April 30, 2020

Mr. Leo Cosentini
California State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812-100

Re: Application for Trash Treatment Control Device - Bio Clean® Connector Pipe Screen (CPS)

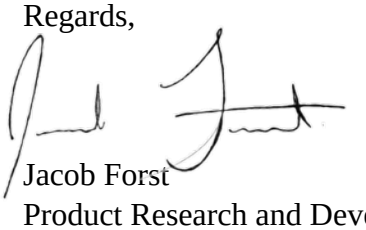
Dear Mr. Cosentini,

Bio Clean® is pleased to re-submit this application for the Connector Pipe Screen for Certification as a Full Capture System - Trash Treatment Control Device. The Bio Clean CPS has been approved since 2010 when originally submitted to the San Francisco Regional Board (BC-3 Modular Connector Pipe Trash Screen). Recently upgrades to the design have been made to improve the functionality of the device. Documentation for this application is being submitted in accordance with the California State Water Resources Control Board *Trash Treatment Control Device Application Requirements* document that includes the following minimum requisite sections:

1. Cover Letter
2. Table of Contents
3. Physical Description
4. Installation Information
5. Operation and Maintenance Information
6. Reliability Information
7. Field/Lab Testing Information and Analysis

Please contact me with any questions or should additional information be required. Thank you for your consideration of this application.

Regards,



Jacob Forst
Product Research and Development Technician
Bio Clean®, A Forterra Company

1.0 COVER LETTER

1.A. A general description of the Device;

The Bio Clean® Connector Pipe Screen (CPS), manufactured by Hydra TMDL, is designed to capture pollutants such as gross solids, trash, and debris. The CPS units' function is identical to the CPS designs used by the County of Los Angeles for several years. Our CPS design offers many unique and innovative features. These units can be customized and adjusted, coming in both a U-shaped design and an L-shaped design for various outlet locations, making it versatile enough to fit into any size catch basin. These devices are fabricated using perforated stainless steel, and the design includes vertical bends in the screen, making the structure rigid and durable, capable of withstanding higher flows than stock perforated metal. Installation is quick and easy with minimal parts required. Each CPS unit has an alternate configuration which includes a top bypass lid when mandatory to ensure that all pollutants coming in from any direction are captured. Routine maintenance is required to remove pollutants and is site and pollutant loading dependent.

1.B. The applicant's contact information and location;

Owner Information:

Greg Kent
Executive VP Business Development
Bio Clean®, A Forterra Company
5796 Armada Dr. Suite 250
Carlsbad, California
760.579.1584
Greg.Kent@forterrabp.com

Authorized Representative Contact Information:

Jacob Forst
Product Research & Development Technician
Bio Clean®, A Forterra Company
6655 Wedgewood Rd, Suite 130
Maple Grove, Minnesota 55311
661.444.3023
Jacob.Forst@forterrabp.com

1.C. The Devices' manufacturing location;

The Bio Clean® CPS units are manufactured by its partner company, Hydra TMDL Systems, Inc. in a facility located in Palm Desert, CA. The facility that provides support for all CPS devices is listed below:

Hydra TMDL Systems, Inc.
77851 Las Montana Rd, Suite A
Palm Desert, CA 92111

1.D. A brief summary of any field/lab testing results that demonstrates the Device functions as described within the application;

Table 1 uses an orifice coefficient of .53 for calculating the treatment flow of the Bio Clean® CPS device. This coefficient was obtained from a technical report done by the County of Los Angeles titles "Connector Pipe Screen Design – Full Capture TMDL Compliance – Screen and Bypass Sizing Requirement" (April 2007). This coefficient is more conservative than the standard .6 which is generally used for the orifice equation. The treatment flow rates assume the screen is 50% clogged.

1.E. A brief summary of the Device limitations, and operational, sizing, and maintenance considerations;

The Bio Clean® Connector Pipe Screens (CPS) are pre-engineered filtration systems designed to meet site-specific water quality treatment requirements. Conformance with the Engineer's Plans and Specifications and the Manufacturer's recommendations is essential to ensure proper operation and function of the Device.

Hydra TMDL Systems, Inc. manufactures the CPS using stainless steel components. The materials selected serve a wide variety of applications and are the most durable materials available for this type of device. Adherence to installation recommendations are required to ensure the design service life of the Device is maintained.

Bio Clean® CPS should be sized to meet site- and region-specific water quality objectives and requirements. Systems that are not designed and installed in conformance within the maximum treatment flow rate and maximum bypass flow rate limits can cause adverse hydraulic conditions. Additionally, non-conformance with the Device design limits may cause non-compliance with the water quality objectives and requirements.

All structural, post-construction Best Management Practices require routine and scheduled inspection and maintenance. Inspection and maintenance is facilitated by the design of the Device. The design of the Device allows for placement of the CPS directly against the outlet pipe in a catch basin, leaving direct, unimpeded access to the rest of the basin for quick and easy removal. Design considerations for maintenance frequency should be a consideration.

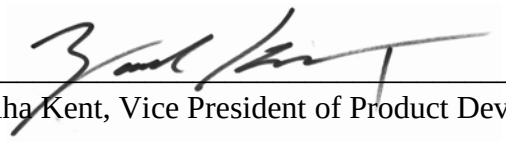
1.F. A description or list of locations, if any, where the Device has been installed. Include the name and contact information of as many as three municipality(s) purchasing the Device, and

The City of Los Angeles in contract with Hydra TMDL has installed over 1000 CPS units in LA County. Cities where CPS units have been installed include, but are not limited to the following:

- Arcadia
- Baldwin Park
- Beverly Hills
- Compton
- El Segundo
- Glendale
- Granada Hills
- Harbor City
- Inglewood
- Los Angeles
- Manhattan Beach
- North Hollywood
- Northridge
- Pasadena
- San Fernando
- Santa Clarita
- Santa Monica
- Sherman Oaks
- Sun Valley
- Van Nuys

1.G. The certification below:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons that manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Zachariha Kent, Vice President of Product Development

1-16-2020

Date

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2.0 TABLE OF CONTENTS

Contents

3.0 PHYSICAL DESCRIPTION

3.A. Description on how the Device works to trap all particles that are 5 mm or greater in size and how it is sized for varying flow volumes;

The Bio Clean® Connector Pipe Screen (CPS) is a perforated stainless-steel stormwater treatment system protecting outlet pipes in catch basins from pollutants by capturing trash, debris, and sediment in stormwater. The CPS screen is installed surrounding the outlet pipe and prevents trash and floatables from continuing downstream. Design flows are directly routed through the screen and the 5 mm perforations on the stainless-steel screen ensure the capture of all particles 5mm in size or larger.

The Bio Clean® Connector Pipe Screen incorporate the following features to achieve full capture of all particles larger than 5mm.

- The perforated screens are made using 14-gauge and 16-gauge stainless steel, with an aperture no greater than 5.0 mm. The open area is not less than 50%. Each unit has an alternate configuration which includes a bypass lid, that can be installed to ensure that any pollutants in stormwater coming from above in grate or curb openings are captured and do not continue downstream.
- Bypass features are incorporated in all Devices and are located above the treatment water level in the basin ensuring retention of all trash and debris for flows conforming to full capture requirements.

