

ANNEX II + III: TECHNICAL SPECIFICATIONS

Contract title: Procurement of Mobile Flood Defence Equipment for the Public Water Management Company “SRBIJAVODE”

Flood Defence line (FDL) on Danube right bank (Zemun area) with Flood Defence Mobile Equipment (FDME) for the protection of New Belgrade and Zemun

Publication reference: EuropeAid/137461/ DH/SUP/RS

Column 1-2 should be completed by the Contracting Authority

Column 3-4 should be completed by the tenderer

Column 5 is reserved for the evaluation committee

The tenderers are requested to complete the template on the next pages:

- Column 2 is completed by the Contracting Authority shows the required specifications (not to be modified by the tenderer),
- Column 3 is to be filled in by the tenderer and must contain details what is offered (for example the words “compliant” or “yes” are not sufficient)
- Column 4 allows the tenderer to make comments on his proposed supply and to make eventual references to the documentation

Tenderers are required to demonstrate that offered specifications are responsive to the Tender Dossier requirements identifying model and manufacturer of each individual item in their Technical Offer.

The potentially supplied documentation should clearly indicate (highlight, mark) the models offered, and the options included, if any, so that the evaluators can see the exact configuration. Offers that do not permit precise identification of the models and the specifications may be rejected by the evaluation committee.

The offer must be clear enough to allow the evaluators to make an easy comparison between the requested specifications and the offered specifications.

Provided documentation must be tidy organized, and all items in respective documentation must be clearly identified (highlighted and indicated by "Item Number").

The documentation's page numbers where the information could be found must be clearly stated in the "Notes, remarks, ref to documentation" column of the offer.

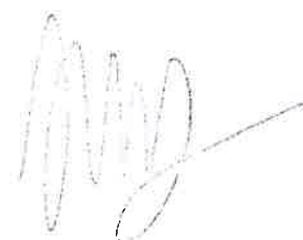
EU Visibility: All supplies shall comply with the visibility Manual for EU External Actions (https://ec.europa.eu/europeaid/communication-and-visibility-manual-eu-external-actions_en) as well as the EU Visibility Manual produced by the EU Delegation to Serbia.

Stickers should be placed on the supplies with a clearly visible EU flag and the phrase “Provided with the support of the EU” in the operational language of the EU programme and in the Serbian language.

A visibility event should be foreseen and financed by the contractor and organised in conjunction with the Contracting Authority.

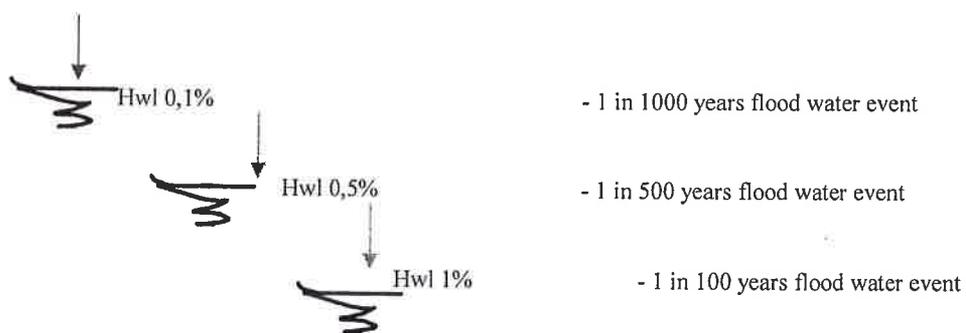
CONTENTS

1. OVERVIEW	4
1.1 Background	4
1.2 FLOOD PROTECTION OF BELGRADE - CURRENT SITUATION	4
1.3 CONCEPT OF THE FLOOD PROTECTION OF NEW BELGRADE AND ZEMUN	6
1.3.1 General Requirements:	6
1.4 Required type of FDME (includes three separate main elements):	7
1.5 FDME – Schematic and Specification	7
2. Beneficiary’s Responsibility	8
2.1 Technical Documentation	8
3. TECHNICAL SPECIFICATIONS	9
4. Annex	19
FLOD PROTECTION OF NEW BELGRADE AND ZEMUN	19
Overview layout	19
Charasteristic detail	19
Recapitulation	19
Layout of section 1	19
Layout of section 2	19
Layout of section 3	19
Layout of section 4	19
Layout of section 5	19
Layout of section 6	19



Abbreviations:

The following abbreviations are used consistently throughout this document.



