



ESK – KOALA OPERATIONS and MAINTENANCE MANUAL

PROJECT NAME: _____

INSTALLATION DATE: _____



ESK – KOALA OPERATIONS and MAINTENANCE

1.0 ESK – KOALA DESCRIPTION

- 1.1 The ESK – Koala is a high efficient oil/water separator manufactured with High Density Polyethylene (HDPE), stainless steel, and open-cell polyurethane.
- 1.2 The ESK – Koala should be installed in containment to be effective and is normally installed in a precast concrete structure, either a manhole or a vault. However, it can be installed in structures fabricated from other materials (e.g. metal, plastic, etc.). The installation portion of this procedure is for precast concrete structures. Please contact Environment 21, LLC for installation recommendations for other materials.
- 1.3 The ESK – Koala is manufactured in different sizes (models) to achieve treatment over a wide range of flows.
- 1.4 The ESK – Koala is lightweight and usually shipped to the precaster or the end user. The precaster casts the containment structure, installs the ESK – Koala into the containment structure, and delivers the assembly to the job site. The ESK – Koala may be installed at the project site by the contractor.
- 1.5 Operation
 - 1.5.1 A stream comprised of water and oil enter (after pre-treatment for grit, if required) the structure containing the ESK – Koala.
 - 1.5.2 The large drops of oil (approximately greater than 150 microns in diameter), in the stream, separate and float to the top of the water in the ESK – Koala containment structure (Stokes Law).
 - 1.5.3 The small drops of oil (less than 150 microns in diameter) are carried by the stream through the open-cell polyurethane. This action forces the drops of oil to combine with each other and



- float to the top of the water in the ESK – Koala containment structure.
- 1.5.4 The amount of oil in the stream, that exits after treatment by the ESK – Koala, is ≤ 5 PPM for oil drops ≥ 20 microns in diameter.
 - 1.5.5 The ESK – Koala comes standard with a catastrophic – spill valve. This valve is unique in that it will float in water but not in oil. When the oil storage capacity of the treatment system is reached (either over time during normal usage or from a catastrophic spill), the catastrophic – spill valve closes and stops the flow through the system.
 - 1.5.6 When the catastrophic – spill valve closes, the stream will surcharge (backup) upstream and require remedial action in a timely fashion.
 - 1.5.7 Environment 21, LLC offers an optional alarm system to warn of a catastrophic spill or when the oil storage is nearing full capacity.
- 1.6 The normal water depth in the ESK – Koala System structure during no – flow conditions is generally just below the elevation of the outlet pipe invert.
 - 1.7 Cast iron access frames with vented covers, or hatches are provided in the ESK – Koala System roof to make the system readily accessible for inspections and maintenance.
 - 1.8 Standing water tends to be an attraction for mosquitoes to use as a breeding ground, therefore Environment 21, LLC recommends using solid covers with gaskets or bio-safe mosquito tablets or a combination of both in the ESK – Koala system.

2.0 SAFETY

- 2.1 Safety is a priority and the following steps are recommended guidelines while performing installation or maintenance on ESK – Koala Systems. These guidelines are not all-inclusive and by no means are meant to usurp any safety program already in place for the individuals performing the installation or maintenance on ESK – Koala Systems.



- 2.1.1 All excavation and lifting and rigging operations should be done while adhering to applicable safety regulations.
- 2.1.2 All lifting and rigging equipment should be approved, tested, and correct for the application (e.g., proper load rating).
- 2.1.1 The ESK - Koala System is a confined space structure and entry into it is required for installation and maintenance.
- 2.1.2 Most of the ESK – Koala Systems have either hatches or cast iron frames with covers which provide access to the ESK – Koala. The openings are normally at ground level so the work area should be staged properly with safeguards to prevent anyone or anything from inadvertently falling through an opening in the ESK – Koala System structure. The access openings provided are usually sized at 24" or 30", dependent on the diameter of the structure, and conform to ASTM C478 specifications.
- 2.1.3 After maintenance has been completed on the ESK – Koala System, the area should be cleared of slip and trip hazards and the cast iron covers set securely in place.

