



Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

Tender Specification

Description of products, services and process requirements to be delivered

Radar for water levels and wave heights

Case number: 31193656

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1 Introduction

This Tender Specification, in the form of a collection of ordered requirements, contains a description of the project in its immediate environment and the quality of the systems and services to be provided. The Tender Specification forms part of the tender documents of the European call for tenders of Radars for Water Levels and Wave Heights. The full set of tender documents that form part of this European call for tenders is set out in the Descriptive Document.

1.1 Objective

This document describes all applicable requirements for the products and services to be delivered during the performance of the Agreement. The purpose of the requirements is to describe the minimum quality of the product and service.

The result of this call for tenders will be of sufficient quality when:

- The availability of radars is guaranteed by prompt delivery.
- The technical performance complies with the requirements relating to measuring specifications, operating conditions, connection conditions, as well as installation and maintenance requirements.
- The radars are of sufficient quality to be deployed failure-free and sustainably with normal maintenance.
- The services for corrective maintenance and support enable Rijkswaterstaat to use the sensors sustainably and efficiently for the envisaged duration.
- The reports enable Rijkswaterstaat to manage the technical and administrative quality of the contract effectively.

Furthermore, with this procurement RWS envisages achieving the following objectives:

- A greater data availability through new technology relative to present-day technology.
- Low implementation costs, for example, as a result of minimally required adjustments to measurement set-ups and data-collection systems.
- Minimal management costs across the entire management chain, for example, through a minimal need for maintenance and site visits.
- Maintenance that is carried out more sustainably, including a minimal need for site visits and through maximum value retention of the equipment during its service life.
- Maximum standardisation of sensor types: to provide the monitoring network with as few differing sensor types as possible to meet the entire need.
- The best possible contract management: logistics of the procurement with a minimum number of contracts and with the least possible administrative burden for RWS.
- Maximum contribution to the objectives in respect of policy topics Sustainability and Social Return.

The above objectives are reflected in the specific requirements in this Tender Specification and the Contract Awarding Criteria on value as mentioned in the Descriptive Document.

2 Technical context

2.1 Dutch National Water Monitoring Network (LMW)

Rijkswaterstaat's National Water Monitoring Network (LMW) comprises a chain of physical measuring stations, a data-collection network, processing and validation, as well as distribution of the information to the various users. Various parameters are measured at the measuring sites. It concerns data on water quantity and water quality such as water levels, wave heights, discharge data, temperature, salinity and beyond that meteorology. Measuring take place in the North Sea, in the Wadden Sea, at estuaries, along rivers, lakes and canals. The data is relevant for real time shipping information, the operation and maintenance of flood defences, water discharge and storage, water-level management and emergency control.

Data provided by LMW is used by managers of barriers and storm-surge barriers, water authorities (national waters and regional waters) as well as the Netherlands Water Management Centre, among others. Data is also used by port authorities, municipalities, the offshore and hydraulic engineering sectors, knowledge institutes and civilians.

LMW data is used for the following purposes:

- Water reporting and crisis management
- Navigation guidance
- Operating barriers, barrages, sluices, floodgates, control systems and bridges
- Operational Water Management
- Defining characteristics and trends of water systems
- National and international obligations and agreements
- Model designs and research projects
- Supportive measurements for determining derived parameters
- Asset management and construction and maintenance of engineering structures

The measurement data is available 24/7 in real time. Approximately 10% of the measuring sites are marked as being mission critical, which means that any faults at these sites must be rectified by the service personnel with greater urgency.



2.2 Management of measurement set-ups and mounted radars

Keeping the measurement set-ups in operation is of major importance to guarantee the availability of information. Hence a distinction is made between two types of maintenance:

Management & Servicing Contractor for measuring sites (falls outside the scope of this call for tenders):

The management and servicing of all the measurement set-ups on site is vested in the maintenance contractors; this includes civil engineering maintenance and the 'primary sensor maintenance'. This primary sensor maintenance consists of all actions required at the measuring site: installation, regular cleaning, radar replacement on malfunction. Radars are taken to shore for corrective maintenance. For this purpose, first a replacement device will be installed which has been taken from the reserve pool stock.

Supplier of Radars (falls within the scope of this call for tenders):

The (secondary) maintenance falls within the scope of the envisaged contract. This concerns the corrective maintenance of radars returned to our stock location (where the reserve-pool stock is also located). The radars must be transported from and to this stock location for corrective maintenance. The envisaged contract, therefore, does not require services at the measuring sites.

2.3 Technical structure of the LMW

The National Water Monitoring Network (LMW) comprises an entire chain of physical measuring stations, a data-collection network, processing and validation as well as distribution to the various users. Various parameters can be measured at the measuring sites and different sensor types can also be used for the same parameter (depending on local conditions). The data-collection network, however, consists of modular solutions that are generic for the various parameters and sensors. This allows the LMW to be managed effectively and makes it flexible and expandable.

IoT gateway

At the measuring sites, the data from the various sensors is connected to an IoT gateway. This is done via a physical hardware interface that allows for connection of various types of connections and signal forms. The IoT gateway thus provides communications of the sensors with the network.

Parameter processing

The starting point of the processing is that raw data is processed centrally into parameters. This means that raw data is retrieved from the sensors:

- for water levels, every 10 seconds or at 2.56 Hz a level relative to NAP;
- for waves at 2.56 Hz a height relative to NAP;
- various domestic metadata and error codes.

This data is collected in real time and processed centrally into:

- 10-minute average water levels relative to NAP;
- wave parameters over an observation interval of 20 minutes.

The processing involves validating the raw data based on a number of criteria, calculating the parameters, and data validation based on knowledge of the water system and surrounding stations. Only correct data will be published.

Physical features of the measuring sites

The measuring sites for measuring water levels and wave heights are located in the North Sea, the Wadden Sea, at estuaries, along rivers, lakes and canals.

Activities at the measuring sites involve relatively high costs. This is due, among other thing, to the accessibility of the measuring sites: most of the sites are only accessible by ship. These are e.g. measurement posts. The other part can be reached by land. These are structures along a canal or at a pier.

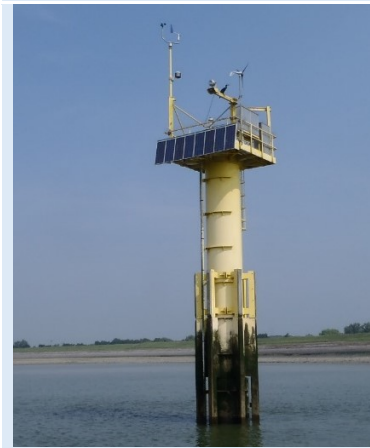
Maintenance at the measuring sites is carried out by maintenance personnel who also maintain various other installations. To reduce the cost of maintenance, we envisage a number of challenges when selecting suitable sensors. The radar version must therefore be able to withstand the prevailing environmental conditions and being cleaned on site.

A large portion of the measuring sites are powered by solar panels. This means that a limited amount of power is available for the sensors. Increased radar power input may mean that the power supply needs to be expanded. This entails costs. This determines a portion of the requirements.

