CORRIGENDUM No.2 to TENDER DOSSIER

Construction of the Regional Waste Management Center for Subotica District Republic of Serbia

EuropeAid/133971/C/WKS/RS

The following modifications are made to:

VOLUME III

EMPLOYER'S REQUIREMENTS

Section 2 - Particular Design & Process Requirements

2.3.3 Administrative Building Area
Laboratory

THE FORMER TEXT:

Laboratory shall be equipped minimum with:

- Analytical balance with capacity up to 300g and resolution of 0,1mg, with a LCD display
- Laboratory scale with capacity up to 3,000 g and resolution of 0.5 g, with a LCD display
- Drying oven range from 0 to 250 °C
- Autoclave
- Electric Muffle furnace range 0 to 600 °C
- Calorimeter
- Incubator range 0 to 20°C
- Waterbath
- Filtering system
- Spectrophotometer - UV/VIS
- Photometar
- Conductivity Meter
- Temperature transmitters (liquid in glass thermometers, 2x; RTD temperature probe with LCD display, 2x)
- pH meter probe with glass electrode and meter with LCD display
- Jar test equipment (compact laboratory mixer for 4 samples that includes jar support base, mixer drive system, mixer paddles, light, cooling fan, tachometer and controls)
- Turbidity meter with LCD display maintenance kit
- Multiparameter - measurements (pH / pH FET / ORP / Ion / Conductivity / TDS / Salinity / Resistivity / Dissolved Oxygen / BOD (OUR, SOUR) / Temperature)
- Dissolved Oxygen analyzer with LCD display
- Equipment for measurement of COD, BOD5
- Equipment for measurement of mineral oils, total oils and fats
- Water Purification Equipment: Ione exchange and reverse osmosis
- Automatic sampler
- Total organic carbon analyzer

4

- ORP analyzer with LCD display
- Digestion Apparatus (Spectroquant thermoreactor)
- Heavy metals analyzer with a connection to a personal computer
- Ammonia analyzer with LCD display
- Turbidity meter with LCD display maintenance kit
- Volumetric Glassware
- Thermometer range 0 to 100 °C
- Refrigerator approx. 120 l
- Set f laboratory sowftware

SHALL READ AS NEW TEXT:

Laboratory shall be equipped minimum with:

- Analytical balance with capacity up to 300g and resolution of 0.1mg, with a LCD display
- Laboratory scale with capacity up to 3,000 g and resolution of 0.5 g, with a LCD display
- *Drying oven range from 0 to 250 °C, (+/-1), 3 x 60 litres, heating supported by ventilation, and with weekly timer. Microprocessor controlled. 10 unit Ceramic shales, d=20cm.*
- *Autoclave of min. 180 liters and vertical placement. Type: combined, universal, for all materials, with pre and auto vacuum and the possibility for automatic and manual water filling.*
- Electric Muffle furnace range 0 to 600 °C
- Calorimeter
- *Incubator range of 0 to 80°C, +/-1, with possibility of temperature adjustment. Microprocessor controlled. The volume should be of 180 l. Petri dishes, flasks etc. should be stored in.*
- *Waterbath for heating up to 100°C. It should have 10 places as minimum and of 180 litres in total. The samples whose parameters should be analysed at constant temperature are placed inside.*
- Filtering system
- *Spectrophotometer - UV/VIS: combined type, for a wide range of materials, with quartz cuvette (for COD, nitrogen and phosphorus components etc.). Wavelength 400-700 nm, single phototube, Adjustment of wavelength for 5 nm sensitivity. Including 12 glass reading tube.*
- Photometar
- Conductivity Meter
- Temperature transmitters (liquid in glass thermometers, 2x; RTD temperature probe with LCD display, 2x)
- pH meter probe with glass electrode and meter with LCD display
- Jar test equipment (compact laboratory mixer for 4 samples that includes jar support base, mixer drive system, mixer paddles, light, cooling fan, tachometer and controls)
- Turbidity meter with LCD display maintenance kit
- Multiparameter - measurements (pH / pH FET / ORP / Ion / Conductivity / TDS / Salinity / Resistivity / Dissolved Oxygen / BOD (OUR, SOUR) / Temperature)
- Dissolved Oxygen analyzer with LCD display
- Equipment for measurement of COD, BOD5
- Equipment for measurement of mineral oils, total oils and fats
- *Water Purification Equipment: reverse osmosis, Capacity of 10 l/h. Water conductivity <10 μ S/cm.*
- Automatic sampler