3.0 ASSEMBLY and INSTALLATION INSTRUCTIONS of the ESK – KOALA into the STRUCTURE

- 3.1 The ESK – Koala comes as a pre-assembled coalescing unit and an inlet pipe and should be pre-installed into a structure prior to final installation. However, it may be installed after final installation of the structure at the project site. The pre-installation of the ESK – Koala into a structure is essentially the same for both round (manhole) or vault precast concrete structures.
- 3.2 The openings for the inlet and outlet pipes must already be in the structure prior to installation of the ESK – Koala. If not, have the openings cored per the requirements of the site civil engineer (e.g., correct elevation, etc.) before continuing.
- 3.3 Remove the outer filter component from the pre-assembled coalescing unit. This is the blue foam cylinder and the stainless steel framework around which it wraps. The outer filter component is not mechanically attached and may be lifted, by the stainless steel framework bale, up off of the pre-assembled coalescing unit. Set the



outer filter component aside for later installation. Please note: the blue foam cylinder and the stainless steel frame must remain assembled.

- 3.4 The outer filter component, when assembled to the pre-assembled coalescing unit, rests in place on a High Density Polyethylene (HDPE) flange. This flange is welded to the outlet pipe. There is a stainless steel framework (different from the outer filter component framework) bolted to the flange. This framework is comprised of four stainless rods bolted to the flange at one end and joined at the other end with a stainless steel ring. This is the framework for the catastrophic – spill valve. Inside the catastrophic – spill valve framework, resting on the flange is the catastrophic – spill valve. This is a stainless steel assembly that has a large bulb (float) attached to a plate (valve). This plate has gasket material on the side that contacts the flange. Take a measurement from the top of the catastrophic – spill valve bale to the ring on the catastrophic – spill valve framework. Record this measurement here for future use _____. Remove the catastrophic – spill valve. Please note: this valve may be tied to the shut-off valve framework with rope or bungee cords. Cut the rope/bungee cords to remove the catastrophic – spill valve. Set the catastrophic – spill valve aside for replacement in Step 4.1.7 and dispose of the rope/bungee cord.
- 3.5 Lower the remaining portion (flange, catastrophic – spill valve framework, outlet piping) of the pre-assembled coalescing unit into the structure. Place the outlet pipe into the outlet opening of the structure. There is an HDPE tab at the top of the outlet structure and a narrow HDPE bar midway up the outlet pipe. Both are welded to the outlet pipe. Make sure the tab and bar are horizontally level and tight to the structure wall. Mark the locations on the structure wall for the tab and bar bolt holes. There is one pre-drilled hole in the tab and two pre-drilled holes in the bar.
- 3.6 Remove the pre-assembled coalescing unit and drill holes into the structure wall at the three marks made in the previous step.
- 3.7 Reposition the pre-assembled coalescing unit in place tight to the wall and lined up with the holes drilled in the last step. Attach the pre-assembled coalescing unit to the structure wall using bolts and wall anchors. Verify with the site civil engineer whether the outlet pipe will be fitted with a boot or grouted in place and proceed accordingly.



- 3.8 Lower the inlet pipe (HDPE elbow with welded tab) into the structure. Place the inlet pipe into the inlet opening of the structure. There is an HDPE tab welded to the inlet pipe. Make sure the tab is up, horizontally level and tight to the structure wall. The vertical part of the pipe is canted a little to one side when the tab is correctly located. Mark the location on the structure wall for the tab bolt hole. There is one pre-drilled hole in the tab.
- 3.9 Remove the inlet pipe and drill a hole into the structure wall at the mark made in the previous step.
- 3.10 Reposition the inlet pipe in place tight to the wall and lined up with the hole drilled in the last step. Attach the inlet pipe to the structure wall using a bolt and wall anchor. Verify with the site civil engineer whether the inlet pipe will be fitted with a boot or grouted in place and proceed accordingly.
- 3.11 Replace the outer filter component removed in Step 2. Make sure it is properly seated in the HDPE flange that is welded to the outlet pipe.
- 3.12 Install the top of the structure.

4.0 SITE INSTALLATION OF THE ESK – KOALA STRUCTURE

4.1 Site Preparation

- 4.1.1 Excavate the site at the proper location and size as determined by the site civil engineer.
- 4.1.2 Prepare the bottom of the excavation for the installation of the structure with a minimum of 6" of approved bedding material compacted to 90% Proctor. The bedding should be 6" beyond the base area of the structure. To prevent shearing of the inlet and outlet pipes, the area under these pipes should be prepared the same way.
- 4.1.3 Set the structure into the excavation at the proper location. Verify the alignment with the site conditions and plans.