FP: flood protection

FD: flood defence

FDME: flood defence mobile equipment

Fdwall: flood defence wall

FPMS: flood protection mobile system

FDL: flood defence line

h/b –height/width (dimensions of width “b” is left to each Contractor to be determined independently based on personal interest with commitment to submit static calculation and study of impact as part of the tender requirement.

Static calculations are performed for completely set protection line, its individual elements and total impact of setting foundations.

1. OVERVIEW

1.1 Background

In order to improve flood protection system in the City of Belgrade and minimize the risk of future similar situation, it is necessary to improve the system's strength with mobile flood protection systems. On the territory of the city's biggest municipality of Novi Beograd, with nearly 300,000 residents and number of schools, kindergartens, health centres and similar facilities of public interest, the left bank of the Sava river is protected only by one line of defence (embankment). By construction of Belgrade infrastructure around rivers Sava and Danube, existing flood protection building structures (embankments) were built according to the at-the-time available and known data on these rivers' water levels. During the period that followed, the existing flood protection building structures were built up for the level that secures unobstructed passage of 50-yr flood waters. Climate change and increased inflow of residents into the city impose the need to increase the existing flood protection building structures levels to the levels of minimum 100-yr flood water with additional protection heights to the level of 1000-yr flood water. Certain locations can be up built, however, because of spatial, urbanistic and technical limitations, large parts need to be protected by flood protection mobile systems.

City of Belgrade has no possibilities for developing second (reserve) line of defence from flood waters due to developed building and road infrastructure. Environmentally, it is important to mention that water intakes and water transportation systems processing the water supply plant are located on the shores/riverbanks.

1.2 FLOOD PROTECTION OF BELGRADE - CURRENT SITUATION

The protection of Belgrade from Danube and Sava high waters is ensured by protection water structures – quay walls in the central urban zone and embankments, as well as embankments upstream and partly downstream from the city in a total length of 32.03 km, whereas the structures protecting directly the riverside of the city itself make the protection line 21.38 km long.

Criteria for necessary flood protection of the Belgrade area are set out in the Master Plan of Belgrade to 2021 ("Official Gazette of the City of Belgrade" no. 27/2003, 25/2005, 34/2007).

According to this document, Belgrade should be protected from high water return period of once in 200 years, with additional protection, which ensures the protection from high water return period of once in 1000 years.

At these critical sections, the necessary degree of protection with additional protection height to $H_{0,1\%}$ will be achieved by mobile systems - mobile equipment that should be installed above the pre-built foundation wall.

FLOOD PROTECTION PRIORITY IN BELGRADE: According to the Flood Protection Operational Plan of Serbia, Flood Protection Area of New Belgrade and Zemun is estimated as critical area, with flood

defence line (FDL) 4.470,29m. The defence line that includes mobile flood defence equipment includes the following 6 sections:

Section 1:

The Section 1 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun.

It starts from the elevated terrain section in Zemun, near the club "Radecki", and ends nearby the restaurant "Šaran".

It is located on the Danube river line from rkm 1173 + 201 to rkm 1173 + 565.

The survey mark of the embankment of the existing line of defence on the section is from km 4 + 087.91 to km 4 + 452.87

Section 2:

The Section 2 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun.

It starts nearby the restaurant "Šaran" and ends nearby the restaurant "Venecia".

It is located on the Danube river line from rkm 1172 + 900 to rkm 1173 + 201.

The survey mark of the embankment of the existing line of defence on the section is from km 3 + 748.68 to km 4 + 087.91

Section 3:

The Section 3 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun.

It starts nearby the restaurant "Venecia" and ends nearby the "Hidrobaze".

It is located on the Danube river line from rkm 1172 + 600 to rkm 1172 + 900.

The survey mark of the embankment of the existing line of defence on the section is from km 3 + 310.00 to km 3 + 748.68.

Section 4:

The Section 4 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun.

It starts in a slope quay of the Danube Steamship Company in Zemun at the location of "Hidrobaze" and ends in a slope quay in front of the Hotel "Jugoslavija".

It is located on the Danube river line from rkm 1172 + 600 to rkm 1172 + 275.

The survey mark of the embankment of the existing line of defence on the section is from km 2+628 to km 3 + 310.00.

Section 5:

The Section 5 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun.

It is located along the built slope in front of the Hotel "Jugoslavija".

It is located on the Danube river line from rkm 1172 + 685 to rkm 1172 + 275.

The survey mark of the embankment of the existing line of defence on the section is from km 1+722 to km 2 + 628,67.