3 Description of the tendering request

3.1 Applications and technical requirements of the two lots

The need for measurements of water levels and wave heights in the LMW network is expressed in the following 3 applications:

Application A Offshore wave measurement	Application B Nearshore wave measurement	Application C Inland waterway level measurement
• High mounting height • Big wave height • Long measuring range	• Mounting heights ranging from high to low • Limited wave height • Measurement of short waves • Foreshortened measuring range • Limited blanking required at some sites	• Low mounting height • Short wave heights • No wave measurement • Short measuring range • Limited blanking required
		

For these applications, a market analysis and market consultation have determined that this can best be carried out with 2 types of radar, for which the Client is requesting for tenders for the following two lots:

- **Lot 1 Marine Radar:**
 - Technically suitable for Application A
 - Technically suitable for Application B
- **Lot 2 Inland Waterway Radar:**
 - Technically suitable for Application C
 - Technically suitable for Application B

The technical distinction between the two Lots can then be summarized as follows using a limited part of the requirements:

Application A Offshore wave measurement		Application B Nearshore wave measurement		Application C Inland waterway level measurement	
Lot 1 Marine Radar		Lot 2 Inland Waterway Radar			
Radar technology	FMCW	Radar technology	FMCW		
Measuring range	≥ 50 m	Measuring range	≥ 19.5 m		
Blanking	≤ 3 m	Blanking	≤ 1 m		
Transmission frequency	≤ 30 GHz	Transmission frequency	no requirement		
Beam width	$\leq 5^\circ$	Beam width	$\leq 5^\circ$		
Sampling frequency	$= 2.56$ Hz	Sampling frequency	$= 2.56$ Hz		
Power consumption	≤ 8 W	Power consumption	≤ 4 W		
Doppler correction	required	Doppler correction	required if Transmission frequency ≤ 30 GHz		

Take note: The above requirements are only given for a quick conceptualisation and are not complete. The full set of technical requirements per Lot is given in chapters 6 and 7.

The Tenderer is asked to make an offer for only a single type of radar for each Lot. This radar must comply technically with all the requirements applicable to the relevant Lot.

For Application B, a choice of radar will be made later as to which radar (from which Lot) will be deployed for each individual measuring site. This depends on:

- A weighing up between the mounting height on the one hand and blanking on the other.
- New measuring sites to be built that are still being designed.
- Renovations to measuring sites that are still being redesigned.

This means that it is not yet known (in this tendering request) what radar quantities will be deployed from which Lot for Application B (refer also to 3.2).

3.2 Requested scope of delivery

The volume of radars to call-off under the Agreement to be concluded cannot be disclosed precisely by the Client. There are a number of reasons for this:

- The deployment plan envisages application at a number of existing measuring sites and also to future expansion with new measuring sites. Given the extensive term of the Agreements, it is not possible to foresee the quantity of new measuring sites to be implemented.
- For Application B, a choice of radar will be made later as to which radar (from which Lot) will be deployed for each measuring site. This is explained in more detail in 3.1.
- The number of radars that will need to be replaced with new ones due to defects is not yet known. These defects are partly related to the robustness of the radar itself, and partly to conditions that arise during use (e.g. collisions or vandalism at measuring sites).

This means that the number of radars to call-off within the first ten (10) years of Agreements to be concluded, lies within the following range:

Quantity	Guaranteed initial call-off	Estimated minimum call-off	Maximum possible call-off
Deployment plan for measuring sites			
Application A		22	27
Application B		29	34
Application C		25	35
Requirement for Lot 1 Marine			
Procurement for A		22	27
Procurement for B		0	34
Reserve stock + replacements		16	36
Requirement for Lot 1	32	38	97
Requirement for Lot 2 Inland waterways			
Procurement for C		25	35
Procurement for B		0	34
Reserve stock + replacements		34	65
Requirement for Lot 2	48	59	134

The Agreement for the systems to be supplied therefore consists of:

- For Lot 1 a guaranteed initial call-off of 32 radars, spread over time:
 - 2024 Q4: 8 units
 - 2025 Q1: 14 units
 - 2026 Q1: 10 units
- For Lot 2 a guaranteed initial call-off of 48 radars, spread over time:
 - 2024 Q4: 18 units
 - 2025 Q1: 15 units
 - 2026 Q1: 15 units
- Supplies can be called-off for measuring site expansions and replacements of defective units during the term of the Agreement. These totals are maximised (including the initially supplied radars) to:
 - Lot 1: a total of 97 radars
 - Lot 2: a total of 134 radars

To clarify: The quantities shown here are minimum and maximum quantities. The Quotation Form uses multiplier factors which assumes a realistic overall impression. Therefore, the quantities used there are different from those in the minimum and maximum quantities above. No rights can be derived from the quantities, other than the guaranteed initial call-off.

3.3 System boundaries / Technical scope

The technical scope of the entire system as meant in the Quotation Form includes:

- The radar, possibly consisting of individual components and accessories required for application.
- Additional electronic units, where necessary, to complete the requirements and best price-quality ratio items, excluding corresponding cables between the radar and electronic unit for signals and power.

Matters that falls outside the technical scope of the system:

- A mounting frame which, however, must be offered separately and stated in the Price List.
- Cables for signals and power, between the radar and any electronic unit.
- The cabling from the system to the RWS data-collection point falls completely outside of the agreements to be concluded.
- Power cabling for the system, which falls completely outside the agreements to be concluded.

This scope and the interfaces at the system boundary are further elaborated in the technical requirements and best price-quality ratio contract awarding criteria.

4 Explanatory note to the technical requirements

4.1 Technical requirements

The technical requirements in chapters 6 and 7 are structured according to functions (F), aspects (A) and interfaces (R=*raakvlakken* in Dutch). In the requirement numbering this is respectively indicated by an F, A or R. This also includes the distinction between requirements for service (D) and process (P).

Functions

These requirements describe the functions featured in the system. The requirements resulting from the functions, are function requirements.

Aspects

Aspect requirements are matters that do not in themselves perform a function, but are a condition of functioning in the environmental conditions when in use.

Interfaces

Deployability is guaranteed by placing the project in its environment and describing the interfaces with its environment. These include interface requirements to the structural and electrical interfaces and data exchange.

4.2 Applicability of the requirements laid down

The requirements specify the minimum quality that the systems must meet. For compliance with the Tender Application it is essential that each individual requirement is met. The categorisation into functions, aspects and interfaces is a supporting structure for readability purposes.

A Tender Application must at least comply with the requirements of this Tender Specification. In addition to the requirements in this Tender Specification, there is additional added value if the Tender Application complies with additional technical features, which are mentioned in the best price-quality ratio contract awarding criteria (refer to the Descriptive Document).

All requirements must be met at the same time, unless specified otherwise in the requirement. So, for example, the measurement uncertainty in one requirement applies over the entire measuring range in the other requirement for the requested sampling frequency, etc. At the same time, this also applies to any additional added value offered for the best price-quality ratio contract awarding criteria (refer to the Descriptive Document).

Annex A: Specification of the RMI message

One of the best price-quality ratio criteria concerns the technical capability of the system to generate an RMI message. For this provision, refer to the Descriptive Document. The technical specification of this RMI message is given in the Annex of this Tender Specification.

4.3 Definitions

Measurement uncertainty

The term measurement uncertainty is understood by RWS to mean the uncertainty of the distance measurement without the influence of waves, i.e. the distance measurement up to a smooth flat surface. The uncertainty concerns a single distance measurement and radar output value. The measurement uncertainty is expressed in a single standard deviation.

Beam width

The beam width is defined as twice the angle between the main axis and the -3 dB point of the radar beam. This is equal to the angle between both -3dB points of the radar beam.

Measuring range

Measuring range is understood by RWS to mean the maximum distance of a stationary surface to be detected relative to (the reference plane of) the radar.

Blanking

'Blanking' is understood by RWS to mean the minimum distance between a surface to be detected and the radar itself, while still meeting the other requirements such as measurement uncertainty. The importance of a limited blanking is that an extensive blanking can mean that the radar needs to be mounted higher and that present measuring structures need to be modified to do so, which leads to unwelcome costs.

Power input

Power: average power input of the entire system (refer to 3.3). Here, a 2.56 Hz data-collection frequency is assumed and the other requirements and best price-quality ratio contract awarding criteria also apply.

5 Explanatory note to Service Requirements and Process Requirements

5.1 Service Requirements

The services concern the systems provided. All services must be capable of being provided for the full term of the Agreement.

Chapters 6 and 7 describe the requirements for the services, which are preceded by a letter 'D' (denotes '*diensten*' in Dutch).

Services group	Description
Supply	This services group consists of: initial supply, additional deliveries (expansion of stations), replacements (of faulty units), spare parts, technical continuity.
Corrective maintenance	This concerns the services that are meant to restore the instruments into a good condition after becoming faulty. The radars are returned for this purpose, services are not performed at the measuring site.
Support	Support relates to questions when deploying radars or when troubleshooting.