- 4.1.4 If the ESK – Koala was not installed prior to setting the structure, refer to Section 3.0 for installation instructions of the ESK – Koala into the structure. Otherwise continue to Step 4.1.5.
- 4.1.5 Connect the structure stub-out pipes to the site pipes as determined by the site civil engineer. Backfill the excavation up to the bottom of the inlet/outlet pipes.
- 4.1.6 Fill the structure with water until the water starts to flow through both the inlet and outlet piping. Shut off the water flow to the structure. Please note: if the inlet and outlet are not the same approximate elevation (within an inch), fill the structure with water only until water is flowing from the lowest pipe. **NOTE: THIS STEP MUST BE COMPLETED PRIOR TO INSTALLING THE CATASTROPHIC – SPILL VALVE. FAILURE TO DO SO COULD CAUSE A NO FLOW CONDITION OR THE CATASTROPHIC – SPILL VALVE TO WORK IMPROPERLY.**
- 4.1.7 Carefully lower the catastrophic – spill valve, removed in Step 3.4, into place in the shut-off valve framework. Verify that the catastrophic – spill valve is floating atop the water and will move unrestricted in the catastrophic – spill valve framework. If the catastrophic – spill valve does not float, remove it and inspect it for any damage or for anything that may be changing the weight (e.g., excess dirt, etc.). If the catastrophic – spill valve appears to be undamaged and free excess weight, try installing it again. If it still does not float, contact Environment 21, LLC.
- 4.1.8 Close and bury the structure per the site civil engineer and place the ESK – Koala into operation. Be extremely careful when backfilling in order to avoid damaging the piping connections to the unit and to avoid uneven pressure on the structure walls.

5.0 MAINTENANCE of the ESK – KOALA

- 5.1 The recommended maintenance practice for the general operation of the ESK – Koala System is to plan on monthly inspections and an annual pump-out for the ESK – Koala, and quarterly inspections and an annual pump-out of the grit chamber.



- 5.2 If the ESK – Koala system has a grit chamber inline before it and is due for a quarterly inspection, refer to step 5.3, if not, please proceed to step 5.5.
- 5.3 If the grit chamber is an Environment 21 product (i.e., V2B1 D1 chamber or vault designed by Environment 21) continue to step 5.4, if not, please contact the grit chamber manufacturer for their grit chamber maintenance procedure.
- 5.4 Grit Chamber Inspection
 - 5.4.1 Maintain an inventory all tools and equipment used for completion of this procedure.
 - 5.4.2 Obtain a flood light and a measuring rod (increments in inches marked on the rod). The measuring rod must be of a length that will reach the floor of the grit chamber structure and still extend a minimum of 2' above the cast iron access frame. The rod should not bend.
 - 5.4.3 Set up the work area using proper safety procedures, equipment (e.g., barricades), and PPE as required.
 - 5.4.4 Carefully remove the access covers using proper lifting and rigging equipment. If the covers are not attached to the framework (i.e., a hatch), set them off to the side, in a safe area and configuration (e.g., not suspended).
 - 5.4.5 Illuminate the water surface of the grit chamber with the flood light.
 - 5.4.6 Gently stir the floatables to estimate the depth. Obtain a sample of the floatables, water, or sediment, if required, for waste disposal. The depth of the oil sheen and floating debris is typically less than one inch and can be skimmed from the surface prior to the pump-out of the sediment. Organic debris that has become waterlogged settles to the floor and is expected to be present in relatively small quantities removed during the pump out of the sediment.
 - 5.4.7 Inspect all visible surfaces of the grit chamber structure for wear (e.g., cracking, spalling, etc.). Report signs of degradation to the proper authorities (i.e., owner, municipality, etc.).