It is located along the built-in quay wall in front of the Hotel Jugoslavija

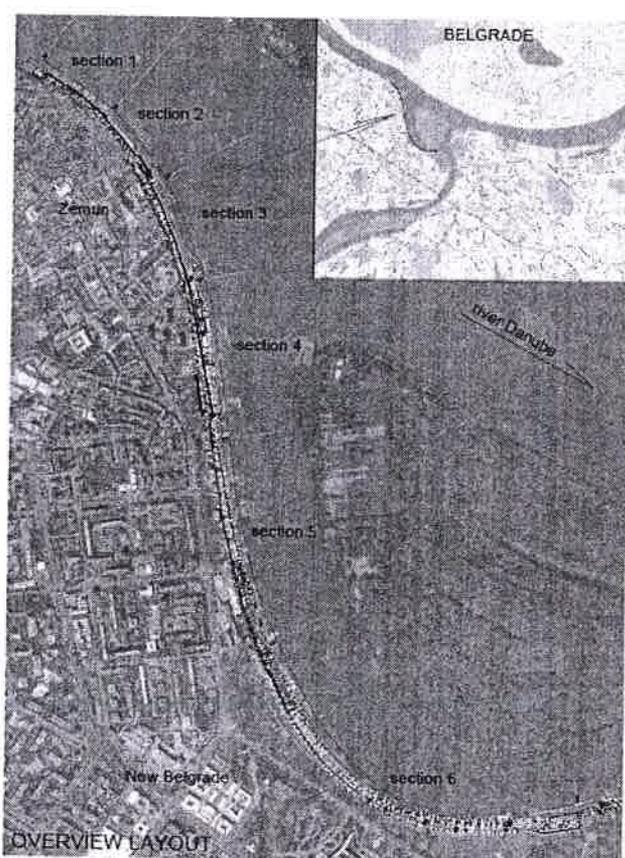
Section 6:

The Section 6 belongs to inundated area "Novi Beograd" and is located on the right bank of the Danube River, in the municipality of Zemun and the municipality Novi Beograd.

It is located along the built slope in front of the Hotel "Jugoslavija" until Danube quay, on tributary Sava river into Danube.

It is located on the Danube river line from rkm 1170 + 280 to rkm 1171 + 685.

The survey mark of the embankment of the existing line of defence on the section is from km 0 + 000 to km 1+722.

All Sections:

Layout of Flood defence line - 6 sections with Flood Defence Mobile Equipment

1.3 CONCEPT OF THE FLOOD PROTECTION OF NEW BELGRADE AND ZEMUN

1.3.1 General Requirements:

The objective to purchase the Flood Protection Mobile System (FPMS) is to achieve the required degree of flood protection of the New Belgrade and Zemun area, in total length of 4.470,29m during flood protection against the high-water level of the Danube.

FPMS includes two elements:

1) NEW FLOOD PROTECTION STRUCTURE (underground foundation with or without over ground wall, depends of the ground level on the river banks). As lower part of FPMS, and as longitudinal support of the mobile equipment, this protection structure shall be built on the river banks sections where the level of the crest is lower, and reconstruction works of the higher permanent structure are unacceptable due to technical, urban and financial reasons):

The Beneficiary (Public Water Management Company "Srbijavode"), has a duty to build it (it is not scope of tender requirements).

2) FLOOD DEFENCE MOBILE EQUIPMENT (FDME):

The subject of this procurement

2.1. Flood defence mobile equipment as top part of FPMS above the crest of foundation wall (which will be installed only in extreme flood defence situation).

FDME - temporary and mountable / demountable waterproof structural system made of high quality and solid materials, resistant to corrosion;

After choosing the best offer, delivery of the quantity of the FDME spare parts and FDME consumables will be defined in contract, as Contractor obligatory.

2.2. Tools, deployment machinery and work equipment, accessories (storage containers), (necessary goods for efficiently mountable / demountable of the FDME in extreme flood defence situation, and for optimum storage of the FDME in normal condition);

2.3. Test installation of the FDME on test route, including training for Beneficiary intervention teams (training shall be organized on test route, according Beneficiary requirements);

1.4 Required type of FDME (includes three separate main elements):

1. **FDME Anchor plate:** permanent support of the FDME (with protection screws), permanently installed in underground foundation or in over ground wall (presented in Annex of this document).