5.2 Process Requirements

In addition to the services directly related to the radars, the Client also envisages to make arrangements for mutual cooperation in the performance of the Agreement. The Process Requirements relate to mutual cooperation in the areas of communications, invoicing and information supply.

The Process Requirements are mentioned in chapters 6 and 7. These requirements are preceded by a letter 'P'.

5.3 Requirements in respect of Social Return

The Contractor is bound to implement Social Return as part of this Agreement. The minimum percentage of the Social Return value is 2%, but in the best price-quality ratio contract awarding criteria (refer to the Descriptive Document), added value can be gained by raising this percentage to a maximum of 5%.

The requirements in respect of Social Return are mentioned in chapters 6 and 7. These requirements are preceded by the letters 'SR'.

6 Schedule of Requirements Lot 1 Marine Radar

6.1 Technical Requirements Lot 1

No.	Type	Group	Requirement title	Requirement for Lot 1 'Marine'
F01	Function	F1 Determining the water level	Purpose of the sensor	The radar level meter enables the user to collect information on the water level of the surface water in an effective manner that meets the user's needs, namely monitoring water levels and waves. The radar level meter offered will be used for permanent continuous online measuring at all present measurement set-ups of Rijkswaterstaat's National Water Monitoring Network (LMW). These set-ups are located across the entire Dutch part of the North Sea, along the coastal zone, in the IJsselmeer and Markermeer and along rivers and canals.
F02	Function	F1 Determining the water level	Scope of the system	The radar level meter as offered, will consist of everything necessary for the operational and manageable functioning as described in the requirements. In addition, the system will at least contain the following matters: - radar for determining the distance to the water surface; - any electronic unit required to meet the requirements, excluding the cables between the radar and this unit. The system price excludes the cables and a mounting frame (for fastening to an existing bracket). However, a mounting frame and cables between the radar and any electronic unit (refer to Requirement R01) must be listed separately on the Price List.
F03	Function	F1.1 Determining the distance to the water surface	Sampling frequency	The continuous sampling frequency is 2.56 Hz (data-collection timeframe is 390.6 ms). Each reading should be based on a single pitch. The tolerance is as follows: minimum data-collection timeframe of 388.6 ms, maximum data-collection timeframe of 392.6 ms.
F04	Function	F1.1 Determining the distance to the water surface	Transmission frequency	The frequency of the transmitted radar wave is up to 30 GHz.
F05	Function	F1.1 Determining the distance to the water surface	Measuring range	The measuring range is at least 50.0 m. Measuring range is understood to mean the maximum detectable distance between the reference plane (Requirement F10) and the stationary surface (flat plane).
F06	Function	F1.1 Determining the distance to the water surface	Blanking	The maximum blanking of the radar is 3.0 m.
F07	Function	F1.1 Determining the distance to the water surface	Beam width	The beam width of the transmitted radar signal is up to 5°. The beam width is defined as the angle between the -3dB points on either side of the main axis of the radar.
F08	Function	F1.1 Determining the distance to the water surface	Modulation technique	The radar is based on Frequency-Modulated Continuous-Wave (FMCW).
F09	Function	F1.1 Determining the distance to the water surface	Doppler correction	Correction is required for precision distance measurement deviations for a moving surface (due to the Doppler effect).

F10	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Reference plane	The radar has a reference plane that is clearly defined in relation to a visible point on the outside of the radar.
F11	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Adjustable reference level	The reference level in respect of which the water level is recorded (NAP height) must be adjustable in the radar.
F12	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Water level relative to adjustable reference level	In the radar, a water level relative to this reference level must be determined from the measured distance to the water surface and the set reference level (refer to Requirement F11).
F13	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Measurement uncertainty	The measurement uncertainty (one standard deviation) of the water level as described in Requirement F12 may not exceed 5 mm. This concerns a single precision distance measurement on a stationary surface (flat plane) and includes the uncertainty in the radar reference plane.
F14	Function	F2 Data output	Real time output message available	It must be possible to have the output message on the data port available in real time.
F15	Function	F2 Data output	One output message	With the output frequency (Requirement F16), one message should be given which contains the measurement data. If there is no measurement data, the message should include an error code denoting the type of error.
F16	Function	F2 Data output	Output frequency	The output frequency of the output message is equal to the sampling frequency (Requirement F03).
F17	Function	F2 Data output	Output of the output message	Output of the measurement data occurs in at least one of the following ways: 1) the sensor actively generates an output message and makes it available on the data port, or 2) it should be possible to call up this output message via the data port with a command at least as often that compliance with the output frequency in Requirement F16 is guaranteed.
F18	Function	F2 Data output	Resolution of water levels	The resolution of the output message is less than or equal to 1 mm.
F19	Function	F2 Data output	Data availability	The measurement data should be available for a minimum of 95% of the time. An error code as described in Requirement F15 is thus also considered to be unavailable data. This requirement applies under controlled conditions. This concerns the system itself, excluding the effect of environmental conditions.

A01	Aspect	A1 Safety	Sharp edges, electricity, liquids	The entire set-up must be safe to use, minimising any risk of bodily harm.
A02	Aspect	A1 Safety	Cyber security	The configuration and data settings of the measuring instrument must not be accessible in any way other than through the physical connectors present.
A03	Aspect	A2 Reliability	Proven system	The measuring instrument has a 'Mean Time Between Failure' of at least 5 years.
A04	Aspect	A3 Availability	COTS components	The sensor, cables and peripheral equipment used should be based on products that have a 'commercial off-the-shelf' (COTS) availability.
A05	Aspect	A3 Availability	Technical service life	The sensor and accessories have an average technical service life of at least ten (10) years (excluding wear and tear and consumable parts).
A06	Aspect	A4 Usability	Calibration	The system must continue to meet all the requirements listed without any calibration for a period of at least ten (10) years.
A07	Aspect	A4 Usability	Sensor weight	The radar (including its antenna) has a maximum weight of 20 kg.
A08	Aspect	A5 Maintainability	Preventive maintenance	The system must continue to meet all of the above requirements on the basis of preventive maintenance that may be carried out at most once a year. Such possible preventative maintenance is only permitted on site and is confined to inspection and cleaning.
A09	Aspect	A5 Maintainability	Reparability	It should be reasonably possible to have the system repaired in the event of defects, and at least the main components of the radar must be replaceable.
A10	Aspect	A6 Conditions for functioning	Ambient conditions	The radar and cables must be designed as such that they can operate for a long time under normal conditions of use at the LMW measuring sites (refer to Requirement F01). This particularly means a humid and saline environment with long-lasting UV rays.
A11	Aspect	A6 Conditions for functioning	Robust design	As a whole, the system and all its components must be sufficiently robust to operate failure-free under normal conditions for a long period of time (refer to Requirement A03), at measurement stations and at LMW measuring sites (refer to Requirement F01).
A12	Aspect	A6 Conditions for functioning	Vibration-proof	As a whole, the system and all its components must be sufficiently robust to withstand vibrations that may be expected under normal conditions of use at LMW measuring sites (refer to Requirement F01).
A13	Aspect	A6 Conditions for functioning	IP rating	The radar and cables to any electronic unit must comply with IP67.
A14	Aspect	A6 Conditions for functioning	Operating temperature	The radar must operate at an ambient temperature of -15 °C to +45 °C.
R01	Interfaces	R1 Interfaces with adjacent objects	Sensor to interface module cables	The distance between the radar and any existing electronic unit (refer to Requirement R06) is at most 10 metres. Cables for the connection between these two elements must be capable of transmitting voltage as well as data in accordance with the communications protocol provided over this distance. Cable lengths can be selected out of three fixed lengths, the longest of which is 10 metres.
R02	Interfaces	R1 Interfaces with adjacent objects	Mounting frame	A mounting frame must be offered on the Price List for mounting the radar to an existing bracket. If present, the Contractor's standard design is sufficient.
R03	Interfaces	R1.1 External power supply	Supply voltage	The system must operate at a supply voltage of 11 to 15 V (DC), or 22 to 30 V (DC).