- Total organic carbon analyzer
- ORP analyzer with LCD display
- Digestion Apparatus (Spectroquant thermoreactor)
- Heavy metals analyzer with a connection to a personal computer
- Ammonia analyzer with LCD display
- Turbidity meter with LCD display maintenance kit
- Volumetric Glassware
- Thermometer range 0 to 100 °C
- *Laboratory Refrigerator of min. 180 l with digital temperature display and sound alarm*
- *Set of laboratory software for autoclave, incubator etc.*

2.3.6 Materials Separation and Recovery Facility (MRF)
Unloading and pre-sorting platform

THE FORMER TEXT:

Waste from the platform can also be picked by an overhead crane travelling on rails, using a grab, and transferred either to the bag shredder or directly to the rotating drum sieve, or anywhere else inside the hall.

SHALL BE DELETED

2.3.6 Materials Separation and Recovery Facility (MRF)
Overhead crane

THE FORMER TEXT:

Overhead crane

An overhead bridge crane, provided with an electro hydraulic orange peel motor grab, will also be taking waste from the sorting platform to the bag shredder, the drum screen or directly to the sorting conveyors. The characteristics of the crane and grab will be as follows:

SORTING PLANT: **OVERHEAD CRANE AND GRAB HOOK**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum number of units	Pieces	1
Minimum bridge span	M	8.00
Minimum load capacity	T	3
Type of grab	-	Orange peel
Grab minimum volumetric capacity	m3	2
Grab minimum load capacity	T	1.5
Maximum Power	kW	4

The filled in data sheet shall be annexed to the questionnaire in Volume I, SECTION 6: DATA SHEETS

SORTING PLANT: **OVERHEAD CRANE AND GRAB HOOK**	TENDERER/CONTRACTOR	
DESIGN DATA	UNIT	DATA
Make/type/model	-	.....
Bridge span	M	.....
Total bridge and grab weight		
Load capacity	T	.....
Grab maximum vertical travel	M	.....
Grab volumetric capacity	m^3	.....
Grab load capacity	Litre	.....
Open grab height	T	.....
Closed grab height	M	.....
Open grab width	M	.....
Closed grab width	M	.....
Maximum Power	kW	

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2.3.6 Materials Separation and Recovery Facility (MRF)
Bag Shredder

THE FORMER TEXT:

SORTING PLANT: **BAG SHREDDER**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity	t/h	20
Maximum Power	kW	12

SHALL READ AS NEW TEXT:

SORTING PLANT: **BAG SHREDDER**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity	t/h	20
Maximum Power	kW	*25*

2.3.6 Materials Separation and Recovery Facility (MRF)
Separated waste bale press

THE FORMER TEXT:

The bale press serves to compact the sorted out plastic materials, paper or cardboard. The minimum throughput capacity of this press shall be at minimum 5 t/h.

SORTING PLANT: **SEPARATED WASTE BALE PRESS**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Throughput	t/h	min. 5
Pressure	Bar	min. 250
Fastening to floor	--	Anchorage
Channel around the press	--	Not necessary
Maximum Power	kW	25

SHALL READ AS NEW TEXT:

The bale press serves to compact the sorted out plastic materials, paper or cardboard. The minimum throughput capacity of this press shall be *at minimum 10 t/h.*

SORTING PLANT: **SEPARATED WASTE BALE PRESS**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Throughput	t/h	*min. 10*
Pressure	Bar	min. 250
Fastening to floor	--	Anchorage
Channel around the press	--	Not necessary
Max. bale size (wxdxh)	*mm x mm x mm*	*1200-2400x1000x1000, width adjustable*
Bale weight	*kg*	*max. 1000*
Maximum Power	kW	*45*

2.3.6 Materials Separation and Recovery Facility (MRF)
Not separated waste press

THE FORMER TEXT:

Not separated waste press

This press is used to compact the useless material that remains after sorting, before they are transported to the landfill.

SORTING PLANT: **NON SEPARATED WASTE BALE PRESS**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Throughput	t/h	min. 5
Pressure	Bar	min. 250
Fastening to floor	--	Anchorage
Channel around the press	--	Necessary
Maximum Power	kW	25

SHALL READ AS NEW TEXT:

Not separated waste bale press

This press is used to compact the useless material that remains after sorting, before they are transported to the landfill.

