

Small Full Capture Device Operation and Maintenance

Standard Operating Procedures



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1.0 PURPOSE AND APPLICABILITY

The purpose of this Standard Operating Procedure (SOP) is to detail all necessary steps for inspecting and cleaning Permittee-owned and operated storm drains installed with small full capture devices to ensure that they are operated at a level necessary to maintain their designation as a full-capture system as required by the State Water Resources Control Board (State Water Board).

2.0 ACRONYMS AND DEFINITIONS

2.1 ACRONYMS

CPS: Connector Pipe Screen

PPE: Personal Protective Equipment

SOP: Standard Operating Procedures

2.2 DEFINITIONS

Debris: Natural, not man-made, material, including vegetation and sediment. This does not include trash.

Full Capture System: A single device or series of devices that can trap all particles retained by a 5 mm mesh screen, and has a treatment capacity that exceeds the peak flow rate resulting from a one-year, one-hour storm in the sub-drainage area or designed to carry at least the same flow as the storm drain connected to the inlet.

Litter: As defined by California Government Code Section 68055.1 (g), litter means all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic, and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling, or manufacturing (State of California 2011).

Small Full Capture Device: A small device (e.g., connector pipe screen or basket) which meets the full capture standard designed to capture trash within a storm drain inlet.

Storm Drain Inlet: The portion of the stormwater conveyance system where runoff enters the underground conveyance system. It includes side inlets located adjacent to curbs and grate inlets located on the surface of a street or parking lot.

Stormwater: Runoff from roofs, roads and other surfaces that is generated during rainfall events and snow melt; and flows into a stormwater conveyance system.

Stormwater Conveyance System: Any pipe, ditch or gully, or system of pipes, ditches, or gullies, that is owned or operated by a government entity and used for collecting and conveying stormwater.

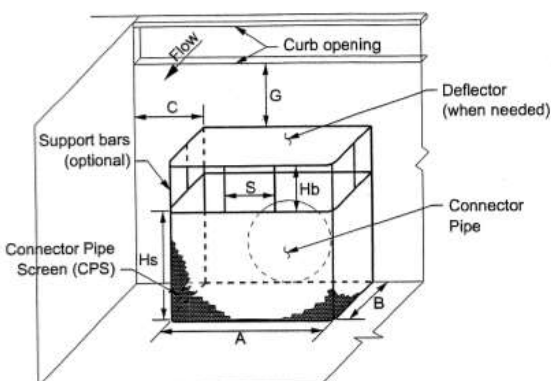
Trash: Man-made litter (as defined by California Government Code Section 68055.1 (g) that cannot pass through a 5 mm mesh screen. Litter does not include sediments, sand vegetation, oil and grease, and exotic species.

3.0 SMALL FULL CAPTURE DEVICE OPERATION

The majority of small full capture devices (small devices) are stainless-steel or plastic screens installed inside a storm drain inlet, in front of the entrance to a connector pipe (outlet), to prevent debris and trash from entering the pipe. Debris and trash is stored within the storm drain inlet until removed by municipal staff. An overflow is provided near the top of the small device to allow stormwater to bypass if the storm drain inlet is filled with debris and trash or if it is plugged or blinded.

A full-capture system is a single device or series of devices that can trap all particles retained by a 5 mm mesh screen, and has a treatment capacity that exceeds the peak flow rate resulting from a one-year, one-hour storm in the sub-drainage area or designed to carry at least the same flow as the storm drain inlet. Full capture systems certified by the State Water Resources Control Board are deemed full capture systems.

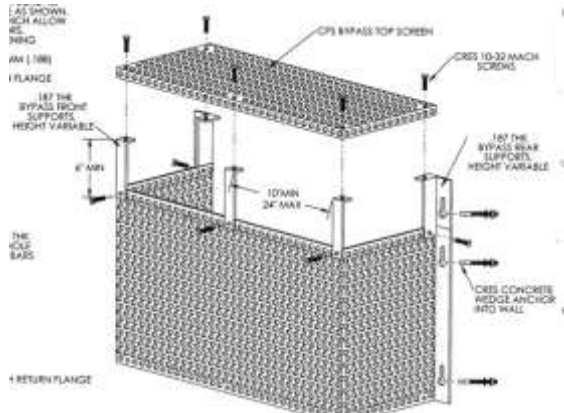
Small devices are manufactured by several different vendors, each with their own design. Examples are provided below.