R04	Interface s	R1.1 External power supply	Power	The average input power of the system is a maximum of 8.0 W. This power includes any peripheral equipment and the sampling frequency mentioned in Requirement F03 .
R05	Interface s	R1.1 External power supply	Sensor restart	After recovery of the voltage in the event of a power supply disruption, the system should start up automatically without loss of settings.
R06	Interface s	R1.2 Gateway	Physical layer of datacom	The sensor must have a digital serial output in accordance with RS-485. This can be achieved by means of a supplied electronic unit, if necessary.
R07	Interface s	R1.2 Gateway	Communica tions protocol	When the measurement data is given by calling up an output message via a command, as described in (2) of Requirement F17 , this should be done via a typical industrial communications protocol (e.g. MODBUS RTU or MODBUS ASCII).
R08	Interface s	R1.2 Gateway	Baud rate	The baud rate of the digital serial output (refer to Requirement R06) must be suitable for the data-collection system's minimum baud rate of 300 and the maximum baud rate of 115,200.

[end of Technical Requirements Lot 1]

6.2 Service Requirements, Process Requirements and Requirements on Social Return Lot 1

No.	Type	Group	Requirement title	Requirement for Lot 1 'Marine'
D01	Service	D1 Supply	Supply includes the full solution	The supply of a system should include the full solution as offered to meet the requirements as well as the Best price-quality ratio added value offered. The costs of supply include the radar and, if necessary, any additional electronic unit between the radar and this unit, as well as the costs for inspection, documentation and delivery (DDP) to the Client's stock location.
D02	Service	D1 Supply	One type	The Contractor must offer a single type of solution that meets all the requirements mentioned here.
D03	Service	D1 Supply	Delivery time	The Contractor must deliver the ordered systems within a maximum delivery time of five (5) months after call-off.
D04	Service	D1 Supply	Aspects of a delivery	Each delivery will: - be delivered within the set delivery time - be tested/checked for correct operation - be complete with all components for proper application and to meet the required technical requirements (except the cables) - include delivery costs and delivery duties paid (DDP) - be provided with a Delivery Document
D05	Service	D1 Supply	Delivery Document	The Contractor will provide a Delivery Document in digital form to the Client with each delivery containing at least: - Date of delivery - Serial number(s) - Scope of delivery (all components delivered) - Description of condition (such as firmware versions, model, etc.) - Proof of correct operation
D06	Service	D1 Supply	Delivery location of supply	The Contractor must deliver every supply to the Rijkswaterstaat stock location, which is currently in Delft.
D07	Service	D1 Supply	Technical continuity of supplies	The Contractor is responsible for the continuity of the system offered for the duration of the Agreement. This relates to keeping in place the deliverability and supportability of the sensors, modules and components offered by the Contractor. If a structural deficiency is identified in the technical performance or there is a deviation from the specifications, it is the responsibility of the Contractor to resolve this at its own expense.

D08	Service	D1 Supply	Availability	The type of system offered must be available for at least three (3) years after tendering. If, within this requirement, a type offered is nevertheless no longer available or supported, to ensure continuity, it is permitted to offer a type that can readily be exchanged: a type with equal specifications, (maximum) equal price and which is exchangeable at the measuring sites without any adaptations by RWS. If the initially offered type is no longer available or supported, an equivalent type may be offered after the initial 3-year period. An equivalent type does not have to be readily exchangeable. An equivalent type complies with the requirements and specifications initially offered. Subsequent types must be available at least five (5) years after being offered the first time.
D09	Service	D1 Supply	Support after phase-out of availability	After phasing out the type of sensor, it remains supported by the manufacturer for at least five (5) years. Spare parts must be available for that period and repairs can be carried out.
D10	Service	D1 Supply	User documentation	The Contractor must provide up-to-date documentation of the delivered items during the term of the Agreement. In any case, this documentation provides instructions for installation, operation, maintenance and handling. This documentation must be available digitally and must be provided by email upon request. It is drawn up either in Dutch or in English.
D11	Service	D2 Maintenance	Quality of corrective maintenance	Corrective maintenance relates to all work required to rectify any deviations or defects found. This concerns the recovery of reduced functionality due to abnormal use (e.g. excessive wear and tear, damage, contamination) or defects (e.g. corrosion, leaks, electronic failure). The work is determined on a case-by-case basis and includes: - Repair or replacement of defective components - Firmware updates - Final inspection - Transportation to and from the Rijkswaterstaat stock location including DDP - Recording in a Service Report. The turnaround time for corrective maintenance is a maximum of four (4) months.
D12	Service	D2 Maintenance	Transfer in consignment list	Any transfer of sensors between the Client and Contractor for maintenance will be confirmed in writing with a consignment list. With this the Contractor confirms that the sensors have been received or transferred back to the Client. In any case, this consignment list includes the date and the transferred items with serial numbers.
D13	Service	D2 Maintenance	Maintenance proposal	The Contractor will determine the extent of the corrective maintenance before maintenance is carried out. After the initial inspection, the Client's approval must first be sought. This coordination occurs with a costs specification, in which the costs and turnaround time are mentioned.

D14	Service	D2 Maintenance	Proper disposal	The Contractor will dispose of sensors and components properly at the end of their service life. The Contractor will endeavour to reuse as much as possible. If reuse is not possible, the Contractor will account for an environmentally sound disposal. The Contractor must also take into account any applicable regulations to the manufacturer/supplier in force in the country of manufacture (dual use goods). Disposals will be confirmed with a statement of proper disposal such as a service report.
D15	Service	D2 Maintenance	Service Report	The Contractor records each corrective maintenance and associated activities in a Service Report . The Service Report is delivered digitally and contains at least: - CIB numbers and serial numbers - cause and problem analysis - work carried out and inspections - ultimate condition (e.g. version, settings) - evidence of correct operation (e.g. final inspection) - if a registered item is disposed of: proof of proper disposal
D16	Service	D2 Maintenance	Risk of having possession	The moment the Contractor is in possession of a system and/or components which are the property of Rijkswaterstaat, the Contractor is liable for damages, theft or disappearance of these properties and is responsible for the taking of appropriate measures. If this should occur, the Contractor will indemnify the Client in any event. This applies both during transportation and when carrying out maintenance activities. This also applies for transportation and handling to and from suppliers.
D17	Service	D2 Maintenance	Supervision of careful handling	The Contractor must treat the system with due care and diligence by handling, transporting and storing the systems carefully and under controlled conditions. The Contractor must also ensure that adequate measures are taken in the work processes against damages, theft and disappearance and, in the case of handling by manufacturers, third parties or shipping agents.
D18	Service	D3 Support	Scope of support	The Contractor must support the users telephonically and by email during the term of the Agreement. This includes substantive remote technical support in Dutch or English about operating, mounting, settings and troubleshooting. The topic is confined to the scope of the systems delivered. The questions will initially be harmonised within the maintenance department and will only be submitted to the Contractor in the second instance (and thus in incidental cases). The response time may not exceed two (2) working days.
D19	Service	D3 Support	Consultation and training services	Occasionally, the Contractor can be consulted by the users about the use of the systems delivered. Such consultation could include application recommendations, training, or troubleshooting assistance. This could include situations that go beyond the user manual, incidents, and troubleshooting complicated issues. This support may be required at several RWS sites.
D20	Service	D3 Support	Training	The Contractor will take care of user training when required, to familiarise users that have an 'senior secondary vocational' level of education with the installation, maintenance, operational controls and primary troubleshooting. The group size per training is a maximum of 10 people. The Contractor must take care of all the necessary training materials. In consultation with the Contractor, the Client will provide an appropriate training room.