2. **FDME Post:** parts of the FDME (with installation screws), for temporary installation during flood protection in anchor plates (presented in Annex... of this document). The posts shall not have any back-support element

3. **FDME Field:** parts of the FDME between posts formed by horizontal beams, for temporary installation during flood protection, with fastened accessories (presented in Annex... of this document). There are two types of FDME beams:

3.1: FDME beams: horizontal parts of FDME field (with integrated rubber sealing parts);

3.2: Basic FDME beam (one piece per FDME field): Beam on the bottom of FDME field with integrated longitudinal sealing rubber support.

The height of the beams shall be 20 cm. All beams should have identical cross sections.

NOTE:

FDME must be new, unused, undamaged.

All elements with the same role should be interchangeable.

The water seals to be used during installation should be replaceable without using any adhesive or sticking material.

1.5 FDME – Schematic and Specification

All Sections of FDL with FDME, including permanent structure, and details of high, length, angles attached (presented in Annex of this document).

2. Beneficiary's Responsibility

In order to ensure smooth project implementation and to provide the Contractor with the necessary information, the Beneficiary (Public Water Management Company "Srbijavode") shall provide:

- ❖ Organize and guide the deployment and effective use of the equipment listed here
- ❖ Acceptance and storage of deliveries (all the goods as subjects of this procurement) under this contract
- ❖ Identification of a place for assembling the equipment and training of the team
- ❖ Operating the equipment after provisional and final acceptance.
- ❖ Build the foundation / wall for mounting FDME (maximum three months: installation test field L=25m).

2.1 Technical Documentation

Technical documentation to be submitted with the proposal shall contain detail descriptions of characteristics and specifications for each element of the offered FDME model separately (for each section of FDL, presented in Annex of this document).

A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke extending to the right.

3. TECHNICAL SPECIFICATIONS

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
1	2	3	4	5
<p>Tender Dossier Requirements:</p> <ol style="list-style-type: none"> 1) FLOOD DEFENCE MOBILE EQUIPMENT 2) Tools, deployment machinery and work equipment, accessories (storage containers), 3) Test installation of the FDME on test route, including training for Beneficiary intervention teams <p>All tenderers submitted must comply with the requirements in the technical specification:</p>				
A	FDME PARTS (Parts of Flood Defence Mobile Equipment shall be packing into the appropriate cargo standard pallets for safe transport, storage and machine loading/unloading)			
A.1	FDME ANCHOR PLATE (permanent support of the FDME (permanently installed in FD wall)			
	Types of FDME Anchor plates	Quantity		
A.1.1	FDME Anchor plate (typical): for installation of the FDME Middle Post	pieces	730	
A.1.2	FDME Anchor plate (angle): for installation of the FDME angle posts	pieces	19	

Item Number	Specifications Required	Specifications Offered	Notes, re- marks, ref to documenta- tion	Evaluation Committee's notes
A.1.3	FDME Anchor plate (special): for installation of the typical FDME posts on a FDME End Post 2)	pieces	103	
A.1.4	Protection screws for anchor plates (anti-vandalism type)	pieces	According to manu- facturer's design and instruc- tions	
A.1.5	Made of: high strength stainless steel			
A.2	FDME POST (parts of the FDME (for temporary installation during flood defence in anchor plates)			
A.2.1	FDME Middle Post (typical) for temporary installation during flood defence in anchor plates (in the FDL direction)	Quantity		
A.2.1.1	H=0,5m	pieces	0	
A.2.1.2	H=1,0m	pieces	440	
A.2.1.3	H=2,0m	pieces	390	
A.2.2	FDME Middle Post (angle) (on the angular points of the FDL route)	Quantity		
A.2.2.1	H=0,5m	pieces	0	
A.2.2.2	H=1,0m	pieces	14	
A.2.2.3	H=2,0m	pieces	5	
A.2.3.	FDME End Post 1 (permanent post at the end of FDL with FDME)	Quantity		

Item Number	Specifications Required	Specifications Offered	Notes, re- documentation	Evaluation Committee's notes
A.2.3.1	H=0,5m	pieces	2	
A.2.3.2	H=1,0m	pieces	0	
A.2.3.3	H=2,0m	pieces	1	
A.2.4	FDME End Post 2 Temporary post on the ends of the exit in FDL walls	Quantity		
A.2.4.1	H=0,5m	pieces	101	
A.2.4.2	H=1,0m	pieces	0	
A.2.4.3	H=2,0m	pieces	0	
A.2.5	Installation screws Screws for installation of posts in anchor plates (packed in aluminium boxes of the appropriate dimensions and suitable for carrying without deformation)	pieces	According to manufacturer's design and instructions	
A.2.6	FDME Post shall be designed as compact unit. Required material: Al (aluminium) or steel (hot-deep galvanized for corrosion resistant)			
A.3	FDME Field part of the FDME between posts formed by horizontal beams (temporary installation during flood defence)			
	Length of FDME Field optimal distance of axis (between posts): BENEFICIARY REQUIREMENTS: 2,5m			