Connector Pipe Screen (United Stormwater, Inc.)



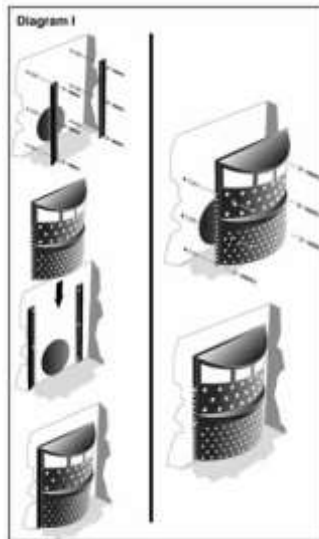
Stormtek ST3 CPS, removable (Advanced Solutions)



Connector Pipe Screen (West Coast Storm, Inc.) Storm, Inc.)



Connector Pipe Screen (West Coast Storm, Inc.)



Trash Guard (Bio Clean Environmental Services, Inc.)

4.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

At a minimum, one person who has prior experience inspecting or cleaning a small device should perform the inspection or cleaning. Supervision may be required for inexperienced field staff to clean the device.

5.0 EQUIPMENT AND SUPPLIES

When removing debris and trash from storm drains installed with small devices, the following equipment and supplies may be required:

- Arrow boards or channelizing devices (e.g., drums, cones, tabular markers, vertical panels, etc.) to visually alert pedestrian and vehicular traffic;
- Personal Protection Equipment (PPE) including high visibility safety apparel;
- Grate tool to remove storm drain grate or storm drain cover. A sledge hammer may be needed to loosen grates which have fine debris sealing the grate and metal channel holding it in place. A hydraulic lift may be needed to lift grates that are jammed.
- Digging tools (e.g., clam shell or flathead shovel, broad head scoop shovel);
- Stiff wire brush, scraping tool and/or broom to clean materials off or out of the small full capture device, storm drain grate, storm drain cover and/or street gutters;
- Pressure washer;
- Empty vacuum truck or portable vacuum system with holding tank free of liquid and solids;
- Super-heavy duty plastic garbage bag(s), five-gallon buckets or other containers used to store and transport debris and trash (only used when manually cleaning devices); and
- Inspection forms.

6.0 PROCEDURES

6.1 INSPECTION

To ensure that small devices are maintaining the full-capture designation, it is necessary to perform routine inspections and cleaning. Small devices should be inspected, at a minimum, according to the frequency provided in your municipality's Operation and Maintenance (O&M) Verification Program.

It is important to document inspection results for each installed small device because it is required by MRP Provision C.10.b.i.b. Additionally, information collected during inspection may lead to changing inspection and cleaning frequencies. Several independent variables (e.g., rainfall frequency, storm events with runoff, trash generation rates, and presence of deciduous street trees) influence the accumulation of debris and trash within storm drains with small devices. Inspection frequencies may change as variables change over time.

The MRP requires that all trash full capture devices be inspected and maintained at least once per year. Devices in high or very high trash generation areas devices must be inspected twice a year with inspections spaced at least

three months or more apart. The inspection frequency can be reduced to once per year if found excessive after two inspections. Maintenance frequencies must be increased if the device is determined to have a plugged or blinded screen or if the device screen is greater than 50 percent full of debris and/or trash (i.e., 50 percent of the screen's capacity below the overflow is covered with debris and/or trash) during a maintenance event. The maintenance frequency must be increased so that the device is neither plugged nor more than half full of debris and/or trash at the next maintenance event. Due to the requirements for changing frequencies, it is important to document the current inspection frequency for each small device.

Cleaning should be conducted when the following conditions have been observed within storm drains with small devices:

- Storm drain floods during storm events; **OR**
- Small device screen is plugged or blinded with leaves, plastic bags or other debris which likely causes overflow or bypass
- Small device screen is greater than 50 percent "full" of debris and/or trash (i.e., 50 percent of the screen's capacity below the overflow is covered with debris and/or trash); **OR**
- Flows have been determined (observed or evidence) to bypass small device.

If the small device is observed to be damaged, vandalized or not working properly during inspection, follow-up maintenance should be scheduled before the next rain event when possible.

Examples of these conditions are below:





The procedures described below should be conducted when inspecting storm drains with small devices.