Connector Pipe Screen

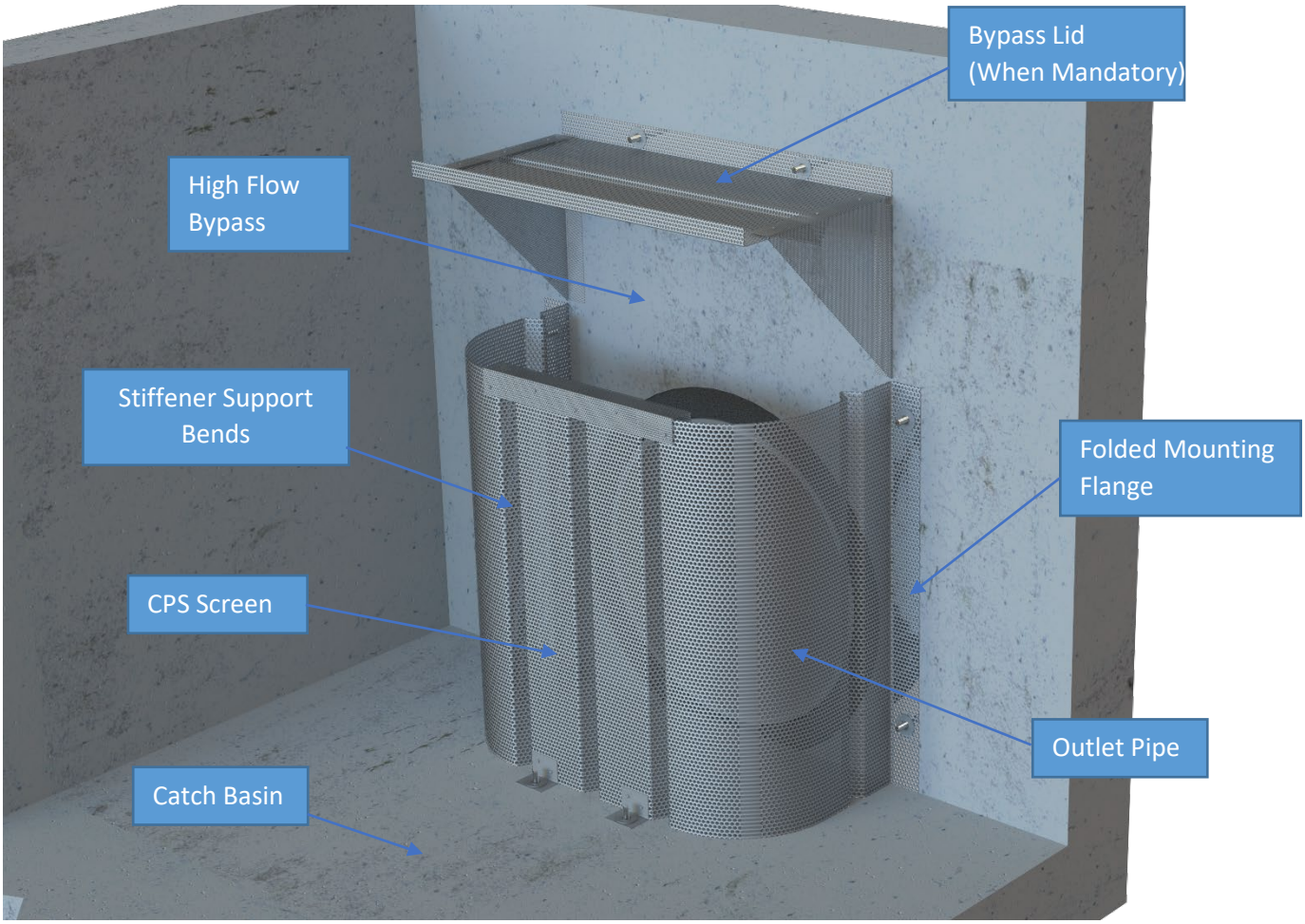


Figure 1 – Connector Pipe Screen (CPS)

Connector Pipe Screen Operation - Diagram

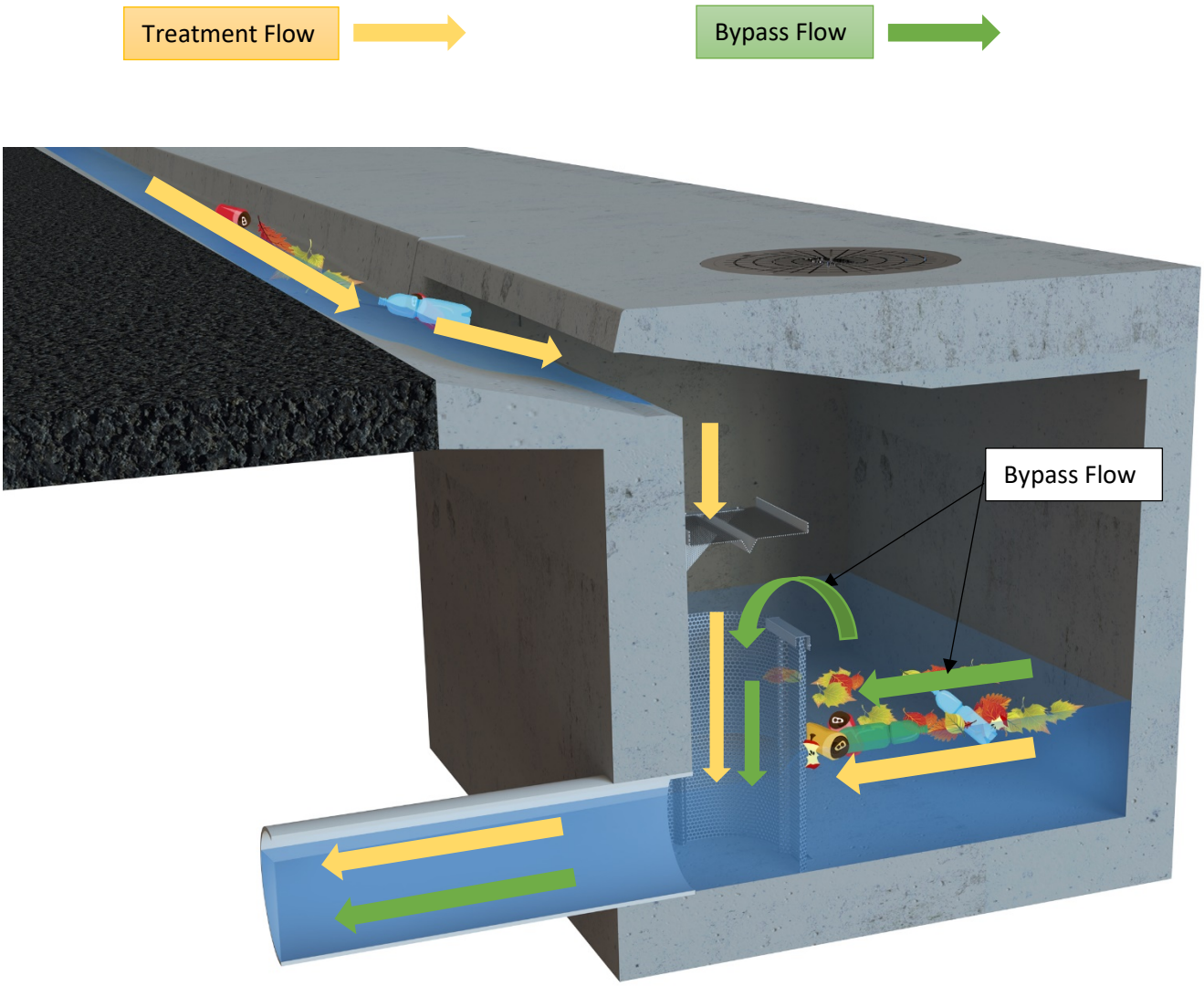


Figure 2 – Connector Pipe Screen Operation

Connector Pipe Screen Operation

Stormwater flows from parking lots and roads begin their entrance into the catch basin through the curb inlet (can be grated or combo inlets as well). Upon entering the catch basin, the flows must first pass through the Connector Pipe Screen (CPS) prior to entering the outlet pipe. The CPS installs surrounding the outlet wall, protecting the outlet pipe from all trash, debris, and sediment larger than 5 mm. (*See Figure 2 – Connector Pipe Screen Operation.*)

The CPS is straight forward in design, with function identical to CPS units used by County of Los Angeles, however special consideration was given to the configuration and capacities to ensure maximum possible treatment and adequate bypass without re-suspension of previously removed pollutants (*See Figure 1 – Connector Pipe Screen Features).* The CPS is constructed from perforated stainless steel with an open area of no less than 50% and apertures no greater than 5.0 mm. This ensures that all pollutants in stormwater are fully captured and the water is allowed to freely exit through the outlet pipe.

During peak flow events, the CPS continues to treat, however water levels in the catch basin may rise to the point of overflow at which point the CPS is considered to be operating in bypass mode. Bypass occurs over the top of the CPS, or in the window between the bypass lid and the top of the screen. This bypass lid can be installed in catch basins with curb or grate openings at the top, ensuring that pollutants will not circumvent treatment by the CPS.

The Engineer should make note of the treatment flow capacity, the bypass flow capacity, as well as the grate or curb inlet flow capacity and determine which of the three may be a limitation of the flow capacity for this component of the storm drain system.

A sizing chart for the CPS is shown below in Table 1 (U-shaped) and Table 2 (L-shaped). The nomenclature for models lists the Width x Length x Height of the CPS. The characteristics and capacity Table lists the maximum treatment capacity for Full Capture trash removal. These capacities are considerate of both resuspension of removed pollutants and screen blocking. A safety factor has been applied to the treatment capacity. The Table lists the most commonly utilized standard sizes available. Other standard sizes are available as well as custom configurations. Characteristics and capacities will be determined on an as needed basis following the same guidelines and using the same empirically determined data for sizing of the custom configurations.

3.B. Design drawings for all standard Device sizes including dimensions, and alternative configurations;

Design drawings for all standard devices and configurations are included in Appendix A.

3.C. If the device is designed with an internal bypass, explain how the bypass only operates with flows greater than the design storm.

The Connector Pipe Screen is designed to capture target pollutants of concern, but the Device has also been designed to not impede normal hydraulic operation of the catch basins it is installed in. This is accomplished by way of an internal bypass feature of the CPS. This bypass feature is incorporated into the Device before the retained trash and treatment area and therefore do not release previously retained pollutants.

Connector Pipe Screen Bypass Operation

During peak flow events, the Connector Bypass Screen (CPS) continues to treat, however water levels in the catch basin may rise to the point of overflow at which point the CPS is considered to be operating in bypass mode. Bypass occurs over the top of the CPS, or in the window between the bypass lid and the top of the screen. (*See Figure 3*) The bypass flow rates for each CPS Device has been pre-determined and are published in Table 1. This bypass flow rate should be noted and compared to the original design capacity of the catch basin. A safety factor has been applied to the bypass capacity.