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
	FDME beams horizontal parts of FDME field (with integrated rubber sealing parts) for temporary installation during flood defence - BENEFICIARY REQUIREMENTS: Dimensions: h/b=20/b¹	Quantity		
A.3.1	FDME beams horizontal parts of FDME field (with integrated rubber sealing parts)	pieces	5490	
A.3.2	Basic FDME beam (one piece per FDME field): special beam on the bottom of FDME field with integrated longitudinal sealing rubber support.	pieces	815	
A.3.3	FDME accessories for fastening the FDME beams (2 pieces/FDME field) (packed in aluminium boxes of appropriate dimensions and suitable for carrying without deformation)	pieces	1630	
A.3.4	Made of aluminium.			
A.4.	Technical Documentation			
A.4.1	A complete list of delivered equipment (for each section of FDL, presented in Annex of this document) (quantity and warranty specification, detail descriptions of characteristics and specifications for each element of the offered FDME model separately).			
A.4.2	Manual			
A.4.3	Attest documentation - certificates for all materials used for the whole assembly elements of FDME (in accordance with the applicable EU standards)			
A.4.4	Brochure (A4 hardcover 20 copies) (Detail Manual per FDL sections, Storage plan in containers,			

¹The "b" dimension is the width of the beam that the contractor determines depending on its production conditions and proves to be accompanied by static calculation and dimension.

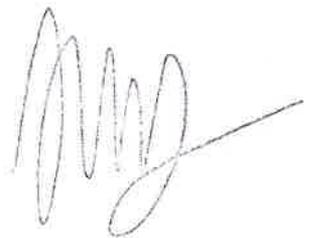
Item Number	Specifications Required	Specifications Offered	Notes, re- documentation	Evaluation Committee's notes
	Maintenance, Reparation instruction)			
A.5.	Tools			
A.5.1	Tools for mounting/dismounting of the FDME parts: standard tools with interchangeable parts (according screws dimensions) (packed in aluminium boxes of the appropriate dimensions and suitable for carrying without deformation)	Quantities		
A.5.2	Ratchet Torque Wrench with Hex Keys	pieces	60	
A.5.3	Ratchet Torque Wrench with deep socket	pieces	60	
A.5.4	Made of high quality material (Chromium-Molybdenum)			
A.5.5	Packed in aluminium boxes of the appropriate dimensions and suitable for carrying without deformation			
A.6.	Deployment machinery			
	Telehandler		Quantities	
A.6.1	Telehandler with: a) Motor, nominal power 80 – 100 kW b) Lifting capacity: min 3500 kg c) Lifting height: min 7m Additional equipment: Loader bucket and pallet forks	pieces	2	
A.6.2	Motor, nominal power 80 – 100 kW			
A.6.3	Lifting capacity: min 3500 kg			
A.6.4	Lifting height: min 7m			
A.6.5	Additional equipment: Loader bucket and pallet forks			

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
A.7.	Work equipment			
A.7.1	Mobile Autonomous Power Generator	Quantities		
A.7.1.1.	7kVA Three Phases Power generator 7kVA with gasoline with four stroke engine with air cooling. Single phase and three phase supplies. kVA max.: 7 kVA continuous: 6,5. Electricity power: 18A to 1~230V and 8A to 3~400V	pieces 6		
A.7.2	Mobile light tower	Quantities		
A.7.2.1.	Mobile light tower Reflectors with mobile light tower minimum elevation of 5 m and min power 4x150 w led Inlet plug (A/V/Hz) 16/220/50. Manual lifting system. Illuminated area 1500-1800 m ² , Wind speed resistance min 80 km/h. Hand trolley.	pieces 4		
A.8.	Storage containers Tenderers shall provide with offer schematic storage plan in containers with ... All FDM E parts (presented in this TS, group A) shall be delivered separately in containers (sorted by sections). All supplies shall comply with the visibility Manual for EU External Actions (https://ec.europa.eu/europeaid/communication-and-visibility-manual-eu-external-actions_en).			
A.8.1	Standard container (20 feet) Length: 5.90 m (19'4"), Width: 2.35 m (7'9"), Height: 2.39 m (7'10")	Quantities		
A.8.1.1		pieces	In accordance with the required number for transport and storage	