- 1) When flooding is observed or reported, the storm drain and small device should be cleaned. In low lying areas, flooding may occur due to high tides. This occurrence is not related to the performance of the device.
- 2) Wear appropriate PPE and if storm drain inlets are within an active street, road or parking lot where vehicle traffic is present set up work zone and traffic control devices in accordance with the *Manual on Uniform Traffic Control Devices* as needed.
- 3) If necessary, remove the storm drain grate or storm drain cover to conduct the inspection. Use proper lifting techniques and appropriate equipment (e.g., grate tool). A sledge hammer may be needed to loosen grates which have fine debris sealing the grate and metal channel holding it in place. A hydraulic lift may be needed to lift grates that are jammed. Once grate or

cover has been removed, place it out of the way in a safe area. Some storm drain inlets may not require the grate be removed to conduct the inspection.

- 4) Conduct the inspection. Determine if the small device screen is plugged or blinded. If “yes”, the device will need to be cleaned. Estimate if the small device screen is greater than 50 percent “full” of debris and/or trash (i.e., 50 percent of the screen’s capacity below the overflow is covered with debris and/or trash). If “yes”, the device will need to be cleaned. Tools can be used to make a visual estimate. A line may be spray painted on the storm drain inlet wall or device screen at the height that represents 50 percent capacity. If the line is visible, the device is less than 50 percent full and does not need cleaned. If the line is not visible, the device is greater than 50 percent full. A graded wooden or metal pole or measuring tape can be used to determine the 50 percent full level (i.e., the distance half way between the bottom of the device and the bottom of the overflow).
- 5) Document the inspection using the field log. Indicate on the field log if the small device needs cleaning or maintenance. If the small device is no longer present in the storm drain, document that it is missing. The field log is provided in Appendix A. Documentation requirements are detailed in Section 6.3.
- 6) Replace the storm drain grate or storm drain cover securely in place.
- 7) Remove any traffic control equipment that may have been setup.
- 8) Submit field logs to appropriate staff when inspections are completed.

6.2 CLEANING AND MAINTENANCE

Cleaning and maintenance is best conducted during dry weather when no flows are entering the storm drain inlet. Routine cleaning should occur at the frequency provided in your municipality’s O&M Verification Program, regardless of inspection results. If inspection indicates that additional cleaning is needed based on the criteria described above, municipalities should conduct cleanings to maintain the full capture designation.

The use of a vacuum truck or portable vacuum system is the most effective method of removing debris and trash from storm drains with small devices. However, digging tools (e.g., clam shell or flathead shovel, broad head scoop shovel) may also be used.

The procedures described below should be conducted when cleaning storm drains with small devices.

6.2.1 Work Zone Set Up

The procedures described below should be conducted prior to removing debris and trash from storm drains with small devices. A flow chart showing this process is provided as Figure B-1 in Appendix B.

- 1) To prevent injury and possible death, individuals conducting storm drain cleaning must institute safety measures at all times prior to starting the cleaning process. Upon arrival on site, put on appropriate PPE, position your vehicle in a safe working area and set up your work zone and traffic control devices in accordance with the *Manual on Uniform Traffic Control Devices* and agency standards.



- 2) Prior to opening the storm drain grate or storm drain cover, clean the grate and retractable screen if present. Manually remove (i.e., sweep away) all material (i.e., debris and trash) that is present on top of the storm drain grate or storm drain cover. If a retractable screen is installed, clear all material from the retractable screen. Keep material on street and collect during the storm drain cleaning process. **Note:** If a vacuum is used, it is recommended that all material be left in place, moistened with a pressure washer and vacuumed prior to opening the storm drain grate or storm drain cover.



- 3) Carefully remove the storm drain grate or storm drain cover using proper lifting techniques and appropriate equipment (e.g., grate tool). A sledge hammer may be needed to loosen grates which have fine debris sealing the grate and metal channel holding it in place. A hydraulic lift may be

needed to lift grates that are jammed. Once grate or cover has been removed, place it out of the way in a safe area.

- 4) Remove small device if not affixed (i.e., not screwed or bolted in place) to storm drain. If affixed (i.e. screwed or bolted in place and requires the use of tools to remove) to storm drain, keep in place.
- 5) Clean the storm drain and small device either manually (Section 6.2.2) or using a vacuum truck or portable vacuum system (Section 6.2.3)
- 6) If the small device is no longer present in the storm drain, document that it is missing on the Field Log.