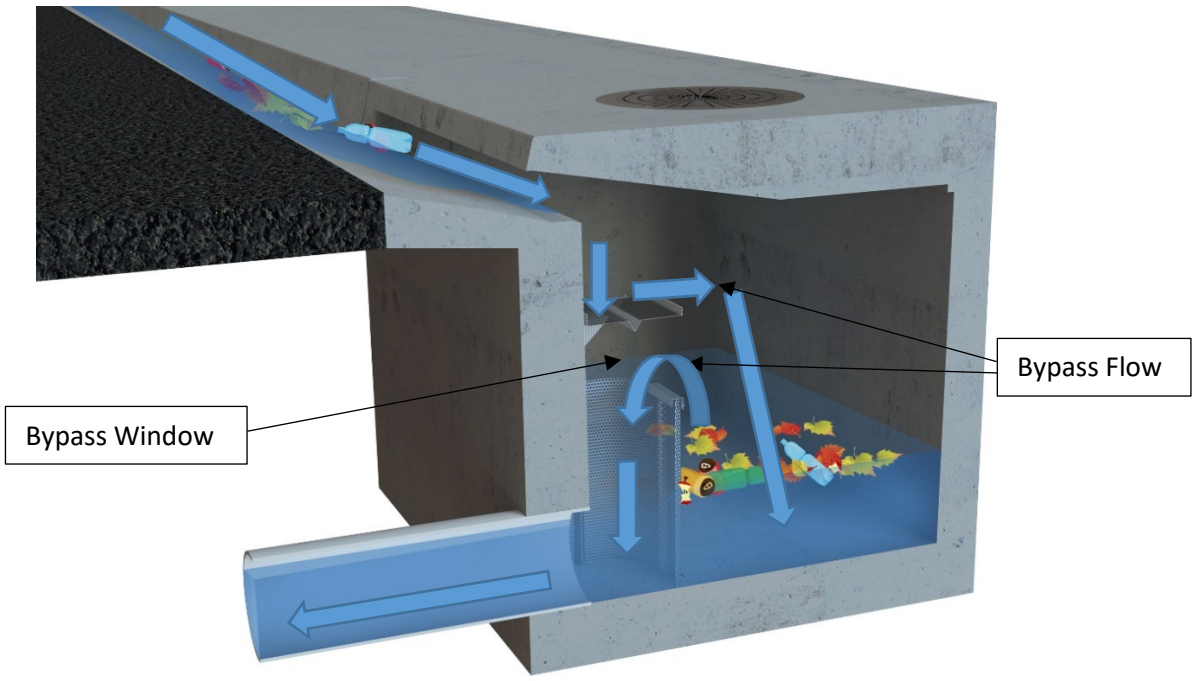


Figure 3 – Connector Pipe Screen in Bypass Operation

3.D. Engineering plans/diagrams for a typical installation;

Typical installation details and typical configurations for the Connector Pipe Screens are included in the Installation Manual submitted as Appendix C.

3.E. Photographs, if any, of pre- and post-installation examples; and

Photographs of the Connector Pipe Screen in various stages of manufacture, installation and operation are included below:

Figure 4 – Connector Pipe Screen Installed (U-Shaped)

Figure 5 – Connector Pipe Screen Installed (U-Shaped)

Figure 6 – CPS Prior to Maintenance (U-Shaped)

Figure 7 – CPS Prior to Maintenance (L-Shaped)

Bio Clean® CPS (U-Shaped) Characteristics and Capacity Table
California Full Capture Certified Capacities

TABLE 1

CPS Length (ft)	CPS Height (in)	Net Open Area (Screen) (SF)	Treatment Capacity (CFS)
3.7	12	1.90	5.26
4.7	12	2.41	6.67
3.7	18	2.84	9.66
4.7	18	3.61	12.26
5.7	18	4.37	14.86

*Other standard and custom model sizes available. Contact Bio Clean® for more information

Bio Clean® CPS (L-Shaped) Characteristics and Capacity Table
California Full Capture Certified Capacities

TABLE 2

CPS Length (ft)	CPS Height (in)	Net Open Area (Screen) (SF)	Treatment Capacity (CFS)
2.7	12	1.39	3.84
3.7	12	1.90	5.26
2.7	18	2.08	7.06
3.7	18	2.84	9.66
4.7	18	3.61	12.26

*Other standard and custom model sizes available. Contact Bio Clean® for more information

3.F. The Device maximum trash capture capacity;

The trash capture volume cannot be calculated by the screen alone, as it differs with each individual catch basin and is a function of the catch basin. Capacity is based upon the dimensions of the catch basin (LxW) multiplied by the height of the screen.

3.G. The Device hydraulic capacity (flow in cfs) at its maximum trash capture capacity for all standard Device sizes;

The maximum hydraulic capacity at the maximum trash capacity is listed as the Treatment Capacity in Table 1 and Table 2.

3.H. Each material and material grade used to construct the Device (stainless steel, plastic, etc.);

The Connector Pipe Screen is constructed of high strength, durable materials and components that ensure a long design and service life for the Device. Appendix B of this submittal includes a detailed Specification for the Connector Pipe Screen which includes material Specifications. Key materials and components are additionally listed below:

- Screen – The main screen is manufactured from Perforated Type 304 Stainless Steel, with openings equal to or less than 5.0 mm in size.
- Bypass Lid (When Mandatory) – The bypass lid is manufactured from Perforated Type 304 Stainless Steel, with openings equal to or less than 5.0 mm in size.

3.I. Conditions under which the Device re-introduces previously trapped trash;

The Connector Pipe Screens have been designed to remove and permanently retain all trash and debris that is 5mm in size or larger. Conditions under which the Device re-introduces previously trapped trash are listed below:

- If the Device is not properly maintained and trash and debris are allowed to accumulate beyond the prescribed maximum allowable level in the trash containment compartments, conditions will be present that could cause a re-introduction of trash into the effluent of the Device.
- Broken or damaged screens can cause an adverse condition that would allow re-introduction of trash and debris into the effluent.
- Missing or un-replaced components after a maintenance service can cause an adverse condition that could re-introduce trash and debris into the effluent of the Device.

3.J. Estimated design life of the Device;

The estimated design life for the Connector Pipe Screen is 25 to 50 years. The design life is dependent on the materials utilized as well as the proper application of those materials.

3.K. If the device is substantially similar to a device currently listed on the *Certified List of Trash Devices*, name the certified device(s) and identify the substantial similarities and any minor changes in materials, material thickness, structural assembly, etc. Explain how these minor changes in your device will impact performance as compared to the similar certified device.

Not applicable.

3.L. If the device includes 'ADDITIONAL COMPONENTS' (e.g., deflector screen etc.) provide installation diagrams of the device with the additional component(s). Explain how the installation of the additional component impacts the overall performance of the device.

Under certain circumstances, it is mandatory to install the CPS with a bypass lid. The installation of the bypass lid is mandatory when the CPS is installed under a grate or directly under a curb opening (See Figures 1, 2 and 3). The bypass lid prevents debris entering from above and bypassing the CPS main screen. The bypass lid deflects debris into the catch basin and allows water to pass through the CPS screening to the outlet pipe. The bypass lid does not effect overall performance of the CPS. The bypass lid may only be open during maintenance or vector control access.

4.0 INSTALLATION INFORMATION

4.A. Installation considerations;

Considerations should be taken prior to installing the Connector Pipe Screen. Most critically, each catch basin and grate (if applicable) should be properly measured. Proper measurement ensures the proper manufacture of the CPS and provides an opportunity to check the Device will function properly with no adverse effects to the existing storm drain system. Additionally, by observing where the stormwater inlet is in relation to the proposed CPS installation location, it will be determined if a bypass lid is required or not. Measurement charts for the CPS are included as part of this submittal at the end of Appendix C.

4.B. Device installation procedures;

Installation requirements and procedures for the Connector Pipe Screen are detailed in the *CPS Installation Manual* which has been included in Appendix C of this submittal. The guidelines include requirements and procedures for:

- Delivery
- Inspection
- Catch Basin preparation
- Installation
- Installation Diagrams

Connector Pipe Screen Installation

Once the measurements have been completed, the CPS is manufactured and delivered for installation. Most installations require only removing the catch basin grate or manhole cover, cleaning the catch basin, lowering the CPS into position, bolting it into the outlet wall and the

bottom of the catch basin, and then replacing the grate or manhole cover. If it is determined that a bypass lid is required, the bypass lid will too be lowered into position at the correct bypass height above the CPS and bolted into the outlet wall.

Additionally, confined space entry of the catch basin is likely required for the primary installation of the CPS system. It is imperative the installer adhere to all jurisdictional and/or OSHA safety recommendations and requirements.

Post installation inspection of the CPS is strongly advised. A representative from Bio Clean® is available for on-site inspection as support for the Owner. Inspection should determine if the CPS was installed properly as well as provided in a clean condition with no defects as a result of the installation.

Installation for Trash Capture in association with Full Capture programs, Trash TMDLs, or the Statewide Trash Amendment are often retrofit type installations. Care should be taken to document existing and as-built conditions to determine if the CPS must be supplied in a unique configuration to meet the retrofit conditions. Consideration must be given to any unique configurations for flow, treatment, and installation.

4.C. Methods for diagnosing and correcting installation errors.

Bio Clean® has a process for design and manufacturer that includes checks and balances to minimize and eliminate errors in the design and manufacturing processes for the Connector Pipe Screen systems. This process involves a formal submittal and review of the design and fabrication details for each unit. The Owner has and should take this opportunity to review the proposed device prior to installation. This process helps to reduce or eliminate errors during installation. In the event an installation error does occur, the error should be documented and reviewed with Bio Clean® and the Contractor immediately upon determination of the error.

After completion of installation, a checklist should be reviewed to ensure proper installation of the CPS system. The checklist should include key criteria for determination of proper installation. This checklist should be reviewed in its entirety at the completion of the installation and kept as documentation of proper installation. If during the checklist review an error is determined, the documented error should be reported to Bio Clean® as well as the Owner and Engineer. The checklist includes key criteria such as:

- The catch basin is clean and free of trash and debris.
- The CPS has been properly set in the basin, with 4” of spacing away from any corners.
- Inlet/Outlet pipes to/from the catch basin are not blocked or impeded as a result of the CPS installation.
- CPS and CPS components are not bent, broken or damaged.
- All debris from installation has been cleaned and removed.
- All components are free of sharp corners and edges.
- The bypass lid has been installed as required in section 4.D below.