- 5.4.8 Lower the measuring rod into the grit chamber until a slight resistance to movement occurs; the rod is now at the top of the sediment pile. Obtain a sight measurement by sighting the rod measuring increments to a point on the cover frame.
 - 5.4.9 Twist the measuring rod into the sediment pile until the measuring rod is on the floor (verify the expected floor level using project submittal drawings). Obtain a sight measurement by sighting the rod increments to the same point on the access frame as was used in step 5.4.8. Subtract the smaller number from the larger number as obtained in this step and step 5.4.8. For example, if the measurement in step 5.4.8 is 7' 0" and the measurement in step 5.4.9 is 7' 3" subtract the 7' 0" from the 7' 3". The resultant 3" is the depth of the sediment in the grit chamber. Record the findings on the attached "ESK – KOALA SYSTEM MAINTENANCE DATA SHEET".
 - 5.4.10 If pump-out of the grit chamber is required and will occur immediately, go to Step 6.0 of this procedure; if not, go to Step 5.5 of this procedure.
- 5.5 ESK – Koala Inspection
 - 5.5.1 Maintain an inventory all tools and equipment used for completion of this procedure.
 - 5.5.2 Set up the work area using proper safety procedures, equipment (e.g., barricades), and PPE as required.
 - 5.5.3 Carefully remove the access covers using proper lifting and rigging equipment. If the covers are not attached to the framework (i.e., a hatch), set them off to the side, in a safe area and configuration (e.g., not suspended).
 - 5.5.4 Obtain a sample of the floatables or water, if required, for waste disposal.
 - 5.5.5 Inspect all surfaces, which can be seen, of the ESK – Koala chamber structure for wear (e.g., cracking, spalling, etc.). Report signs of degradation to the proper authorities (i.e., owner, municipality, etc.).



5.5.6 Oil Level Measurement

PLEASE NOTE: THE INCREASE IN OIL DEPTH IS DEPENDENT UPON THE OIL LOAD IN THE WASTE STREAM. SINCE EACH SITE IS DIFFERENT, MAINTENANCE HISTORY WILL NEED TO BE ESTABLISHED BEFORE FORECASTING OF THE PUMP-OUT INTERVALS OF THE ESK – KOALA IS POSSIBLE.

- 5.5.6.1 Take a measurement from the top of the shut-off valve bale to the ring on the shut-off valve framework. Compare this measurement to the measurement obtained in Step 3.4. If the two measurements are within 1.5" pump-out of the ESK – Koala should be completed. If the amount of turbidity prevents visual obtainment of this measurement, go to Step 5.5.6.2.
- 5.5.6.2 Obtain water detection paste and a rod of sufficient length to insert into the ESK – Koala chamber. The rod should touch the floor of the chamber with a minimum of two feet rod above the structure top. Cover 2/3 of the lower length of the rod with water detection paste and insert the rod into the ESK – Koala chamber. The rod should go between the ESK – Koala and the outer wall of the structure, taking care to avoid the ESK – Koala to prevent damage to it. Visually note the top of the liquid level on the stick and then remove the stick. Subtract the distance, on the rod, from the water level, as indicated with the water detection paste, from the top of the liquid level noted while the rod was submerged. This is the depth of the oil. Refer to the pump-out table below for the particular ESK – Koala model. Pump-out should be completed before the oil level is within 2" of the maximum oil depth as shown on the table. The table is for standard installations. For exceptions, or uncertain of installation, contact Environment 21, LLC for information on determining the oil depth and volume.



ESK – Koala Models	Maximum Oil Depth (in.)	Oil Volume (Gal.)
1.5 – 10	9	71
15 – 20	16.7	131
30 – 40	21.6	265
50 – 100	23.8	420
110 – 200	31	973*
225 – 300	43.1	2111**