6.2.2 MANUAL CLEANOUT

The procedures described below should be conducted when cleaning storm drains with a digging tool. A flow chart showing the manual cleanout process is provided as Figure B-2 in Appendix B.

- 1) Remove all material from the storm drain with a digging tool (e.g., clam shell or flathead shovel, broad head scoop shovel).
- 2) Place all material removed from storm drain into super-heavy duty plastic garbage bag(s), five-gallon buckets or other containers used to store and transport material. In some instances, municipalities are placing material removed from storm drains directly into the back of their service trucks.



- 3) Remove all material adhering to small devices with a wire brush, scraping tool or broom. Ensure that the screen is free of obstructions.



- 4) If small device is removed for cleaning, manually sweep street where the small device was cleaned. Place all material into storage containers or directly into the back of service trucks for transport and disposal.



- 5) If the small device was removed, place it back in storm drain.
- 6) Replace the storm drain grate or storm drain cover. Make sure area is clean and free of debris.
- 7) Prior to departing the site, fill out the Field Log with all requested information. An example Field Log is provided in Appendix A. Documentation requirements are detailed in Section 6.3. Submit Field Logs to appropriate personnel when inspections are complete.
- 8) Remove work zone safety traffic devices.
- 9) Transport material to designated storage or disposal facility. (See Section 6.2.4)

6.2.3 VACUUM CLEANOUT

The procedures described below should be conducted when cleaning storm drains with a vacuum truck or portable vacuum system. A flow chart showing the vacuum cleanout process is provided as Figure B-3 in Appendix B.

- 1) Prior to using a vacuum, spray all material with a pressure washer until it becomes a soupy mixture (i.e., slurry). Remove all material with a vacuum. It is highly recommended that the material be sprayed to facilitate vacuuming.



- 2) Remove all material adhering to the small device with a pressure washer. Ensure that the screen is free of obstructions.



- 3) If the small device is removed for cleaning, vacuum all material on the street or manually sweep the material back into the storm drain. Remove all material swept into the storm drain with a vacuum. It is highly



recommended that the material be sprayed to facilitate vacuuming.

- 4) If the small device was removed, place it back in storm drain.
- 5) Replace the storm drain grate or storm drain cover. Make sure area is clean and free of debris.
- 6) Prior to departing the site, fill-out the Field Log with all requested information. An example Field Log is provided in Appendix A. Documentation requirements are detailed in Section 6.3. Submit Field Logs to appropriate personnel when inspections are completed.
- 7) Remove work zone safety traffic devices.
- 8) Transport material to designated storage or disposal facility. (See Section 6.2.4)

6.2.4 SOLIDS DRYING AND DISPOSAL

- 1) Transport all collected solids to a designated facility for drying. The drying area must be in a secure area, flat in nature and within an area where leachate may drain to the sanitary sewer. At a minimum, the designated drying area should be at least 20 feet by 20 feet. Good housekeeping procedures are strongly encouraged.



- 2) When arriving at the designated drying area, remove all solids from the vacuum truck or portable vacuum system and place within the area. Allow solids to dry for a minimum of 96 hours. During the wet season, solids should be managed to prevent exposure to wind and rain.
- 3) Once the solids are dry, dispose in accordance with all applicable regulations. Common practice is to dispose solids in the same manner as sediments collected from street sweeping operations, storm drain cleanings and deep sump manhole cleanings unless they are contaminated with hazardous materials or hazardous waste.
- 4) Individual agencies may require additional data collection of the amount and/or type of trash collected. Prior to disposing solids, fill-out any additional agency forms or fields as needed.

6.3 DOCUMENTATION

MRP Provision C.10.b.i.b requires Permittees to retain device specific maintenance records that include, at a minimum:

- The date(s) of maintenance
- Capacity condition at the time of maintenance (greater than or less than 50 percent full)
- Special problems such as
 - Screen blinding or plugging from leaves, plastic bags, or other debris
 - Overflowing
 - Damage reducing function
 - Other negative conditions

Capacity condition will be exceeded if the small device screen is greater than 50 percent “full” of debris and/or trash (i.e., 50 percent of the screen’s capacity below the overflow is covered with debris and/or trash) during a maintenance event. This information is required to determine if the maintenance frequency must be increased (MRP Provision C.10.b.i.a). A visual estimate of the capacity is all that is required.