D21	Service	D3 Support	Quality of support	For all the support mentioned, this will take place in the Dutch or English language, staffed by one of the Contractor's personnel who has sufficient know-how of sensor operations as well as the Rijkswaterstaat application to resolve questions effectively.
P1	Process	P1 Process Requirements	Contractor's organisation	Before the Contractor commences the performance of any service, it must prepare, design and operationalise its organisation. The Contractor must design its organisation as such that it is able to build and maintain the necessary know-how (knowledge retention) relative to the activities of the contract (self-motivation). The Contractor must comply with the Client's procedures, regulations and practices as set out in this Tender Specification. In all cases, if the Contractor applies other procedures, regulations and practices internally, then during the performance of the Agreement and its daily activities, the Client shall not notice any effect of this and it will not incur any additional costs to the Client.
P2	Process	P1 Process Requirements	Organising the Project Start Up (PSU)	The Client and Contractor will organise a PSU after this Agreement has entered into force. The purpose of a joint PSU is to have the Client and the Contractor jointly agree on how the contract will be implemented on commencement of the Agreement. The PSU should contribute to collaboration based on mutual trust. The PSU includes: • interactions between the Client and the Contractor • organisations • mutual lines of communication and working arrangements • points of attention in the agreement • quality assurance of services and supplies
P3	Process	P1 Process Requirements	Plan of Supplies and Services	The Contractor must draw up a Plan of Supplies and Services. This plan must at least include the following fully elaborated performance-specific topics: • At least the processes for carrying out the services Supply and Corrective Maintenance with the activities and inspections to be carried out. • The manner of controlling these processes. • The times and manner in which exchange between the Contractor and the Client and other external parties takes place within the described processes, such as which documents, manner of communications, etc. • The Contractor's project organisation which contains at least the management and key roles and an overview of the operational contacts with contact details of both the Contractor and the Client.
P4	Process	P1 Process Requirements	Deadline for submission of the Plan of Supplies and Services	The Contractor must submit the Plan of Supplies and Services to the Client as soon as possible but in any event within three (3) months of the signing of the Agreement.

P5	Process	P1 Process Requirements	Random checks	The Client is entitled to carry out random checks on the Contractor's control of processes. A random check examines whether the services and/or supplies concerned meet the requirements of the contract, the offer and processes described in the Plan of Supplies and Services. The Client may exercise its power of review at its own discretion. The Contractor must take two random checks into account for the duration of the contract. The Contractor must always cooperate with the Client to carry out a random check (or to have a random check carried out) and provide the necessary documents and information as supporting documents for the test.
P6	Process	P1 Process Requirements	Call-off	The call-off of orders for individual Products, Services and activities, as specified in this document, must be notified to the Contractor in writing by the Client's contact.
P7	Process	P1 Process Requirements	Requirements of cost specification	Applicable to all cost specifications for items on the Price List: 1. It must state verifiable (called-off) quantities; 2. It must state a specified amount of VAT; 3. All costs, such as transportation costs etc., must be included unless specified otherwise and agreed in writing; 4. It must agree with the price items as they appear in the Price List as part of the Agreement; 5. The stated delivery dates must be fixed dates; 6. No costs are involved in drawing up a costs specification.
P8	Process	P1 Process Requirements	Price List settlement	Settlement takes place based on an invoice, listing items from the Price List.
P9	Process	P1 Process Requirements	Settlement of deliveries	For deliveries, the following starting point applies: • For delivery of systems and components, the price as indicated on the Price List applies. Invoicing is done immediately after delivery. Documents required: Delivery document and packing slip.
P10	Process	P1 Process Requirements	Settlement of services	For services, the following starting points apply: • For Corrective Maintenance, an hourly rate and any materials according to the Price List apply. Also included are transportation costs to and from the Client's stock location, as well as any necessary transportation to the ultimate manufacturer. Retrospectively calculated costs not included in the maintenance proposal with cost specification are not eligible for settlement. Invoicing is done immediately after implementation. Documents required: Service report and Consignment list. • For providing support and training, an hourly rate is applicable according to the Price List. Invoicing takes place immediately after delivery of a product to be agreed in advance with the Client. Document required: Agreed product and an hourly time sheet. • For the transportation of systems and components for Corrective Maintenance, the cost price may be charged to the Client with a maximum surcharge of 10%.

P11	Process	P1 Process Requirements	Consultation	Each year, the Client and the Contractor have discussions with each other. The aim is to have a good basis for cooperation at operational level. The purpose of this consultation is to discuss issues at operational level and to facilitate agreements on formal contractual matters. In this consultation, for example, escalations, learning points and improvement actions are defined and monitored on progress.
SR1	Social Return	SR1 Social Return	Social Return	The Contractor commits itself to an appropriate implementation of the Social Return obligation.
SR2	Social Return	SR1 Social Return	Social Return	The Contractor has the latitude to translate its own ambitions/ideas for achieving social impact into a concrete proposal for Rijkswaterstaat's 'Groei tuin'. This proposal fits within the social return value in SR6 and the frameworks in the <i>Groei tuin</i> Social Return Guide, refer to the Annex. After final contract awarding, the Client will arrange an introduction between the Contractor and the <i>Groei tuin</i>. Within three (3) months of the introductory discussion, the Contractor must submit a draft Plan of Action. Within six (6) months of the introductory discussion, the Plan of Action must be finalised. In any case, the Plan of Action must address the following points: - The modality in which the obligations are met. - A proposal elaborating the initial three (3) years. - A proposal for process arrangements for practical implementation. The Plan of Action must be completed and submitted for approval to the <i>Groei tuin</i> and the Contract Manager. The <i>Groei tuin</i> assesses the Plan of Action on its elaboration of the above-mentioned points, its ambition, concreteness, feasibility and the reality of the proposal.
SR3	Social Return	SR1 Social Return	Social Return	If <i>Groei tuin</i> agrees with the Plan of Action, this will form part of the Agreement. If, during implementation, it appears that the initial Plan of Action is not or is not fully feasible, then the Contractor is obliged to report this to <i>Groei tuin</i> and the Contract Manager, to jointly agree on a revised plan. After approval, the Contractor is obliged to carry out the plan within three (3) years.
SR4	Social Return	SR1 Social Return	Social Return	Every three (3) years, the Plan of Action will be revised, starting from year six after contract awarding. The Tenderer must address social return to the extent (percentage) stated in the tender on the turnover made. For this purpose, the turnover made over the three (3) years preceding the revised plan, will apply. An amended Plan of Action forms part of the Agreement.
SR5	Social Return	SR1 Social Return	Social Return	The Contractor must report on the social impact achieved with social return efforts during the regular supplier discussion.
SR6	Social Return	SR1 Social Return	Social Return	For social return, the Contractor will use the percentage of the Contract sum mentioned in the Agreement. For the first three (3) years, this Contract sum is equal to the initial supply. In turn, the value is determined every three (3) years: the Contract sum is always equal to the turnover of the previous three (3) years. For example: In the amended Plan of Action that is made in year six, the applicable turnover is that of between year three and year six. The amount that this represents is the social return value.