Additionally, the CPS units can be inspected after commencement of operation to determine proper operation.

4.D. Provide an explanation of the condition or circumstance that would necessitate the implementation of an 'ADDITIONAL COMPONENT' to render it mandatory.

The installation of the bypass lid is mandatory if the CPS is to be installed directly under the curb inlet or grate opening (*See Figure 2 and Figure 3).* The bypass lid may only be open during maintenance or vector control access.

5.0 OPERATION AND MAINTENANCE INFORMATION

5.A. Device inspection procedures and inspection frequency considerations;

The Connector Pipe Screen *Operation and Maintenance Manual* is included with this submittal as Appendix D. This manual includes detailed requirements and recommendations for operation and maintenance of the CPS when used as Full Capture Trash Treatment Control Devices. A summary of the requirements and recommendations are listed below:

Maintenance Summary

- Clean CPS. Typical service interval occurs twice every 12 months for inspections and once every 12 months for maintenance service (≈ 10-minute service time). Unit may require more frequent maintenance service if the Device is located in a high debris loading drainage area.
- Maintenance cycles are dependent on site-specific pollutant loading.
- Maintenance operations should be planned to occur just prior to start of the rainy season and at the termination of the rainy season for the most effective system operation.

Inspection Procedures

- Following the installation of a Connector Pipe Screen, the unit will require periodic and scheduled maintenance. Bio Clean® or a Bio Clean® approved contractor can provide inspection and maintenance services.
- Inspection of the CPS should be quick and require no entry into the catch basins or extensive use of equipment. The inspection should provide a general assessment of the condition and operation of the CPS and an estimate as to the need or timing for maintenance.
    - The primary observation during inspection is the condition of the CPS. The screen should be in good, working condition and should be free from

obstructions or blockages. Accumulated trash levels should be documented and if maximum capacity levels are exceeded maintenance should occur.

5.B. Maintenance procedures, including a description of necessary equipment and materials;

A full description of the maintenance procedures can be located in the Connector Pipe Screen *Operation and Maintenance Manual* included with this submittal as Appendix D. A summary of the key components of the procedures is listed below:

Maintenance Procedures

It is recommended that maintenance occur at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the Device while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the CPS can be performed from finished surface without entry into catch basin utilizing a vacuum truck. Some unique and custom configurations may create conditions that would require entry for some or all of the maintenance procedures. Once all safety measures have been set up cleaning of the CPS can proceed as follows:

- Remove all manhole covers or access hatches (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck, position the hose over the opened manhole, hatch or grate opening. Insert the vacuum hose down into the catch basin and suck out trash, foliage and sediment. A pressure washer is recommended and will assist in spraying of any debris stuck on the CPS.
- The last step is to close up and replace the manhole or hatch and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas, the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer.

Record Keeping Maintenance Procedures

- Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
- The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.

Maintenance Equipment and Materials

The following equipment is helpful when conducting Connector Pipe Screen inspections and maintenance:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Measuring stick or sludge sampler
- Confined space entry equipment (if necessary)
- Vacuum truck
- Pressure washer

5.C. Maintenance frequency considerations, including effects of delay; and

Standardized maintenance frequencies that are suitable for most sites are detailed in Section 5.A. and 5.B. Maintenance frequency however is very site specific depending on pollutant loading. Records from inspections and prior maintenances should be periodically reviewed to assess the appropriateness of the prescribed maintenance frequency.

Delayed or deferred maintenance can cause diminished pollutant removal, re-entrainment of pollutants, in catch basin and upstream hydraulic impacts, and impacts to water quality.

5.D. Device maintenance and vector control accessibility.

Bio Clean® designed the CPS with access that facilitates maintenance for vector control inspection and treatment (if required). While in operation, the Connector Pipe Screen is designed to be free of standing or constant pools of water in the catch basins. Because of the absence of any standing water and because prolonged wet conditions are not anticipated, vector is not anticipated as a result of the installation and operation of the CPS. In the event that vector is experienced, direct access to the catch basin from the ground surface for vector control operations is available. The bypass lid can be hinged upwards (*See Figure 8 and Figure 9)* where the outlet pipe can be accessed in the event of any vector. A verification letter sent by the Mosquito and Vector Control Association of California (MVCAC) for the Device was received on March 10, 2020 and is attached to this application as Appendix F.

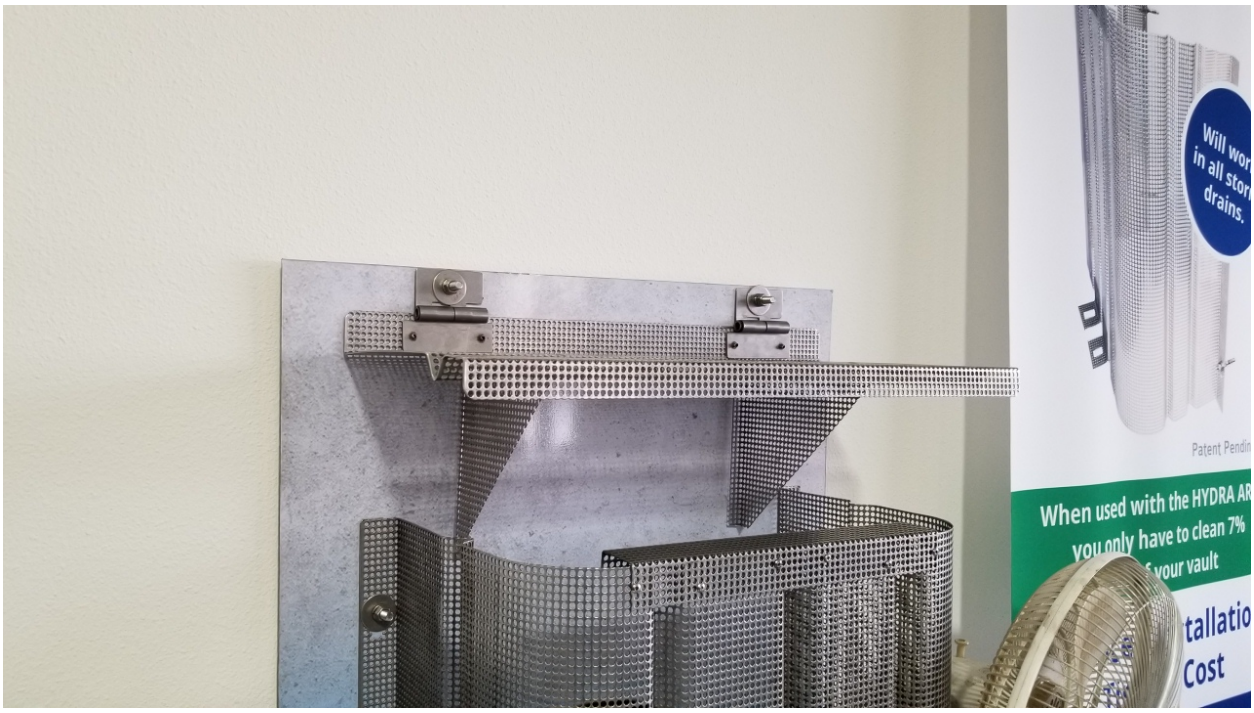


Figure 8 – CPS Bypass Lid in Closed Position (bypass lid is mandatory when unit is placed immediately beneath a curb inlet or grate)

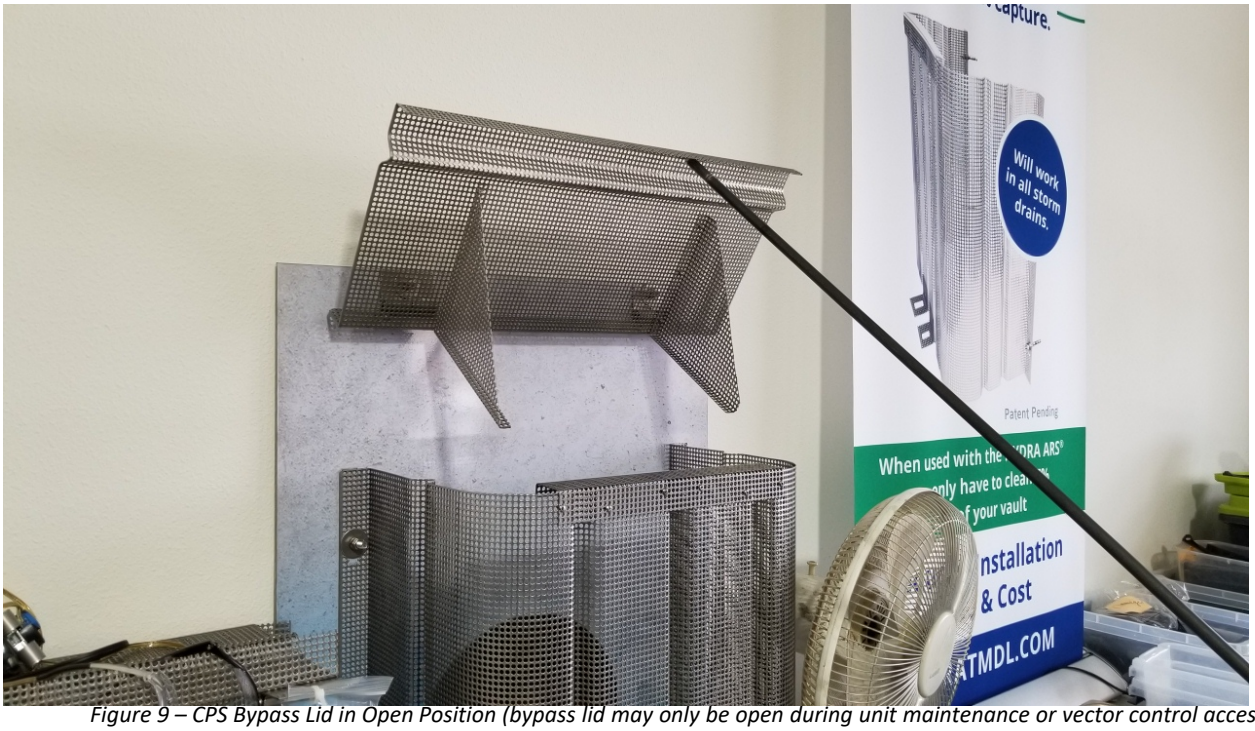


Figure 9 – CPS Bypass Lid in Open Position (bypass lid may only be open during unit maintenance or vector control access)

5.E. Repair procedures for the Device's structural components

In the event of any damage to the CPS, replacement parts should be ordered, the damaged parts should be taken out of the catch basin, and the replacement parts bolted into the outlet wall in their place.