SORTING PLANT: **NON SEPARATED WASTE BALE PRESS**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Throughput	t/h	*min. 10*
Pressure	Bar	min. 250
Fastening to floor	--	Anchorage
Channel around the press	--	Necessary
Max. bale size (wxdxh)	*mm x mm x mm*	*1200-2400x1000x1000, width adjustable*
Bale weight	*kg*	*max. 1000*
Maximum Power	kW	*45*

2.3.6 Materials Separation and Recovery Facility (MRF)
Magnetic separators for ferrous metals

THE FORMER TEXT:

A larger unit will be required for the sorting line

SORTING PLANT: **MAGNETIC SEPARATOR AFTER SORTING**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity of feed	t/h	18

3

SHALL READ AS NEW TEXT:

A larger unit will be required for the sorting line

SORTING PLANT: **MAGNETIC SEPARATOR AFTER SORTING**	MINIMUM REQUIREMENTS	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity of feed	t/h	*14*

2.3.6 Materials Separation and Recovery Facility (MRF)
Eddy current separators

THE FORMER TEXT:

A larger unit will be required for the sorting line

SORTING PLANT: **EDDY CURRENT SEPARATOR AFTER SORTING**	MINIMUM REQUIREMENTS	
Type	Concentric	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity of feed	t/h	18

SHALL READ AS NEW TEXT:

A larger unit will be required for the sorting line

SORTING PLANT: **EDDY CURRENT SEPARATOR AFTER SORTING**	MINIMUM REQUIREMENTS	
Type	Concentric	
PERFORMANCE AND DESIGN CRITERIA	UNIT	DATA
Minimum capacity of feed	t/h	*14*

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description

THE FORMER TEXT:

- delivery of materials (waste) during the day time;
- material is transported in the reception area by means of front end loaders;
- composting process in two stages: composting followed by maturing;
- The first stage of the composting process will take place under a roofed area, while the maturing area is in the open air;
- use of static pile system;
- use a compost turning machine to regularly turn the organic material
- concrete or asphalt hard surface is provided with a drainage system;

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- mechanical processing at reception (shredding, after composting and sieving after maturing);
- moistening with water (recirculation system).
- Maximum consumption of the electrical energy is limited to 6 kWh/m^3 of the raw materials.

SHALL READ AS NEW TEXT:

- delivery of materials (waste) during the day time;
- material is transported in the reception area by means of front end loaders;
- composting process in two stages: composting followed by maturing;
- *Both stages, composting and maturing processes will take place in the open air;*
- *use of static pile system during compost stage;*
- *use a compost turning machine to regularly turn the organic material during maturation*
- *concrete or asphalt hard surface is provided with a drainage system and retaining walls;*
- mechanical processing at reception (shredding, after composting and sieving after maturing);
- moistening with water (recirculation system).
- Maximum consumption of the electrical energy is limited to 6 kWh/m^3 of the raw materials.

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Composting
Set up composting fields

THE FORMER TEXT:

Composting includes pulverizing /grinding of material in order to bring it in contact with air and water as much as possible: after grinding, the particle size in a pile is 5 to 6 mm. At the composting field the material is mixed with a quantity of oversized material to guarantee a porous mixture. During the grinding process, different components are mixed in order for the composting mass to be mixed well enough.

SHALL READ AS NEW TEXT:

Composting includes pulverizing /grinding of material in order to bring it in contact with air and water as much as possible: after grinding, the particle size in a pile is *40 to 60 mm.* At the composting field the material is mixed with a quantity of oversized material to guarantee a porous mixture. During the grinding process, different components are mixed in order for the composting mass to be mixed well enough.

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Composting
C/N ratio

THE FORMER TEXT:

The decomposing processes start in the pile which consequently increases in temperature. Piles are stacked by loader and they need to be moistened in order to maintain an optimal humidity level of 50 to 65%. The highest water demand is in the first and the third phase when the processes are most intense. They can be covered with foil in order to maintain the temperature.

After formation of the composting piles and the start of decomposition, microorganisms quickly use all the oxygen, especially because the pile is compacted under its own weight which makes it difficult for new amount of air to reach inside the pile. Therefore the piles are regularly turned with a windrow-turning machine and air from below is blown into the piles. The most favourable oxygen amount is between 10 and 15%. The time and number of turnings are most often defined by temperature monitoring, but they also depend on the size of the pile, material composition and type of turner. The piles are at first turned over every three to five days, and every 15 days in the curing period.

Leachate collected from the composting piles will be collected, stored and reused for recirculation of the compost moisture because of high nutrient content and necessary microorganisms. Excess leachate can be discharged into the sewage network for further treatment.

The composting plant is situated in a large industrial building to protect rain infiltration and lower the required water treatment system capacity. The height of the covering construction is estimated at 6 m.

