiencies throughout the *Consultant* is expected to run Task 2 inclusive of Task 1.

Task 2 deliverables in the following order:

- Completed FMAT Excel spreadsheet for each Flood Model, including the equivalent for coastal and estuarine.
- Model quality and current condition scores (plus assessment dates) to be populated in the relevant geodatabase as part of Task 1. Within the geodatabase, a default target condition score must also be populated. (See Target Condition Guidance – Appendix B4).

Delivery of Deliverables for Task 1 and 2

- The minimum set of deliverables for 25 flood models will be required by 31 December 2021.
- All remaining deliverables for the flood models to be completed by 31 March 2022.

Exclusions

The *services* specifically excludes the following for Task 1 and 2.

a) Re-running of flood models or new scenarios in existing flood models
b) Software development

Provisions

2. The *Client* will provide the following information for Task 1 and 2:

- Consolidated post-April 2019 Flood Model list
- Metadata spreadsheets for each geographical area (see Sharefile link)

- Mapping Adjustment Log
- Data Quality Standards
- NaFRA 2 Data Improvements Work Instruction
- MapEdit QC Tool, (v1.5.3) (provided at contract start date)
- User defined scenarios, Excel (provided at contract start date)
- Other tools and guidance where deemed appropriate
- Flood Model data from MapEdit and associated files (provided at contract start date)

The *Client* will provide the following documents for Task 2:

- Target Condition Guidance, PDF
- Fluvial Modelling Standards (FMS), PDF
- Fluvial Model Assessment Tool Guidance, PDF
- Fluvial Model Assessment Tool (FMAT, Excel
- Fluvial Model Assessment Tool Back Lane 2017, (completed), Excel
- Fluvial Model Assessment Too Back Lance 2021, (completed), Excel

3. Specifications of standards to be used

a) As laid out in the Modelling and Mapping Framework.
b) Using the agreed naming convention for Flood Model Group ID.

4. Constraints on how the *Consultant* provides the *services*

a) Weekly or bi weekly reporting (telecom/checkpoint reports) and financial monthly forecasts to meet the Client reporting deadlines, exception reports, risk log, end stage reports and other management reports accordance to PRINCE 2.

b) The *Consultant* shall ensure that appropriate use is made of existing data, to avoid duplication work already undertaken. In addition, any other existing sources known to the *Consultant* should be utilised.

5. Requirements of the programme

The amount of time required to process data from any specific Flood Model will vary depending on the number of scenarios in MapEdit and the number of in scope scenarios outside of MapEdit.

The *Consultant* will be expected to state which scenarios will be processed at agreed intervals.

All models and packages assessed will need to be recorded to avoid duplication of work. The *Consultant* to describe the approach, taking into account minimum support from Area colleagues

Any technical troubleshooting should be undertaken with the project team at regular weekly virtual meetings with project team members and minutes recorded by the *Consultant.*

The following schedule is therefore suggested:

- Project start up meeting, including handover of existing work status and training provided by the *Client* where needed.

- Fortnightly review meetings with the project team using MS Teams and any troubleshooting highlighted.

The *Consultant* will provide fortnightly progress reports using a simple template provided by the *Client* (how many scenarios are forecast to be processed, how many scenarios are actually processed and how many uncertainties/ambiguities are identified. The *Consultant* will provide a report showing progression of work for Tasks 1 and 2.

The *Consultant* will provide suitable means of data transfer where appropriate.

The following are absolute requirement for Completion to be certified.

a) For each Flood Model the deliverable will be:

- Processed 1D data in MapEdit Geodatabase and 2D (Geotiff and Netcdf files), including blockages, breaches and asset failures
- A QC Certificate (produced from Environment Agency QC Tool) demonstrating all data quality rules have been sufficiently met.
- A record of adjustments undertaken to fulfil data quality standards as part of QC.
- Completed FMAT Excel spreadsheet for each Fluvial Flood Model. Model quality and current condition scores (plus assessment dates) to be populated in the relevant geodatabase as part of task 2. Within the geodatabase, a default target condition score must also be populated, including the equivalent for coastal and estuarine.

6. Provision by the *Client*

- Access to FastDraft

7. Appendix A

A1 Flood Model List
A2 Mapping Adjustment Log
A3 Data Quality Standards
A4 Work Instruction

8. Appendix B

B1 FMAT Tool
B2 Fluvial Modelling Guidance
B3 Fluvial Modelling Standards
B4 Target Condition Guidance

9. Appendix C (completed assessments)

C1 Fluvial Model Assessment Tool, Back Lane 2017
C2 Fluvial Model Assessment Tool, Back Lance 2021

10. Sharefile links
Metadata sheets for each geographical area
MapEdit QC Tool V1_5_3 (provided at contract start date)