[end of Service Requirements, Process Requirements and Requirements of Social Return Lot 1]

7 Schedule of Requirements Lot 2 Inland Waterway Radar

7.1 Technical Requirements Lot 2

No.	Type	Group	Requirement title	Requirement for Lot 2 'Inland Waterways'
F01	Function	F1 Determining the water level	Purpose of the sensor	The radar level meter enables the user to collect information on the water level of the surface water in an effective manner that meets the user's needs, namely monitoring water levels and waves. The radar level meter offered will be used for permanent continuous online measuring at all present measurement set-ups of Rijkswaterstaat's National Water Monitoring Network (LMW). These set-ups are located across the entire Dutch part of the North Sea, along the coastal zone, in the IJsselmeer and Markermeer and along rivers and canals.
F02	Function	F1 Determining the water level	Scope of the system	The radar level meter as offered, will consist of everything necessary for the operational and manageable functioning as described in the requirements. In addition, the system will at least contain the following matters: - radar for determining the distance to the water surface; - any electronic unit required to meet the requirements, excluding the cables between the radar and this unit. The system price excludes the cables and a mounting frame (for fastening to an existing bracket). However, a mounting frame and cables between the radar and any electronic unit (refer to Requirement R01) must be listed separately on the Price List.
F03	Function	F1.1 Determining the distance to the water surface	Sampling frequency	The continuous sampling frequency is 2.56 Hz (data-collection timeframe is 390.6 ms). Each reading should be based on a single pitch. The tolerance is as follows: minimum data-collection timeframe of 388.6 ms, maximum data-collection timeframe of 392.6 ms.
F04	Function	F1.1 Determining the distance to the water surface	Transmission frequency	The frequency of the transmitted radar wave is freely selectable by the Tenderer.
F05	Function	F1.1 Determining the distance to the water surface	Measuring range	The measuring range is at least 19.5 m. Measuring range is understood to mean the maximum distance to be measured between the reference plane (Requirement F10) and the stationary surface (flat plane).
F06	Function	F1.1 Determining the distance to the water surface	Blanking	The maximum blanking of the radar is 1.0 m.
F07	Function	F1.1 Determining the distance to the water surface	Beam width	The beam width of the transmitted radar signal is up to 5°. The beam width is defined as the angle between the -3dB points on either side of the main axis of the radar.
F08	Function	F1.1 Determining the distance to the water surface	Modulation technique	The radar is based on Frequency-Modulated Continuous-Wave (FMCW).
F09	Function	F1.1 Determining the distance to the water surface	Doppler correction	Correction for precision distance measurement deviations on a moving surface (as a result of the Doppler effect) is required, if the transmission frequency is less than or equal to 30 GHz (Requirement F04).

F10	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Reference plane	The radar has a reference plane that is clearly defined in relation to a visible point on the outside of the radar.
F11	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Adjustable reference level	The reference level in respect of which the water level is recorded (NAP height) must be adjustable in the radar.
F12	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Water level relative to adjustable reference level	In the radar, a water level relative to this reference level must be determined from the measured distance to the water surface and the set reference level (refer to Requirement F11).
F13	Function	F1.2 Translate a precision distance measurement to a water level relative to an adjustable reference level	Measurement uncertainty	The measurement uncertainty (one standard deviation) of the water level as described in Requirement F12 may not exceed 5 mm. This concerns a single precision distance measurement on a stationary surface (flat plane) and includes the uncertainty in the radar reference plane.
F14	Function	F2 Data output	Real time output message available	It must be possible to have the output message on the data port available in real time.
F15	Function	F2 Data output	One output message	With the output frequency (Requirement F16), one message should be given which contains the measurement data. If there is no measurement data, the message should include an error code denoting the type of error.
F16	Function	F2 Data output	Output frequency	The output frequency of the output message is equal to the sampling frequency (Requirement F03).
F17	Function	F2 Data output	Output of the output message	Output of the measurement data occurs in at least one of the following ways: 1) the sensor actively generates an output message and makes it available on the data port, or 2) it should be possible to call up this output message via the data port with a command at least as often that compliance with the output frequency in Requirement F16 is guaranteed.
F18	Function	F2 Data output	Resolution of water levels	The resolution of the output message is less than or equal to 1 mm.
F19	Function	F2 Data output	Data availability	The measurement data should be available for a minimum of 95% of the time. An error code as described in Requirement F15 is thus also considered to be unavailable data. This requirement applies under controlled conditions. This concerns the system itself, excluding the effect of environmental conditions.

A01	Aspect	A1 Safety	Sharp edges, electricity, liquids	The entire set-up must be safe to use, minimising any risk of bodily harm.
A02	Aspect	A1 Safety	Cyber security	The configuration and data settings of the measuring instrument must not be accessible in any way other than through the physical connectors present.
A03	Aspect	A2 Reliability	Proven system	The measuring instrument has a 'Mean Time Between Failure' of at least 5 years.
A04	Aspect	A3 Availability	COTS components	The sensor, cables and peripheral equipment used should be based on products that have a 'commercial off-the-shelf' (COTS) availability.
A05	Aspect	A3 Availability	Technical service life	The sensor and accessories have an average technical service life of at least ten (10) years (excluding wear and tear and consumable parts).
A06	Aspect	A4 Usability	Calibration	The system must continue to meet all the requirements listed without any calibration for a period of at least ten (10) years.
A07	Aspect	A4 Usability	Sensor weight	The radar (including its antenna) has a maximum weight of 20 kg.
A08	Aspect	A5 Maintainability	Preventive maintenance	The system must continue to meet all of the above requirements on the basis of preventive maintenance that may be carried out at most once a year. Such possible preventative maintenance is only permitted on site and is confined to inspection and cleaning.
A09	Aspect	A5 Maintainability	Reparability	It should be reasonably possible to have the system repaired in the event of defects, and at least the main components of the radar must be replaceable.
A10	Aspect	A6 Conditions for functioning	Ambient conditions	The radar and cables must be designed as such that they can operate for a long time under normal conditions of use at the LMW measuring sites (refer to Requirement F01). This particularly means a humid and saline environment with long-lasting UV rays.
A11	Aspect	A6 Conditions for functioning	Robust design	As a whole, the system and all its components must be sufficiently robust to operate failure-free under normal conditions for a long period of time (refer to Requirement A03), at measurement stations and at LMW measuring sites (refer to Requirement F01).
A12	Aspect	A6 Conditions for functioning	Vibration-proof	As a whole, the system and all its components must be sufficiently robust to withstand vibrations that may be expected under normal conditions of use at LMW measuring sites (refer to Requirement F01).
A13	Aspect	A6 Conditions for functioning	IP rating	The radar and cables to any electronic unit must comply with IP67.
A14	Aspect	A6 Conditions for functioning	Operating temperature	The radar must operate at an ambient temperature of -15 °C to +45 °C.
R01	Interfaces	R1 Interfaces with adjacent objects	Sensor to interface module cables	The distance between the radar and any existing electronic unit (refer to Requirement R06) is at most 10 metres. Cables for the connection between these two elements must be capable of transmitting voltage as well as data in accordance with the communications protocol provided over this distance. Cable lengths can be selected out of three fixed lengths, the longest of which is 10 metres.
R02	Interfaces	R1 Interfaces with adjacent objects	Mounting frame	A mounting frame must be offered on the Price List for mounting the radar to an existing bracket. If present, the Contractor's standard design is sufficient.
R03	Interfaces	R1.1 External power supply	Supply voltage	The system must operate at a supply voltage of 11 to 15 V (DC), or 22 to 30 V (DC).

R04	Interface s	R1.1 External power supply	Power	The average input power of the measuring system is a maximum of 4.0 W. This power includes any peripheral equipment and the sampling frequency mentioned in Requirement F03 .
R05	Interface s	R1.1 External power supply	Sensor restart	After recovery of the voltage in the event of a power supply disruption, the system should start up automatically without loss of settings.
R06	Interface s	R1.2 Gateway	Physical layer of datacom	The sensor must have a digital serial output in accordance with RS-485. This can be achieved by means of a supplied electronic unit, if necessary.
R07	Interface s	R1.2 Gateway	Communica tions protocol	When the measurement data is given by calling up an output message via a command, as described in (2) of Requirement F17 , this should be done via a typical industrial communications protocol (e.g. MODBUS RTU or MODBUS ASCII).
R08	Interface s	R1.2 Gateway	Baud rate	The baud rate of the digital serial output (refer to Requirement R06) must be suitable for the data-collection system's minimum baud rate of 300 and the maximum baud rate of 115,200.