6.0 RELIABILITY INFORMATION

6.A. Estimated design life of Device components before major overhaul;

Each component of the CPS is made of high-quality Type 304 Stainless Steel. This is a very durable material, that is expected to have a design life of 25 to 50 years. The design life is dependent on the proper application of the materials.

6.B. Device sensitivity to loadings other than trash (i.e., leaves, sediment);

The Connector Pipe Screen is designed to treat trash and debris. The presence of other pollutant loadings than trash have no effect on the trash capture performance of the Device. The CPS removal mechanisms occur in the catch basin; storage capacity is inclusive of all pollutants including trash and sediment.

6.C. Warranty Information; and

Bio Clean® provides a three-year limited warranty for the Connector Pipe Screens Filter per the conditions listed in the warranty document included in the submittal in Appendix E.

6.D. Applicant's customer support.

Bio Clean® is a California based company and has three facilities to provide Customer Support within the State.

Bio Clean® Corporate Office
5796 Armada Dr, Suite 250
Carlsbad, CA 92008
Phone: (855) 566-3938
stormwater@forterrabp.com

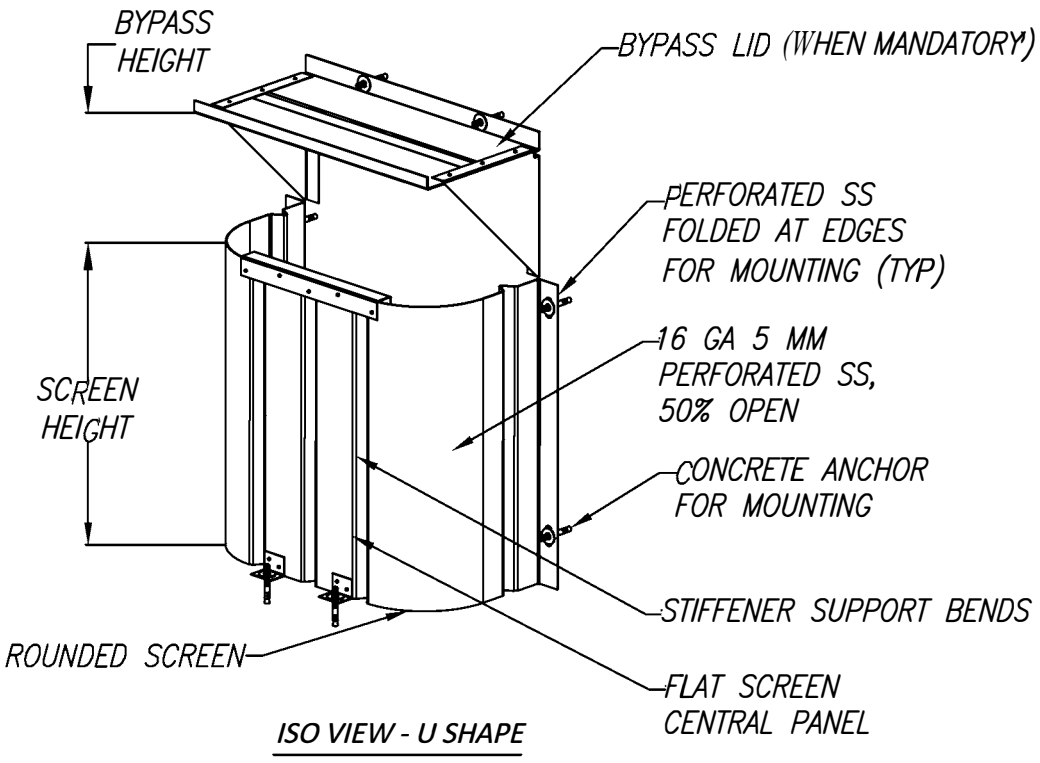
7.0 FIELD/LAB TESTING INFORMATION AND ANALYSIS

The County of Los Angeles published a technical report titled "Connector Pipe Screen Design – Full Capture TMDL Compliance – Screen and Bypass Sizing Requirement" (April 2007), which established the sizing criterion for all CPS screens to comply with Ballona Creek and Los Angeles River Trash Total Maximum Daily Load (Trash TMDL) full capture standards. Using this as a reference, Bio Clean® designed the CPS using an orifice coefficient of .53, which is more

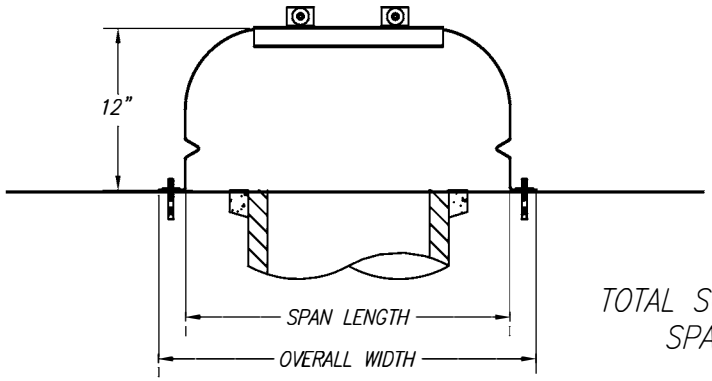
conservative than the standard .6 which is generally used for the orifice equation. The treatment flow rates assume that the screen is 50%.

APPENDIX A

HYDRA CONNECTOR PIPE SCREEN (CPS)



ISO VIEW - U SHAPE



TOTAL SCREEN LENGTH ~ VARIES
SPAN LENGTH = VARIES

TOP SECTION VIEW - U SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
		REVISIONS:	DATE:
DATE: 1/17/2020	SCALE: NTS	REVISIONS:	DATE:
DRAFTER: G.M.S.	UNITS = INCHES	REVISIONS:	DATE:

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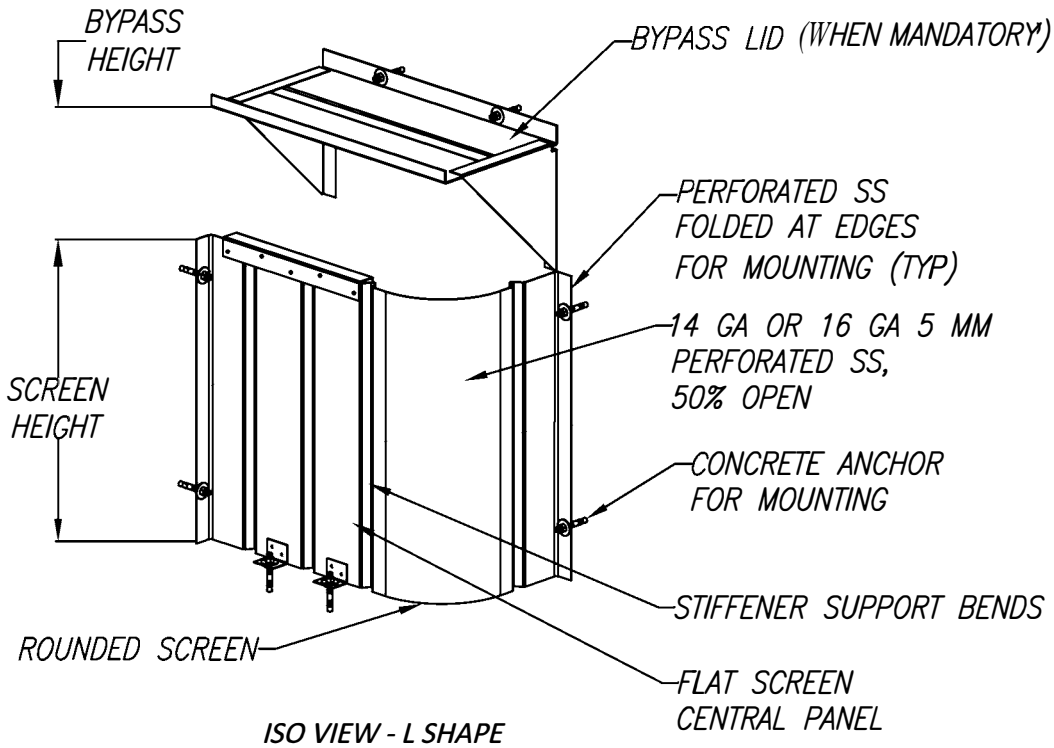
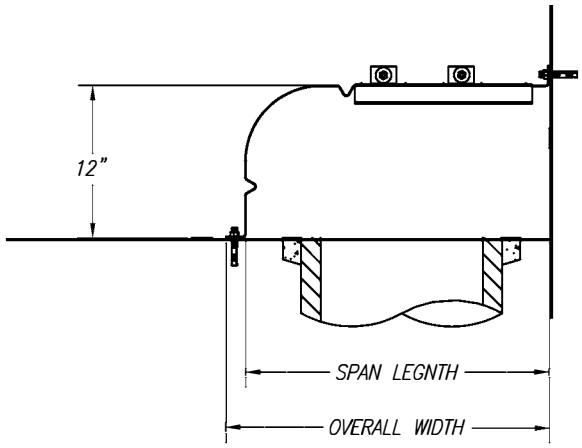
HYDRA CONNECTOR PIPE SCREEN (CPS)