SHALL READ AS NEW TEXT:

The decomposing processes start in the pile which consequently increases in temperature. Piles are stacked by loader and they need to be moistened in order to maintain an optimal humidity level of 50 to 65%. The highest water demand is in the first and the third phase when the processes are most intense. *They can be covered with foil in order to maintain the temperature and humidity, and probes are placed inside the piles to monitor the oxygen level and temperature. Based on the data received from probes the process is automatically controlled with respect to the set/desired parameters.*

After formation of the composting piles and the start of decomposition, microorganisms quickly use all the oxygen, especially because the pile is compacted under its own weight which makes it difficult for new amount of air to reach inside the pile. *For this reason the mass should be fed with fresh air.* The most favourable oxygen amount is between 10 and 15%. *The air is blown through the bottom of the pile by perforated pipes and fans.*

Leachate collected from the composting piles will be collected, stored and reused for recirculation of the compost moisture because of high nutrient content and necessary microorganisms. Excess leachate can be discharged into the sewage network for further treatment.

The process lasts for about 2 months, a period during which around 6.000 m^3 of waste can be processed. Tunnels are emptied and static piles for maturing are set up in the same manner as the piles for composting in open area.

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Maturing step

THE FORMER TEXT:

Post processing stage – shredding and screening

Post processing is normally performed to refine the compost product to meet end-use specifications or market requirements. Sorting and removal operations can be conducted to remove any remaining large or inorganic particles that could lower the quality of the compost, or be aesthetically displeasing. The same equipment can be used in both pre-processing and post-processing. After curing, the compost is

transferred to a hammer mill for further size reduction. An additional stationary rotary drum screening device (mesh of 5 mm), placed in composting facility, or mobile drum screens/air separator/wind shifter, is then used to separate non-degraded materials from this compost. This equipment allows effective cleaning and removing of impurities and over-sized screened particles, the screen size has to be 50-80 mm. The undersize material is the readily-usable product and is transferred to the storage area. Oversized particles undergo additional shredding and screening. Material which is inorganic or cannot be shredded is disposed of at the landfill cell. Compost is transported with a shovel/wheel loader within compost storage area.

The composted material is further sieved (<40 mm) and at the end of the rotary drum the oversized material is discharged. A hand picker may be positioned to remove small contaminants or components that are not suitable for composting. The remaining oversized waste is brought by truck to the composting area to be used there as covering material when setting up the extended static piles.

The static piles for maturing are set up in the same manner as the composting area. They are also provided with forced aeration. The static pile is not covered with the oversized material as this material has already reached a sufficient stage of stabilisation.

During the setting up of the maturing fields the material is moistened. The undersized material of the composted fraction usually has a dry substance of approximately 65% and this should be brought back for the maturing step up to approximately 50%. Using irrigation pumps, water is transported by means of a hose from the water basin to the maturing field.

The maturing stage will take some 1.5 months resulting in a total windrow of approximately 600 m. It is anticipated to make 4 to 8 windrow lines.

The material is aerated during approximately 42 days. As with the composting process the organic waste is decreasing (-40 vol%) therefore less surface is required during this phase than in the composting process. It is estimated that only 4800 m^2 are required.

This part of the process takes place in open air. Therefore no covering is required.

At the end of the curing process, when about 50% of the volatile organic matter will have decomposed and the moisture content of the compost will be around 30%, the volume of the compost will be around 25 m^3 with a bulk density of around 1,100 Kg/m^3, or 27.5 tons of compost daily. A non-cured product will have a moisture content of about 40% and will be about 30 tons/day. During the curing process the loss in organic matter is minimal.

After 3 months the compost dries i.e. matures. Cured compost is subject to analysis during which chemical composition, moisture, pH value, pathogens content, etc., are determined.

SHALL READ AS NEW TEXT:

Processing stage

The static piles for maturing are set up in open area in the same manner as the piles for composting, as elongated piles shaped like a prism around 3.5 m high with max. Width of 2.0 m at the top. The width of pile base depends on the machinery for turning waste and it is usually around 7.0 m. The static piles are not covered as this material has already reached a sufficient stage of stabilisation. They are turning from time to time by windrow turner. During rainy days the piles can be covered with light nylon because of protection reason.

During the setting up of the maturing fields the material is moistened. The undersized material of the composted fraction usually has a dry substance of approximately 65% and this should be brought back for the maturing step up to approximately 50%. *Using irrigation pumps, water is transported by means of a hose from the basin, with waste water from the composting plant, to the maturing field.*

The maturing stage will take some 1.5 months resulting *in a total windrow length of* approximately 600 m. It is anticipated to make 4 to 8 windrow lines.