MRP Provision C.10.f.iii requires certification that each full trash capture system is operated and maintained to meet full trash capture system requirements in the Annual Report (due September 30th each year). You also must provide a description of any device that did not meet full trash capture system requirements (e.g., due to plugging or overflowing) and any corrective actions taken.

Additional inspection and maintenance data is collected as needed for internal operation metrics.

7.0 REFERENCES

State of California. 2011. California codes. Government Code Section 68055-68055.9. Available at <http://www.leginfo.ca.gov/>

U.S. Department of Transportation. 2009. Manual on Uniform Traffic Control Devices. Available at http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm. December 2009.

Appendix A

Trash Full Capture Device Inspection and Cleaning Field Log



Trash Full Capture Device Inspection and Cleaning Field Log

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

Date	ID	Location				Inspectors
Plugged/Blinded? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Device > 50% full? * <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Overflow? <input type="checkbox"/> Yes <input type="checkbox"/> No	Evidence of Flooding? <input type="checkbox"/> Yes <input type="checkbox"/> No	Cleaned? <input type="checkbox"/> Yes <input type="checkbox"/> No	Damaged? <input type="checkbox"/> Yes <input type="checkbox"/> No	HDS Solids Depth (in):
Comments/Corrective Actions:						

*If "Yes", must increase inspection frequency.

Data Points	Definitions
Date	The inspection and/or cleaning date of the trash full capture device.
ID	The unique identification code assigned to the site. The ID is used to track trash full capture device inspection and cleaning activities within tabular formats, databases or other data collection tools. This box may be pre-populated prior to inspection and cleaning.
Location	The physical location of the trash full capture device in relation to roads and/or physical landmarks. (e.g., buildings, bus stops, signs). Example descriptors: Northeast corner of Main Street and First Avenue, Main Street in front of Burger King, next to bus stop. This box may be pre-populated prior to inspection and cleaning.
Inspectors	The names or initials of staff performing the inspection and cleaning.
Plugged/Blinded?*	Indicate if the trash full capture device's 5 mm screen is plugged or blinded with leaves, plastic bags or other debris which likely causes overflow or bypass. *MRP 2.0 states that if the device is found to have a plugged or blinded screen during a maintenance event, the maintenance frequency shall be increased so that the device is neither plugged nor more than half full of trash at the next maintenance event. Ensure that the inspection frequency for such a device has been increased to a new frequency. Document in Co-permittee records.
Device > 50% full?*	Connector pipe screens and insert filters , indicate if the 5 mm screen is greater than 50 percent "full" of trash (i.e., 50 percent of the screen's capacity below the overflow is covered with debris and trash) during a maintenance event. For HDS systems , indicate if the HDS sump is more than 50 percent full of solids. This will be determined by using a measuring instrument or "sludge judge". For gross solids removal devices (GSRDs) , indicate if accumulated solids are greater than 50 percent of the screened pipe capacity. For netting system , indicate if the net is greater than 50 percent full. *MRP 2.0 states if such device is greater than 50 percent full of trash during a maintenance event, the maintenance frequency shall be increased so that the device is not more than half full of trash at the next maintenance event. Ensure that the inspection frequency for such a device has been increased to a new frequency. Document in Co-permittee records.
Evidence of Overflow?	Indicate if there is any evidence of overflow for trash full capture devices. For small devices, evidence of overflow includes but is not limited to the following situations: overflow observed during a storm event, trash present inside the device (e.g., trash that bypassed the device and is present adjacent to the connector pipe screen) and trash present on top of the device (e.g., if the device has a top). For HDS systems, evidence of overflow includes but is not limited to solids being present outside the separation screen.
Evidence of Flooding?	Indicate if there is any evidence of flooding associated or caused by trash full capture devices. For small devices, evidence of flooding includes but is not limited to the following situations: flooding observed during a storm event, flooding observed due to tidal activity, flooding reported to municipal staff by eyewitnesses, and observing a storm drain completely full of trash and debris (with a significant amount of trash and debris present on the storm drain grate) which likely floods during a storm event.
Cleaned?	Indicate if the trash full capture device was cleaned.
Damaged?	Indicate if the trash full capture device is damaged which reduces its functionality. If damaged, indicate if the device should be repaired in the comments/corrective action box.
HDS Solids Depth (in)	This box is to be filled-out when inspecting and/or cleaning HDS systems. If a "sludge judge" is used, record the amount of solids within the column. If the measured solids exceed the pre-determined solids depth requiring HDS maintenance, initiate cleaning or schedule a time to clean the HDS system. If a measuring device is used to determine the distance from the HDS rim to the top of solids in the sump, record the distance. If this distance is shorter than the pre-determined distance requiring HDS maintenance, initiate cleaning or schedule a time to clean the HDS system. All pre-determined solids depths were determined to ensure that HDS systems are no greater than 50 percent full
Comments/ Corrective Actions	Provide any comments or corrective actions pertaining to the trash full capture device inspection and cleaning event.