[end of Technical Requirements Lot 2]

7.2 Service Requirements, Process Requirements and Requirements of Social Return Lot 2

No.	Type	Group	Requirement title	Requirement for Lot 2 'Inland Waterways'
D01	Service	D1 Supply	Supply includes the full solution	The supply of a system should include the full solution as offered to meet the requirements as well as the Best price-quality ratio added value offered. The costs of supply include the radar and, if necessary, any additional electronic unit between the radar and this unit, as well as the costs for inspection, documentation and delivery (DDP) to the Client's stock location.
D02	Service	D1 Supply	One type	The Contractor must offer a single type of solution that meets all the requirements mentioned here.
D03	Service	D1 Supply	Delivery time	The Contractor must deliver the ordered systems within a maximum delivery time of five (5) months after call-off.
D04	Service	D1 Supply	Aspects of a delivery	Each delivery will: - be delivered within the set delivery time - be tested/checked for correct operation - be complete with all components for proper application and to meet the required technical requirements (except the cables) - include delivery costs and delivery duties paid (DDP) - be provided with a Delivery Document
D05	Service	D1 Supply	Delivery Document	The Contractor will provide a Delivery Document in digital form to the Client with each delivery containing at least: - Date of delivery - Serial number(s) - Scope of delivery (all components delivered) - Description of condition (such as firmware versions, model, etc.) - Proof of correct operation
D06	Service	D1 Supply	Delivery location of supply	The Contractor must deliver every supply to the Rijkswaterstaat stock location, which is currently in Delft.
D07	Service	D1 Supply	Technical continuity of supplies	The Contractor is responsible for the continuity of the system offered for the duration of the Agreement. This relates to keeping in place the deliverability and supportability of the sensors, modules and components offered by the Contractor. If a structural deficiency is identified in the technical performance or there is a deviation from the specifications, it is the responsibility of the Contractor to resolve this at its own expense.
D08	Service	D1 Supply	Availability	The type of system offered must be available for at least three (3) years after tendering. If, within this requirement, a type offered is nevertheless no longer available or supported, to ensure continuity, it is permitted to offer a type that can readily be exchanged: a type with equal specifications, (maximum) equal price and which is exchangeable at the measuring sites without any adaptations by RWS. If the initially offered type is no longer available or supported, an equivalent type may be offered after the initial 3-year period. An equivalent type does not have to be readily exchangeable. An equivalent type complies with the requirements and specifications initially offered. Subsequent types must be available at least five (5) years after being offered the first time.

D09	Service	D1 Supply	Support after phase-out of availability	After phasing out the type of sensor, it remains supported by the manufacturer for at least five (5) years. Spare parts must be available for that period and repairs can be carried out.
D10	Service	D1 Supply	User documentation	The Contractor must provide up-to-date documentation of the delivered items during the term of the Agreement. In any case, this documentation provides instructions for installation, operation, maintenance and handling. This documentation must be available digitally and must be provided by email upon request. It is drawn up either in Dutch or in English.
D11	Service	D2 Maintenance	Quality of corrective maintenance	Corrective maintenance relates to all work required to rectify any deviations or defects found. This concerns the recovery of reduced functionality due to abnormal use (e.g. excessive wear and tear, damage, contamination) or defects (e.g. corrosion, leaks, electronic failure). The work is determined on a case-by-case basis and includes: - Repair or replacement of defective components - Firmware updates - Final inspection - Transportation to and from the Rijkswaterstaat stock location including DDP - Recording in a Service Report. The turnaround time for corrective maintenance is a maximum of four (4) months.
D12	Service	D2 Maintenance	Transfer in consignment list	Any transfer of sensors between the Client and Contractor for maintenance will be confirmed in writing with a consignment list . With this the Contractor confirms that the sensors have been received or transferred back to the Client. In any case, this consignment list includes the date and the transferred items with serial numbers.
D13	Service	D2 Maintenance	Maintenance proposal	The Contractor will determine the extent of the corrective maintenance before maintenance is carried out. After the initial inspection, the Client's approval must first be sought. This coordination occurs with a costs specification , in which the costs and turnaround time are mentioned.
D14	Service	D2 Maintenance	Proper disposal	The Contractor will dispose of sensors and components properly at the end of their service life. The Contractor will endeavour to reuse as much as possible. If reuse is not possible, the Contractor will account for an environmentally sound disposal. The Contractor must also take into account any applicable regulations to the manufacturer/supplier in force in the country of manufacture (dual use goods). Disposals will be confirmed with a statement of proper disposal such as a service report.
D15	Service	D2 Maintenance	Service Report	The Contractor records each corrective maintenance and associated activities in a Service Report. The Service Report is delivered digitally and contains at least: - CIB numbers and serial numbers - cause and problem analysis - work carried out and inspections - ultimate condition (e.g. version, settings) - evidence of correct operation (e.g. final inspection) - if a registered item is disposed of: proof of proper disposal

D16	Service	D2 Maintenance	Risk of having possession	The moment the Contractor is in possession of a system and/or components which are the property of Rijkswaterstaat, the Contractor is liable for damages, theft or disappearance of these properties and is responsible for the taking of appropriate measures. If this should occur, the Contractor will indemnify the Client in any event. This applies both during transportation and when carrying out maintenance activities. This also applies for transportation and handling to and from suppliers.
D17	Service	D2 Maintenance	Supervision of careful handling	The Contractor must treat the system with due care and diligence by handling, transporting and storing the systems carefully and under controlled conditions. The Contractor must also ensure that adequate measures are taken in the work processes against damages, theft and disappearance and, in the case of handling by manufacturers, third parties or shipping agents.
D18	Service	D3 Support	Scope of support	The Contractor must support the users telephonically and by email during the term of the Agreement. This includes substantive remote technical support in Dutch about operating, mounting, settings and troubleshooting. The topic is confined to the scope of the systems delivered. The questions will initially be harmonised within the maintenance department and will only be submitted to the Contractor in the second instance (and thus in incidental cases). The response time may not exceed two (2) working days.
D19	Service	D3 Support	Consultation and training services	Occasionally, the Contractor can be consulted by the users about the use of the systems delivered. Such consultation could include application recommendations, training, or troubleshooting assistance. This could include situations that go beyond the user manual, incidents, and troubleshooting complicated issues. This support may be required at several RWS sites.
D20	Service	D3 Support	Training	The Contractor will take care of user training when required, to familiarise users that have an 'senior secondary vocational' level of education with the installation, maintenance, operational controls and primary troubleshooting. The group size per training is a maximum of 10 people. The Contractor must take care of all the necessary training materials. In consultation with the Contractor, the Client will provide an appropriate training room.
D21	Service	D3 Support	Quality of support	For all the support mentioned, this will take place in the Dutch language, staffed by one of the Contractor's personnel who has sufficient know-how of sensor operations as well as the Rijkswaterstaat application to resolve questions effectively. Support in the English language is permitted for specific knowledge and topics.
P1	Process	P1 Process Requirements	Contractor's organisation	Before the Contractor commences the performance of any service, it must prepare, design and operationalise its organisation. The Contractor must design its organisation as such that it is able to build and maintain the necessary know-how (knowledge retention) relative to the activities of the contract (self-motivation). The Contractor must comply with the Client's procedures, regulations and practices as set out in this Tender Specification. In all cases, if the Contractor applies other procedures, regulations and practices internally, then during the performance of the Agreement and its daily activities, the Client shall not notice any effect of this and it will not incur any additional costs to the Client.