The material is aerated during approximately 42 days. As with the composting process the organic waste is decreasing (-40 vol%) therefore less surface is required during this phase than in the composting process. It is estimated that only 4800 m^2 are required.

At the end of the curing process, when about 50% of the volatile organic matter will have decomposed and the moisture content of the compost will be around 30%, the volume of the *compost will be around 25 m^3 (produced from 65 m3 of raw materials) with a bulk density of around 1,100 Kg/m^3*, or 27.5 tons of compost daily. A non-cured product will have a moisture content of about 40% and will be about 30 tons/day. During the curing process the loss in organic matter is minimal.

After 3 months the compost dries i.e. matures. Cured compost is subject to analysis during which chemical composition, moisture, pH value, pathogens content, etc., are determined.

Post processing stage- Grinding and screening the matured material

Post processing (grinding and screening) is normally performed to refine the compost product to meet end-use specifications or market requirements. Sorting and removal operations can be conducted to remove any remaining large or inorganic particles that could lower the quality of the compost, or be aesthetically displeasing. The same equipment can be used in both pre-processing and post-processing. After curing, the compost is transferred to a shredder for further size reduction. An additional stationary rotary drum screening device (mesh of 60 mm), placed in composting facility, or mobile drum screens/air separator/wind shifter, is then used to separate non-degraded materials from this compost. This equipment allows effective cleaning and removing of impurities and over-sized screened particles, the screen size has to be 60 mm. The undersize material is the readily-usable product and is transferred to the storage area. Oversized particles undergo additional shredding and screening. Material which is inorganic or cannot be shredded is disposed of at the landfill cell. Compost is transported with a shovel/wheel loader within compost storage area.

The composted material is further sieved (<40 mm) and at the end of the rotary drum the oversized material is discharged. A front end loader may be positioned to remove small contaminants or components that are not suitable for composting. The remaining oversized waste is brought by truck to the composting area to be used there as covering material when setting up the extended static piles.

The mobile rotary drum screening device (mesh of 40 and 60 mm), shall be positioned at the end of the maturing area. The material of 40-60mm is the finished compost product and is transported to the compost storage area. Grinding and sieving of compost is needed after post composting phase for the high grade compost (dedicated for selling on the market) obtaining by removal of the (potential) inorganic impurities like small stones and glass particles. Impurities higher than max. 60 mm and less than 40 mm should be removed. The rejected material should be disposed at the landfill. Grinding and sieving of the compost is no needed for low level compost which will be used as cover material for waste.

Afterwards, the finished product is stored in bulk waiting for transportation. The compost can be used on agricultural fields or as a material for landfill closure. Compost can be sold in bulk, although the variant with packed compost is more cost-effective. If compost is packed then the packaging machine should be acquired and it can be located below the roof structure which is already used for storage of equipment and machinery.

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Maturing step

THE FORMER TEXT:

Excavating and screening the matured material

The excavated material is brought into the mobile rotary drum screening device (mesh of 8 mm), positioned at the end of the maturing area. The undersized material is the finished product and is transported to the compost storage area.

The finished product undergoes a final processing step which may be a ballistic separation or a grinding step to remove small stones and glass particles. Afterwards it is stored in bulk waiting for transportation. The compost can be used on agricultural fields or as a material for landfill closure.

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2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Miscellaneous
Infrastructure

THE FORMER TEXT:

The facility will be provided with a hardened concrete base. A gutter will be constructed to intercept and drain off the possible leachate water.

SHALL READ AS NEW TEXT:

The area will be provided with a hardened concrete base, *with installed drainage channels for collection of leachate. The leachate is collected in watertight pool and it will be used for wetting of compost.*

2.3.7 Organic matter composting and curing facilities
2.3.7.2 Process description
Miscellaneous
Mass balance

THE FORMER TEXT:

The input of the process is 20,000 ton/year. The incoming organic waste from the waste separation collection is estimated at 100%. It is expected that the final yield of compost is approximately 45% of the total organic waste input and that the compost has a 70 % dry fraction of which approximately 30% is organic.

SHALL READ AS NEW TEXT:

The input of the process is *minimum* 20,000 ton/year. The incoming organic waste from the waste separation collection is estimated at 100%. It is expected that the final yield of compost is approximately 45% of the total organic waste input and that the compost has a 70 % dry fraction of which approximately 30% is organic.

All other terms and conditions of the Works tender Dossier remain unchanged.

The above amendments are integral part of the Works tender dossier.