ISO VIEW - L SHAPE



TOTAL SCREEN LENGTH ~ VARIES
SPAN LENGTH = VARIES

TOP SECTION VIEW - L SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 14 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
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DATE: 1/17/2020	SCALE: NTS	REVISIONS:	DATE:
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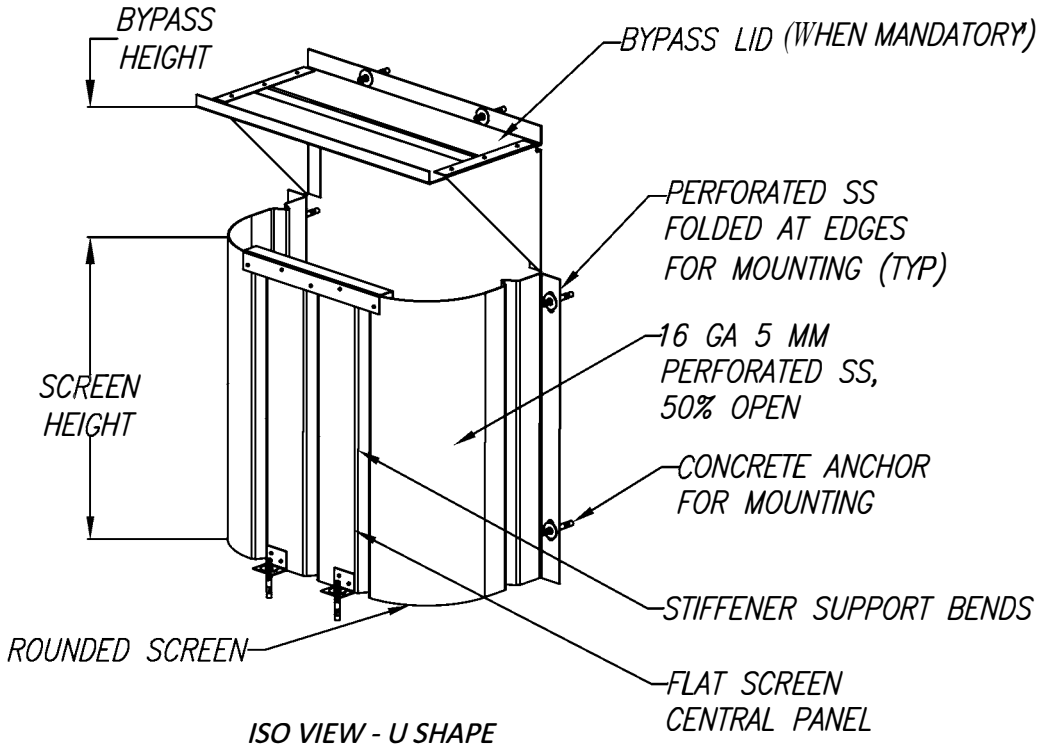
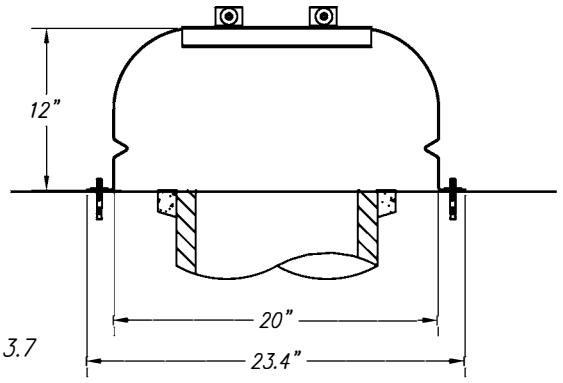
HYDRA CONNECTOR PIPE SCREEN (CPS)
U 3.7



ISO VIEW - U SHAPE

CPS U WITH 3.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	5.26
18	9.66
24	14.88
30	20.80
36	27.35
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOTAL SCREEN LENGTH ~ 3.7
SPAN LENGTH = 20"
COMPATIBLE WITH PIPES UP TO ø15"

TOP SECTION VIEW - U SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
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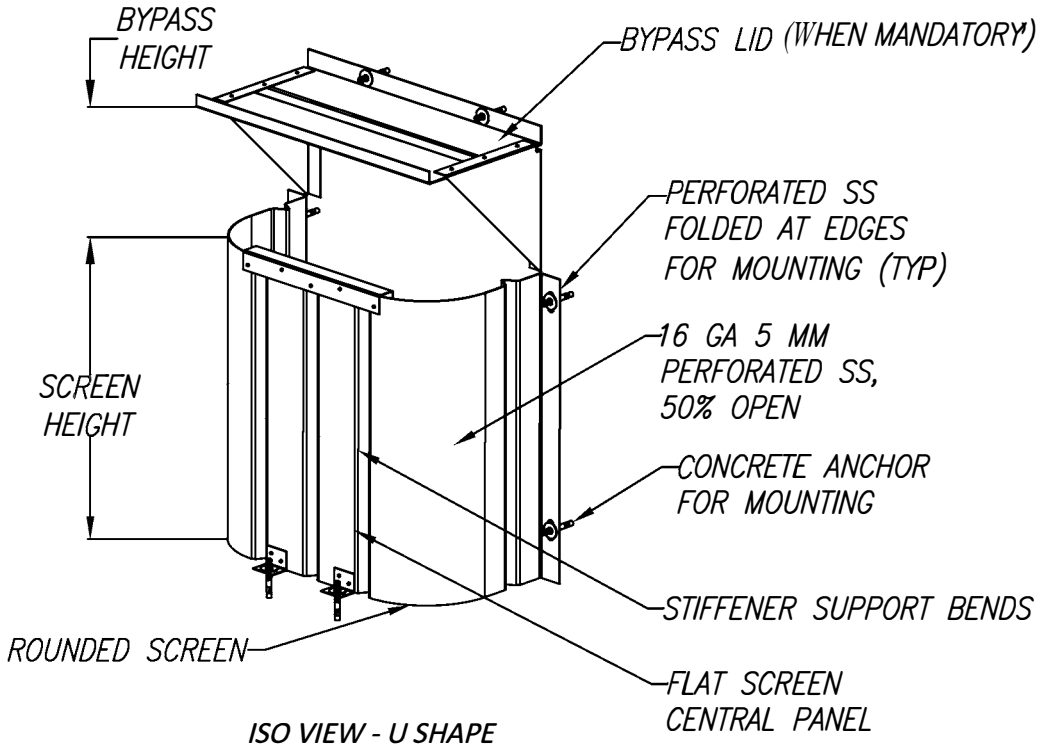
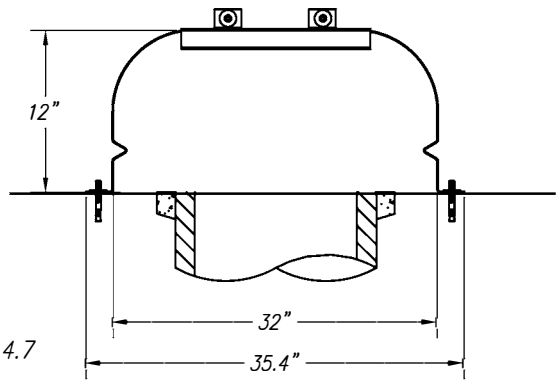
HYDRA CONNECTOR PIPE SCREEN (CPS)
U 4.7



ISO VIEW - U SHAPE

CPS U WITH 4.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	6.67
18	12.26
24	18.88
30	26.40
36	34.71
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOTAL SCREEN LENGTH ~ 4.7
SPAN LENGTH = 32"
COMPATIBLE WITH PIPES UP TO ø24"

TOP SECTION VIEW - U SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
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DRAFTER: G.M.S.	UNITS = INCHES	REVISIONS:	DATE:

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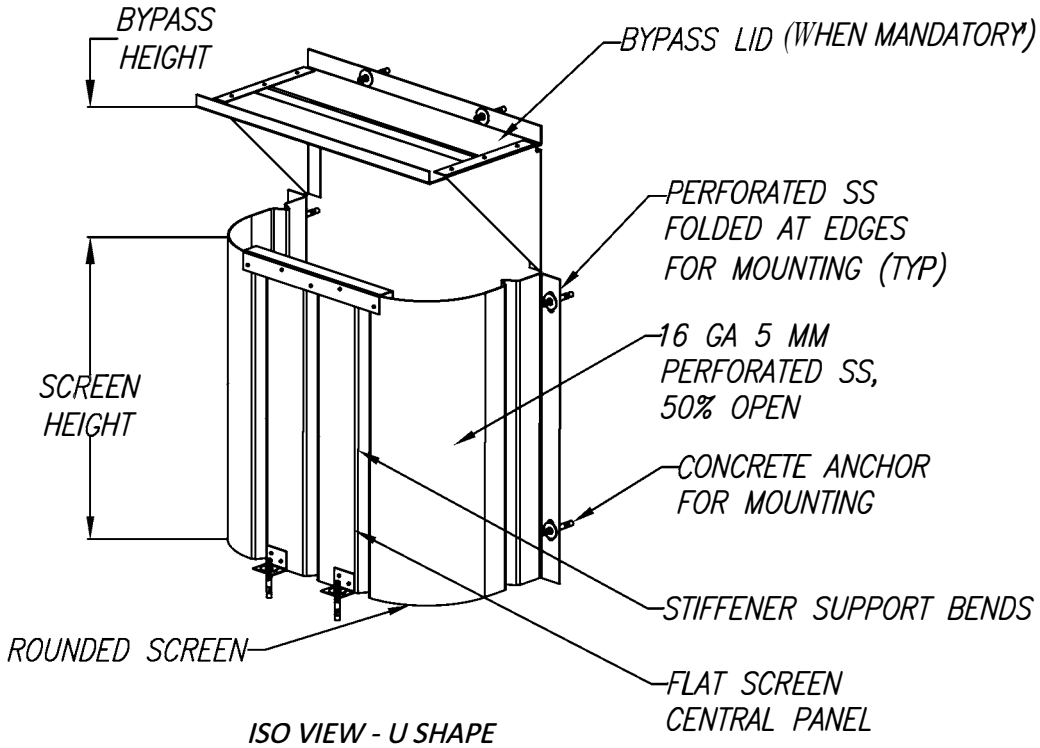
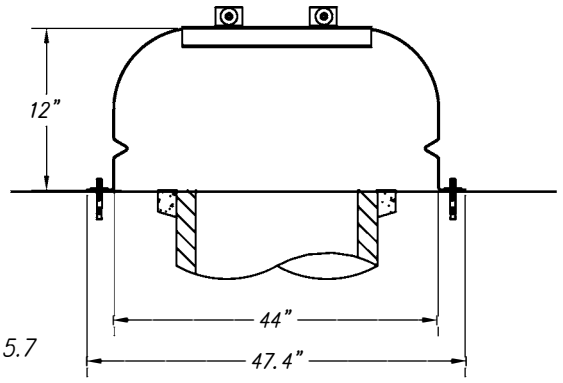
HYDRA CONNECTOR PIPE SCREEN (CPS)
U 5.7



ISO VIEW - U SHAPE

CPS U WITH 5.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	8.09
18	14.86
24	22.89
30	31.99
36	42.07
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOTAL SCREEN LENGTH ~ 5.7
SPAN LENGTH = 44"
COMPATIBLE WITH PIPES UP TO ø36"

TOP SECTION VIEW - U SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
		REVISIONS:	DATE:
DATE: 1/17/2020	SCALE: NTS	REVISIONS:	DATE:
DRAFTER: G.M.S.	UNITS = INCHES	REVISIONS:	DATE:

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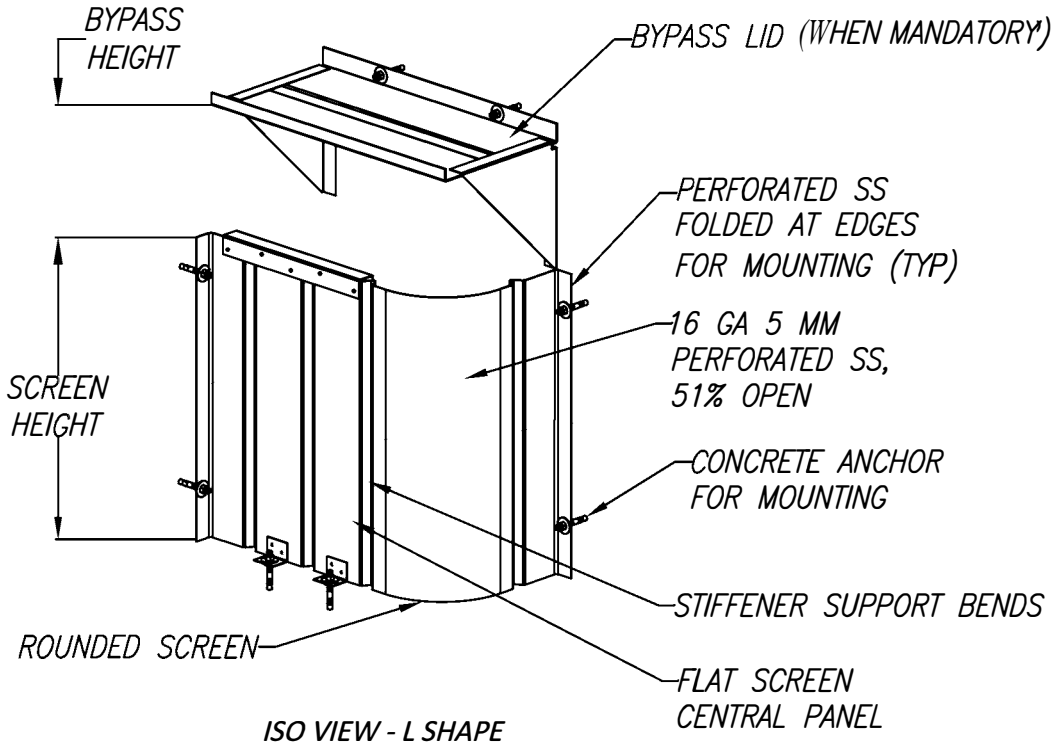
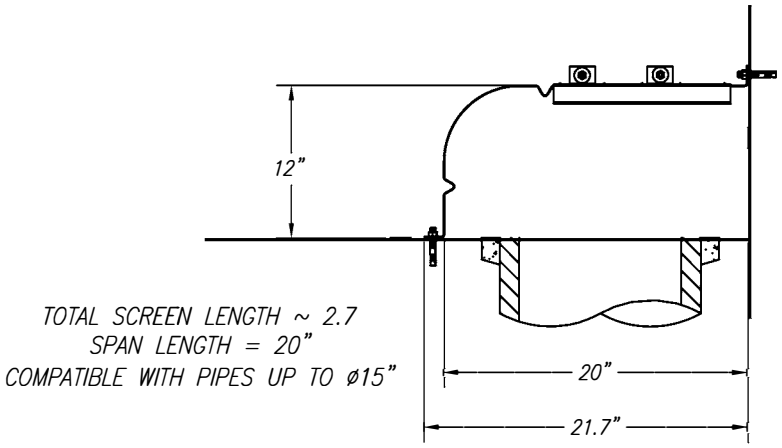
HYDRA CONNECTOR PIPE SCREEN (CPS)
L 2.7



ISO VIEW - L SHAPE

CPS L WITH 2.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	3.84
18	7.06
24	10.88
30	15.20
36	19.99
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOTAL SCREEN LENGTH ~ 2.7
SPAN LENGTH = 20"
COMPATIBLE WITH PIPES UP TO ø15"

TOP SECTION VIEW - L SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO INSTALL THE CPS UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
BIO CLEAN ENVIRONMENTAL SERVICES, INC. 398 VIA EL CENTRO, OCEANSIDE CA 92058 PHONE: 760-433-7640 FAX: 760-433-3176		REVISIONS:	DATE:
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Bio Clean
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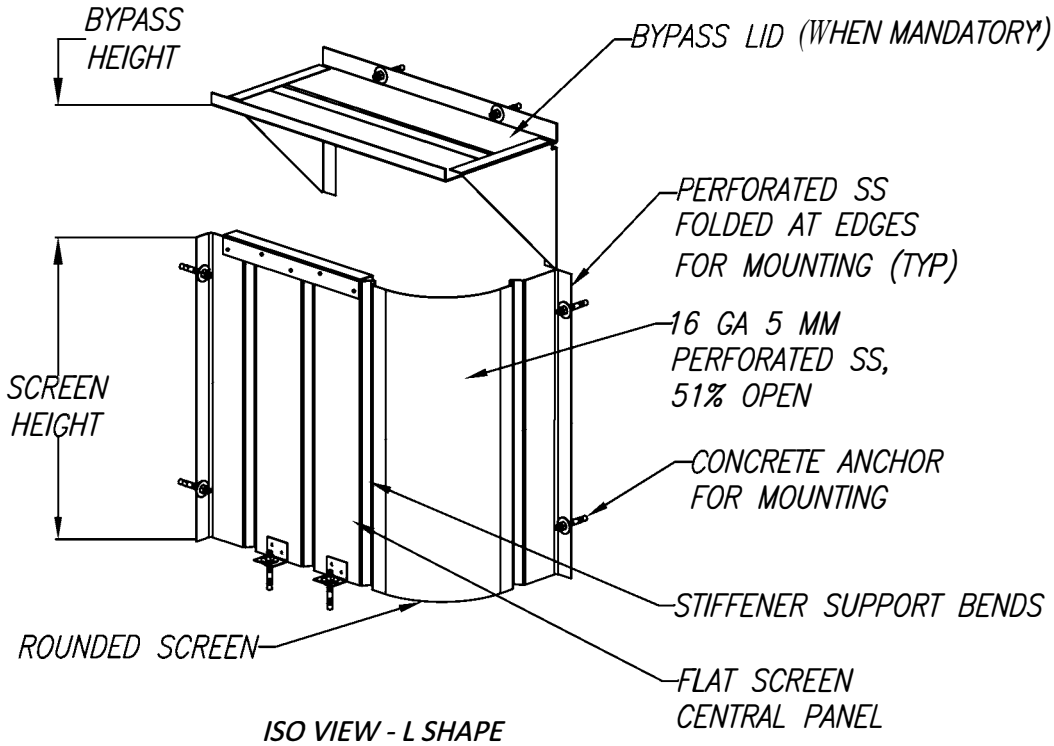
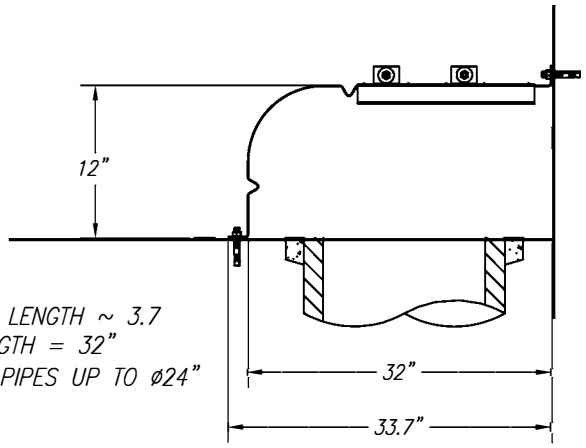
HYDRA CONNECTOR PIPE SCREEN (CPS)
L 3.7