P2	Process	P1 Process Requirements	Organising the Project Start Up (PSU)	The Client and Contractor will organise a PSU after this Agreement has entered into force. The purpose of a joint PSU is to have the Client and the Contractor jointly agree on how the contract will be implemented on commencement of the Agreement. The PSU should contribute to collaboration based on mutual trust. The PSU includes: • interactions between the Client and the Contractor • organisations • mutual lines of communication and working arrangements • points of attention in the agreement • quality assurance of services and supplies
P3	Process	P1 Process Requirements	Plan of Supplies and Services	The Contractor must draw up a Plan of Supplies and Services. This plan must at least include the following fully elaborated performance-specific topics: • At least the processes for carrying out the services Supply and Corrective Maintenance with the activities and inspections to be carried out. • The manner of controlling these processes. • The times and manner in which exchange between the Contractor and the Client and other external parties takes place within the described processes, such as which documents, manner of communications, etc. • The Contractor's project organisation which contains at least the management and key roles and an overview of the operational contacts with contact details of both the Contractor and the Client.
P4	Process	P1 Process Requirements	Deadline for submission of the Plan of Supplies and Services	The Contractor must submit the Plan of Supplies and Services to the Client as soon as possible but in any event within three (3) months of the signing of the Agreement.
P5	Process	P1 Process Requirements	Random checks	The Client is entitled to carry out random checks on the Contractor's control of processes. A random check examines whether the services and/or supplies concerned meet the requirements of the contract, the offer and processes described in the Plan of Supplies and Services. The Client may exercise its power of review at its own discretion. The Contractor must take two random checks into account for the duration of the contract. The Contractor must always cooperate with the Client to carry out a random check (or to have a random check carried out) and provide the necessary documents and information as supporting documents for the test.
P6	Process	P1 Process Requirements	Call-off	The call-off of orders for individual Products, Services and activities, as specified in this document, must be notified to the Contractor in writing by the Client's contact.

P7	Process	P1 Process Requirements	Requirements of cost specification	Applicable to all cost specifications for items on the Price List: 1. It must state verifiable (called-off) quantities; 2. It must state a specified amount of VAT; 3. All costs, such as transportation costs etc., must be included unless specified otherwise and agreed in writing; 4. It must agree with the price items as they appear in the Price List as part of the Agreement; 5. The stated delivery dates must be fixed dates; 6. No costs are involved in drawing up a costs specification.
P8	Process	P1 Process Requirements	Price List settlement	Settlement takes place based on an invoice, listing items from the Price List.
P9	Process	P1 Process Requirements	Settlement of deliveries	For deliveries, the following starting point applies: • For delivery of systems and components, the price as indicated on the Price List applies. Invoicing is done immediately after delivery. Documents required: Delivery document and packing slip.
P10	Process	P1 Process Requirements	Settlement of services	For services, the following starting points apply: • For Corrective Maintenance, an hourly rate and any materials according to the Price List apply. Also included are transportation costs to and from the Client's stock location, as well as any necessary transportation to the ultimate manufacturer. Retrospectively calculated costs not included in the maintenance proposal with cost specification are not eligible for settlement. Invoicing is done immediately after implementation. Documents required: Service report and Consignment list. • For providing support and training, an hourly rate is applicable according to the Price List. Invoicing takes place immediately after delivery of a product to be agreed in advance with the Client. Document required: Agreed product and an hourly time sheet. • For the transportation of systems and components for Corrective Maintenance, the cost price may be charged to the Client with a maximum surcharge of 10%.
P11	Process	P1 Process Requirements	Consultation	Each year, the Client and the Contractor have discussions with each other. The aim is to have a good basis for cooperation at operational level. The purpose of this consultation is to discuss issues at operational level and to facilitate agreements on formal contractual matters. In this consultation, for example, escalations, learning points and improvement actions are defined and monitored on progress.
SR1	Social Return	SR1 Social Return	Social Return	The Contractor commits itself to an appropriate implementation of the Social Return obligation.

SR2	Social Return	SR1 Social Return	Social Return	The Contractor has the latitude to translate its own ambitions/ideas for achieving social impact into a concrete proposal for Rijkswaterstaat's 'Groei tuin'. This proposal fits within the social return value in SR6 and the frameworks in the <i>Groei tuin</i> Social Return Guide, refer to the Annex. After final contract awarding, the Client will arrange an introduction between the Contractor and the <i>Groei tuin</i>. Within three (3) months of the introductory discussion, the Contractor must submit a draft Plan of Action. Within six (6) months of the introductory discussion, the Plan of Action must be finalised. In any case, the Plan of Action must address the following points: - The modality in which the obligations are met. - A proposal elaborating the initial three (3) years. - A proposal for process arrangements for practical implementation. The Plan of Action must be completed and submitted for approval to the <i>Groei tuin</i> and the Contract Manager. The <i>Groei tuin</i> assesses the Plan of Action on its elaboration of the above-mentioned points, its ambition, concreteness, feasibility and the reality of the proposal.
SR3	Social Return	SR1 Social Return	Social Return	If <i>Groei tuin</i> agrees with the Plan of Action, this will form part of the Agreement. If, during implementation, it appears that the initial Plan of Action is not or is not fully feasible, then the Contractor is obliged to report this to <i>Groei tuin</i> and the Contract Manager, to jointly agree on a revised plan. After approval, the Contractor is obliged to carry out the plan within three (3) years.
SR4	Social Return	SR1 Social Return	Social Return	Every three (3) years, the Plan of Action will be revised, starting from year six after contract awarding. The Tenderer must address social return to the extent (percentage) stated in the tender on the turnover made. For this purpose, the turnover made over the three (3) years preceding the revised plan, will apply. An amended Plan of Action forms part of the Agreement.
SR5	Social Return	SR1 Social Return	Social Return	The Contractor must report on the social impact achieved with social return efforts during the regular supplier discussion.
SR6	Social Return	SR1 Social Return	Social Return	For social return, the Contractor will use the percentage of the Contract sum mentioned in the Agreement. For the first three (3) years, this Contract sum is equal to the initial supply. In turn, the value is determined every three (3) years: the Contract sum is always equal to the turnover of the previous three (3) years. For example: In the amended Plan of Action that is made in year six, the applicable turnover is that of between year three and year six. The amount that this represents is the social return value.

[end of Service Requirements, Process Requirements and Requirements of Social Return Lot 2]

Annex A RMI message specification

The following applies for RMI messages:

- A message for the water level (GH message for wave data processing) is recorded once every 0.3906 seconds (2.56 Hz).
- A message for the average water level (H message) is recorded once every 10 seconds (0.1 Hz).
- Both messages contain only ASCII characters.
- The RMI message consists of one value of 6 characters. The general layout of the message is `<LF><RMI message><CR>`, with
 - `<LF>` = line feed character
 - `<CR>` = carriage return character
 - `<RMI message>` = STDDDD
- The RMI message is provided sequentially, with no additional spaces between characters.
- The format of each value is STDDDD, with
 - S = status (refer to Table 1)
 - T = character (depending on status, refer to Table 1)
 - DDDD = measurement or code for service and management purposes (refer to Table 1)
- The message consists of one value that represents the water level in whole centimetres relative to NAP or represents an error code.
- If the measured water level relative to NAP exceeds limit values, error code +9990 applies in
- Table 1 (**limit value check**). These limit values should be programmed at -9999 cm and +9999 cm.
- The quantity of good measurement values underlying the RMI messages given should be above a minimum (**quantity check**). This minimum must be programmed at 1 (GH message) and 15 (H message).

To illustrate, here are some examples of RMI messages:

- `<LF> +0037<CR>` water level of 37 cm above NAP
- `<LF> -0583<CR>` water level of 583 cm below NAP
- `<LF> A+9999<CR>` sensor error

Table 1 Definition of values in the RMI message

Value		Meaning:
Status	TDDDD	
' '	-9999 to +9999	'good' reading
'A'	+9999	code: sensor error
	+9990	code: processing error (quantity check / limit value check)

Create GH message

The GH message (2.56 Hz) is expressed in centimetres relative to NAP.

The process for creating the GH message includes the following functions:

- limit value check;
- quantity check (OKTEL) for 0.3906 seconds (1/2.56 Hz);
- sum of good values (SOMH) in 0.3906 seconds (1/2.56 Hz);
- determination of water level in 0.3906 seconds (1/2.56 Hz) if $H = \text{SOMH}/\text{OKTEL}$.

Create H message

The H message (0.1 Hz) is expressed in centimetres relative to NAP.

The process for creating the H message includes the following functions:

- limit value check;
- quantity check (OKTEL) for 10 seconds;
- sum of good values (SOMH) in these 10 seconds;
- determination of average water level in 10 seconds if $H = \text{SOMH}/\text{OKTEL}$.