*includes Model 100 for oil volume only

**includes Model 200 for oil volume only

- 5.5.7 If pump-out of the ESK – Koala chamber is required and will occur immediately, go to Section 6.0 of this procedure; if not, go to Step 5.5.8 of this procedure.
- 5.5.8 Using proper equipment and technique, carefully remove the outer filter component taking care not to roil the fluid in the ESK – Koala chamber.
- 5.5.9 Rinse the outer filter component with ambient-temperature (40°F to 80°F or 4.5°C to 27°C) water using a low pressure (i.e., <100 psi) hose. Do not clean the outer filter component with anything (e.g., brush, chemicals) other water. Properly dispose of contaminants rinsed from the outer filter component.
- 5.5.10 Inspect the outer filter component for wear. If tears, decay, pocking, or extensive plugging (>20% of the surface area of the outer layer of the filter) are evident on the outer filter component, it must be changed. Contact Environment 21, LLC for purchase of a new filter.
- 5.5.11 Using proper equipment and technique, carefully lower the outer filter component back into place. Make sure it is properly seated in the HDPE flange that is welded to the outlet pipe. If the filter needs replacing and a new filter is available, please refer to Step 5.6 of this procedure after receipt of the new filter; if not, go to Step 5.5.12 of this procedure.
- 5.5.12 Using proper equipment and technique, carefully lower the outer filter component back into place. Make sure it is properly seated in the HDPE flange that is welded to the outlet pipe. Go to Step 7.0 of this procedure.



5.6 Filter replacement

- 5.6.1 Set up the work area using proper safety procedures, equipment (e.g., barricades), and PPE as required.
- 5.6.2 Carefully remove the access covers to the ESK – Koala using proper lifting and rigging equipment. If the covers are not attached to the framework (i.e., a hatch), set them off to the side, in a safe area and configuration (e.g., not suspended).
- 5.6.3 Using proper equipment and technique, carefully remove the outer filter component taking care not to roil any fluid in the ESK – Koala chamber.
- 5.6.4 Carefully remove the two straps from the outer filter component and set them aside for reuse in Step 5.6.6.
- 5.6.5 Remove the old filter by slicing through one side lengthwise and removing it from the stainless steel framework. Inspect and clean the stainless steel framework.
- 5.6.6 Slide the new filter into place on the stainless steel framework. The filter must slide on evenly (square). Take care to avoid snagging or cutting the filter. The filter is in place when it is all the way to the “feet” welded at the bottom of the stainless steel framework. Replace the straps removed in Step 5.6.4.
- 5.6.7 Using proper equipment and technique, carefully lower the outer filter component back into place. Make sure it is properly seated in the HDPE flange that is welded to the outlet pipe. Go to Step 7.0.

6.0 PUMP-OUT OF THE ESK – KOALA SYSTEM

- 6.1 Contact the following for approval and notification of the intent to pump out the ESK – Koala System:
 - 6.1.1 Owner
 - 6.1.1.1 Obtain permission from the Owner to pump out the contents of the ESK – Koala System.



6.1.2 Waste Disposal Facility

6.1.2.1 Facilities used by the local Highway Department may be acceptable, while, for industrial sites, the pumper truck contents should be delivered to a disposal site approved by the owner of the industrial site and disposed of in accordance with local requirements for disposal of pollutants.

6.1.2.2 Obtain permission to deliver the waste to the facility.

6.1.3 Government Agencies

6.1.3.1 Obtain permission, as required, from local, State and Federal Agencies.

6.2 Obtain a standard truck-mounted sewer and catch basin cleaner with positive displacement rotary lobe vacuum pumps or other acceptable pump-out equipment.

6.3 If the area was secured after the inspection and Section 7.0 was performed complete steps 5.4.3 and 5.4.4 of this procedure.

6.4 Grit Chamber Pump-out

6.4.1 Using the truck-mounted sewer and catch basin cleaner, suction the floatables, and hydrocarbons from the grit chamber. Segregate this waste from the sediment and water as required by the local regulations and the waste facility.

6.4.2 Using the truck-mounted sewer and catch basin cleaner, suction the standing water, and sediment from the grit chamber. Segregate this waste from the hydrocarbons and floatables as required by the local regulations and the waste facility.

6.4.3 Using the water supply from the vacuum truck wash down the interior surface of the grit chamber and suction any waste and water from the bottom of the structure.

6.4.4 Using a flood light, inspect all surfaces, which can be seen, of the grit chamber structure for wear (e.g., cracking, spalling,



etc.). Report signs of degradation to the proper authorities (i.e., owner, municipality, etc.).

6.4.5 Refill the grit chamber, with clean water, to the inlet/outlet pipe invert elevation.

6.4.6 Properly dispose of the waste removed from grit chamber as pre-arranged

6.5 ESK – Koala Chamber Pump-out

6.5.1 Using the truck-mounted sewer and catch basin cleaner, suction the floatables, and hydrocarbons from the ESK - Koala chamber. Segregate this waste from the sediment and water as required by the local regulations and the waste facility.