Appendix B

Cleanout Process Flow Charts

Figure B-1. Small Full Capture Device Grate/Cover Removal

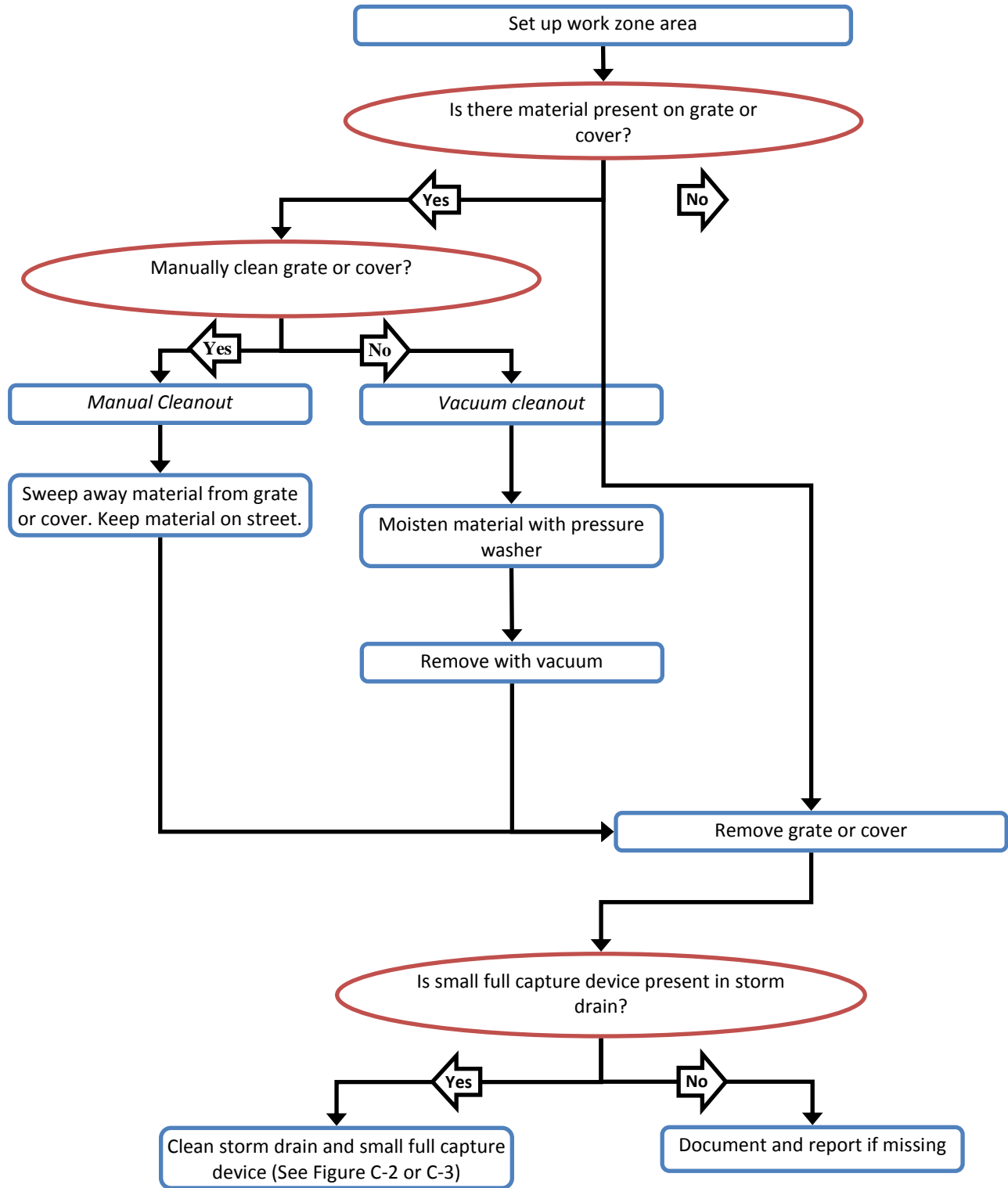