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
	<p>Standard container (20 feet) for FDME parts, separately for each Sections:</p> <p>Length: 5.90 m (19'4 "), Width: 2.35 m (7'9"), Height: 2.39 m (7'10"), side-opening of the entire site in full hole.</p>	<p>of equipment, selected by sections and prepared for machine loading and manipulation and with containers separately indicated for spare parts.</p>		
A.8.1.2	<p>Standard container (20 feet) Length: 5.90 m (19'4 ") , Width: 2.35 m (7'9") , Height: 2.39 m (7'10") , front opening, with shelves on the walls (60 cm deep) length: 5m in 4 levels</p>	<p>pieces</p>	<p>1</p>	
A.8.1.3	<p>The FDME containers with panels should be clearly identified, and visibly marked with the EU flag and the phrase "Provided with the support of the EU" with logo of Beneficiary (in the operational language of the EU programme and in the Serbian language).</p>			
A.8.1.4	<p>All FDME parts (presented in this TS, group A) shall be adequately packed on specially designed and steel reinforced pallets, in boxes (steel profiles, galvanized mesh, with holders).</p>			
A.8.1.5	<p>Pallets, or package boxes, shall be designed and manufactured using durable materials for multiple use</p>			
A.8.1.6	<p>The Pallets shall be tied using polyester strap, with contents specification table on each package</p>			

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
A.8.1.7	Pallets with boxes must have fastening elements for the floor / walls of the container.			
B	INSTALLATION TEST AND TRAINING Tenderers shall provide method statement of installation test and of training programme			
B.1	<p>Test of the FDME Installation:</p> <p>Technical documentation (with atest and statical calculations), set of FDME for test installation and training of the Beneficiary team at the test field (L=25m):</p> <p>Specification of the test field: length 25 m, with 6 pieces of anchor plates (typical), 6 pieces of posts (typical middle posts h=2 m) with installation screws and tools and 250 pieces of beams (including basic beams) and beam fastened accessories.</p> <p>Construction structure for test installation should be provided by Beneficiary in New Belgrade area. Duration of training: 2 days.</p> <p>Test will be implemented during the delivering period (of the FDM), depending of the Beneficiary decision, with a min announcement one month before the commencement.</p>			
B.2	<p>Training of the Beneficiary Intervention teams to handle FDME:</p> <p>Training of 4 Intervention teams (1 instructor and 5 workers in the Beneficiary team) to handle FDME (mobilization from storage, installation, removal, maintenance, repair, packaging, storage, application security measures and the protection of workers).</p> <p>Training will be organized along the route at least 25 m long.</p> <p>Beneficiary shall provide the foundation at the test field for the installation FDME.</p> <p>Training will be implemented during the delivering period (of the FDM), depending of the Beneficiary decision, with a min announcement one month before the commencement.</p>			
B.3	<p>Training for handling deployment machinery (2 operators - Beneficiary workers) and for handling works equipment (4 operators - Beneficiary workers)</p>			

Item Number	Specifications Required	Specifications Offered	Notes, remarks, ref to documentation	Evaluation Committee's notes
	Beneficiaries will provide training field			
C.3.	Construction Elements			
C.3.1	Protection screws Protection screws for anchor plates (anti-vandalism type) (1 screw / 1 Anchor Plate)	pieces	850	
C.3.2	Installation screws Screws for installation of posts 1 screw / 2 Posts	pieces	480	
C.3.3	Post rubber stripes Vertical rubber profiled stripe for posts			
C.3.3.1	Post rubber stripes, H=0,5 Vertical rubber profiled stripe for posts	pieces	80	
C.3.3.2	Post rubber stripes, H=1,0 Vertical rubber profiled stripe for posts	pieces	360	
C.3.3.3	Post rubber stripes, H=2,0 Vertical rubber profiled stripe for posts	pieces	320	
C.3.4	FDME beams accessories Accessories for fastening the FDME beams	pieces	320	
C.3.5	Horizontal beams rubber Horizontal beams rubber	pieces	1000	
C.3.6	Horizontal bottom beams rubber Horizontal rubber seal on the bottom of the basic beam)	pieces	160	

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

4. Annex

FLOD PROTECTION OF NEW BELGRADE AND ZEMUN

Overview layout

Charasteristic detail

Recapitulation

Layout of section 1

Layout of section 2

Layout of section 3

Layout of section 4

Layout of section 5

Layout of section 6

A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke extending to the right.