6.5.2 Using the water supply from the vacuum truck wash down the interior surface of the ESK - Koala chamber and suction any waste and water from the bottom of the structure.

6.5.3 Using a flood light inspect all surfaces, which can be seen, of the ESK - Koala chamber structure for wear (e.g., cracking, spalling, etc.). Report signs of degradation to the proper authorities (i.e., owner, municipality, etc.).

6.5.4 Refill the ESK - Koala chamber, with clean water, to the inlet/outlet pipe invert elevation. Verify that the catastrophic – spill valve is in position and floating. If not, carefully retrieve the catastrophic – spill valve by the bale attached to the top of it. Clean the catastrophic – spill valve and replace it. If it still does not float, contact Environment 21, LLC.

6.5.5 Properly dispose of the waste removed from ESK – Koala chamber as pre-arranged

7.0 SECURING THE AREA

7.1 Verify that no personnel, tools or equipment are in the ESK – Koala System structure.

7.2 Inspect the cast iron access frames and covers for damage (e.g., cracks, excessive wear, etc.).



- 7.3 Clear the cast iron access frames of any extraneous material and carefully replace the cast iron covers using proper lifting and rigging equipment. Verify that the covers are properly seated.
- 7.4 Remove the site set-up (tools, equipment, etc.) and verify the work area has been returned to its pre-work condition.
- 7.5 Complete an inventory of all tools and equipment used for this work, accounting for lost, damaged, or stolen tools or equipment.

8.0 RECORD KEEPING

- 8.1 Maintenance is a very important aspect in keeping the ESK – Koala System performance up to par. The attached "ESK – KOALA SYSTEM MAINTENANCE DATA SHEET" is provided to document the maintenance performed on the ESK – Koala System.
- 8.2 Provide a copy of the "ESK – KOALA SYSTEM MAINTENANCE DATA SHEET" to the owner, required government agencies, and Environment 21, LLC (P.O. Box 55, East Pembroke, NY 14056-1055).



ESK - KOALA SYSTEM MAINTENANCE DATA SHEET

STRUCTURE NO.: _____

LOCATION: _____

OWNER: _____

ESK - KOALA MODEL _____

DATE INSTALLED: _____

MUNICIPALITY: _____

DATE	GRIT CHAMBER SEDIMENT DEPTH (if applicable)	GRIT CHAMBER PUMPOUT REQ. YES/NO (if applicable)	ESK - KOALA OIL DEPTH	ESK - KOALA PUMPOUT REQ. YES/NO	SAMPLED YES/NO	SAMPLE RESULTS ATTACHED TO DATA SHEET YES/NO

PUMPOUT DATA (IF APPLICABLE)

DATE	SEDIMENT VOLUME REMOVED	OIL VOLUME REMOVED	SEDIMENT/OIL DISPOSAL INFORMATION:	
			WHERE DISPOSED	HOW DISPOSED



environment²¹
Global Stormwater Solutions

P.O. Box 55 | East Pembroke | NY 14056
Phone: 1-800-809-2801 | Fax: 1-585-815-4701
www.env21.com | enveng@env21.com

ENV²¹
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PRIOR TO START OF WORK

- OWNER NOTIFIED AS REQUIRED.
- GOVERNMENT AGENCIES NOTIFIED AS REQUIRED.
- DISPOSAL SITE CONTACTED (IF PUMPOUT IS REQUIRED.)
- ALL REQUIRED PPE, TOOLS, AND EQUIPMENT ARE AVAILABLE AND IN GOOD WORKING ORDER.

AFTER WORK COMPLETION

- ALL CAST IRON COVERS HAVE BEEN PROPERLY REPLACED.
- NO HAZARDOUS CONDITIONS EXIST AS A RESULT OF THE MAINTENANCE WORK.
- ALL PPE, TOOLS, AND EQUIPMENT HAVE BEEN INVENTORIED AND REMOVED FROM THE SITE.
- THE WORK AREA HAS BEEN RETURNED TO A SAFE PRE-WORK CONDITION.
- ALL NOTIFICATIONS HAVE BEEN MADE, AS REQUIRED, THAT THE WORK IS COMPLETED.

DATE: _____

SIGNATURE: _____