Figure B-2. Small Full Capture Device Manual Maintenance/Cleaning

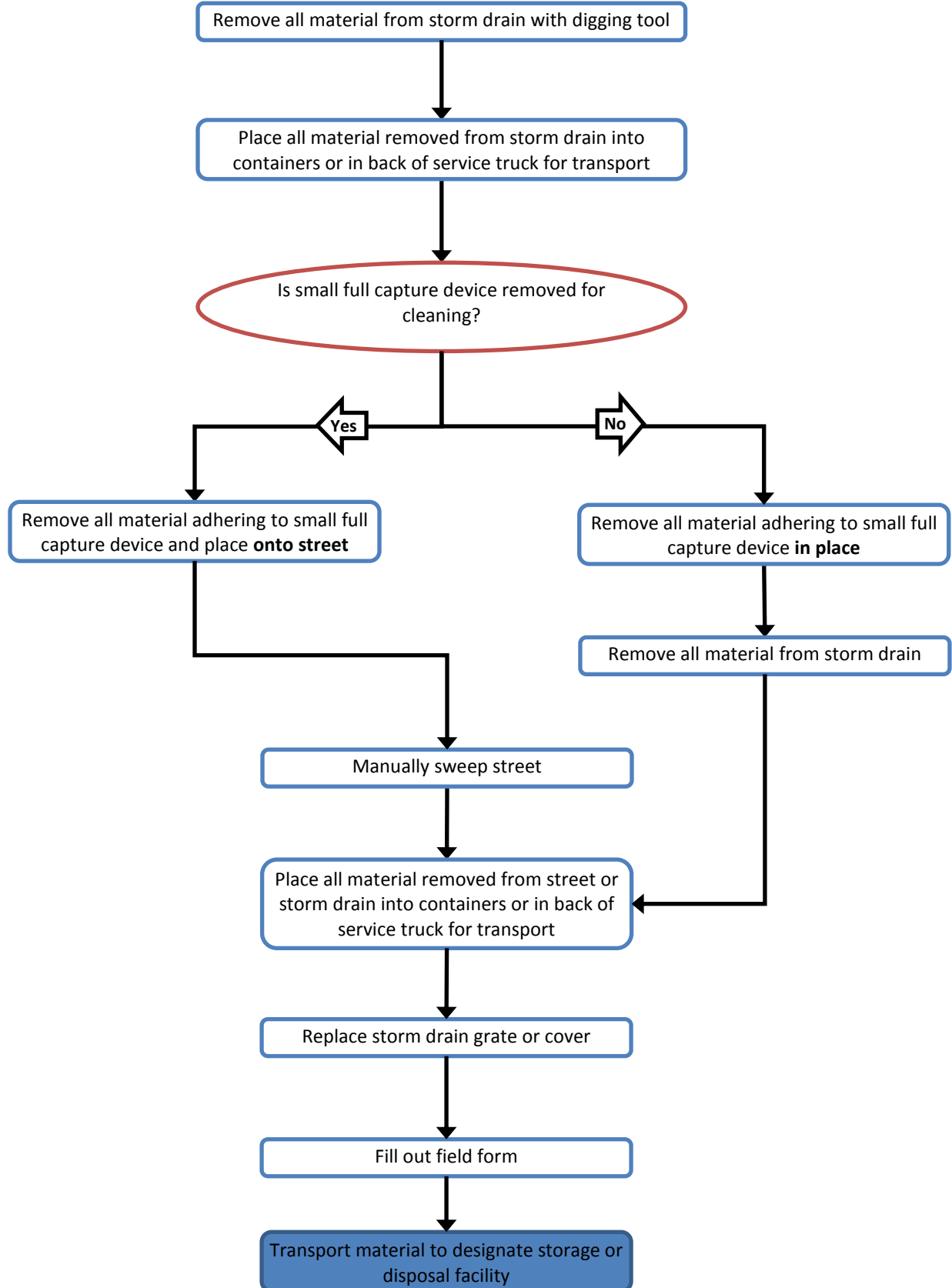


Figure B-3. Small Full Capture Device Vacuum Cleanout