ISO VIEW - L SHAPE

CPS L WITH 3.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	5.26
18	9.66
24	14.88
30	20.80
36	27.35
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOTAL SCREEN LENGTH ~ 3.7
SPAN LENGTH = 32"
COMPATIBLE WITH PIPES UP TO ø24"

TOP SECTION VIEW - L SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

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2. POSITION THE CPS SO IT IS EVENLY SPACED AROUND THE CONNECTOR PIPE, ENSURING A MIN. OF 4" SPACING AWAY FROM ANY CORNERS. SCREEN BOTTOM SHALL BE FLUSH WITH THE CATCH BASIN FLOOR, OR WITH GAPS NO GREATER THAN 5 MM.
3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
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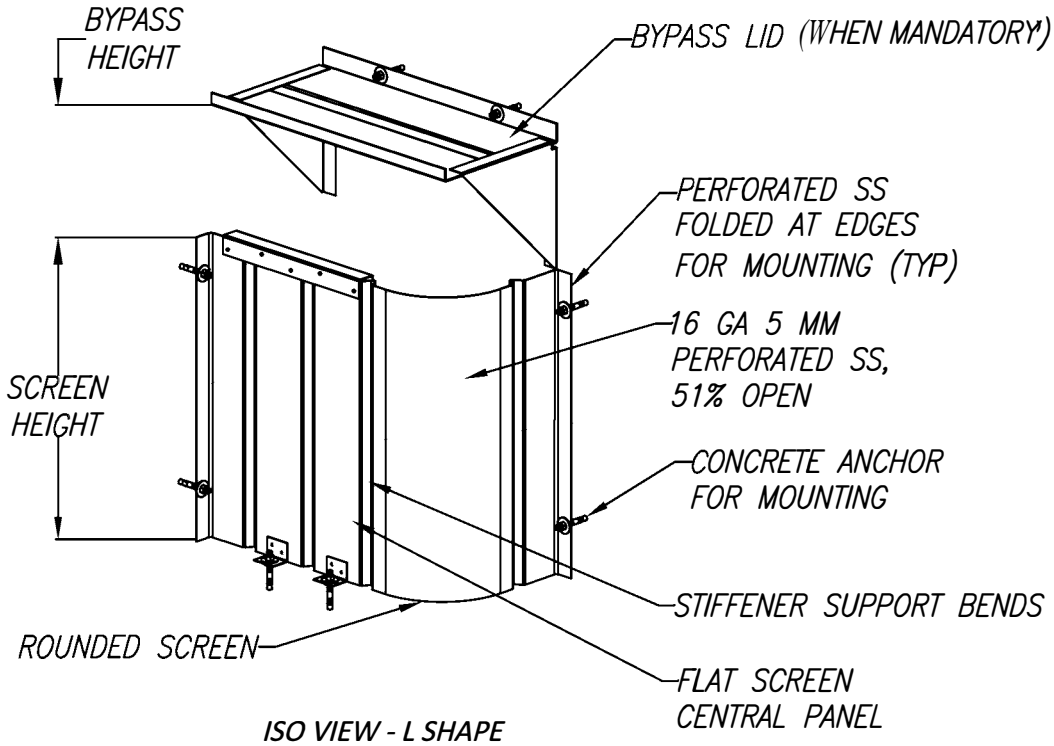
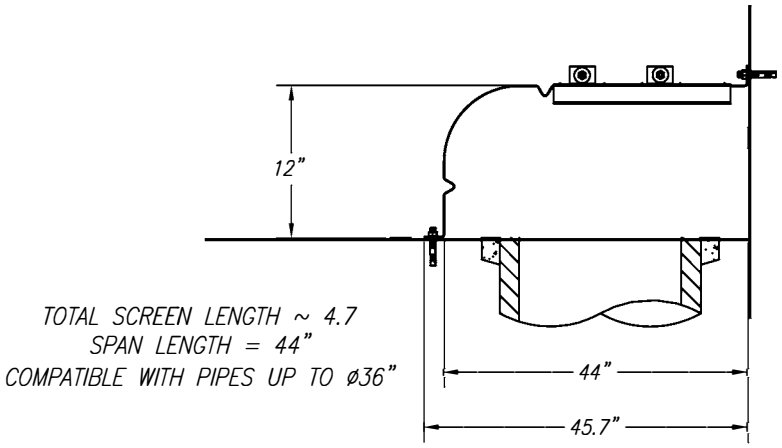
Bio Clean
A Forterra Company

HYDRA CONNECTOR PIPE SCREEN (CPS)
L 4.7



ISO VIEW - L SHAPE

CPS L WITH 4.7 FT SCREEN LENGTH	
CPS HEIGHT (IN)	SCREEN FLOW (CFS)
12	6.67
18	12.26
24	18.88
30	26.40
36	34.71
NOTE: BYPASS FLOW RATES VARY WITH VAULT DEPTH AND BYPASS HEIGHT. CONTACT BIO CLEAN FOR ADDITIONAL INFORMATION.	



TOP SECTION VIEW - L SHAPE

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE.
3. THIS CPS UNIT IS DESIGNED FOR TREATMENT FLOWS THROUGH THE SCREEN. FLOWS GREATER THAN THE TREATMENT FLOW RATE WILL BYPASS OVER THE SCREEN.
4. A BYPASS LID IS REQUIRED SINCE THE OUTLET PIPE IS DIRECTLY BELOW THE CURB OPENING.
5. CPS IS COMPRISED OF 304 STAINLESS STEEL. THICKNESS IS 16 GAUGE. SCREEN PERFORATIONS ARE 5 MILLIMETERS IN DIAMETER. THE SCREEN AREA IS 51% OPEN SPACE.

INSTALLATION NOTES

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3. IF A BYPASS LID IS REQUIRED, VERIFY THE BYPASS HEIGHT NEEDED AND MARK THAT LOCATION ON THE WALL DIRECTLY ABOVE THE BASE UPRIGHTS. LIFT THE LID IN PLACE AND MARK THE HOLE LOCATIONS FOR THE LID MOUNTING BRACKETS. SECURE THE LID WITH STAINLESS STEEL NUTS.

WARRANTY: 3 YEAR MANUFACTURERS		MEETS FULL CAPTURE REQUIREMENTS	
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Bio Clean
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Bio Clean Hydra CPS U			
CPS length ft	CPS height in	A_{screen} (net open area) sf	**Q_{screen} cfs**
3.7	12	1.90	**5.26**
4.7	12	2.41	**6.67**
5.7	12	2.92	**8.09**
3.7	18	2.84	**9.66**
4.7	18	3.61	**12.26**
5.7	18	4.37	**14.86**
3.7	24	3.79	**14.88**
4.7	24	4.81	**18.88**
5.7	24	5.83	**22.89**
3.7	30	4.74	**20.8**
4.7	30	6.01	**26.4**
5.7	30	7.29	**31.99**
3.7	36	5.69	**27.35**
4.7	36	7.22	**34.71**
5.7	36	8.75	**42.07**

Bio Clean Hydra CPS L			
CPS length ft	CPS height in	A_{screen} (net open area) sf	**Q_{screen} cfs**
2.7	12	1.39	**3.84**
3.7	12	1.90	**5.26**
4.7	12	2.41	**6.67**
2.7	18	2.08	**7.06**
3.7	18	2.84	**9.66**
4.7	18	3.61	**12.26**
2.7	24	2.77	**10.88**
3.7	24	3.79	**14.88**
4.7	24	4.81	**18.88**
2.7	30	3.46	**15.20**
3.7	30	4.74	**20.80**
4.7	30	6.01	**26.40**
2.7	36	4.16	**19.99**
3.7	36	5.69	**27.35**
4.7	36	7.22	**34.71**

CPS U & U-Ext length (ft)	CPS L length (ft)	Max. Pipe Ø (in)
3.7	2.7	15
4.7	3.7	24
5.7	4.7	36

APPENDIX B

Bio Clean
A Forterra Company

Section [_____]
Stormwater Connector Pipe Screen

PART 1 – GENERAL

01.01.00 Purpose
The purpose of this specification is to establish generally acceptable criteria for Connector Pipe Screens used for collecting trash and debris inside catch basins. It is intended to serve as a guide to producers, distributors, architects, engineers, contractors, plumbers, installers, inspectors, agencies and users; to promote understanding regarding materials, manufacture and installation; and to provide for identification of devices complying with this specification.

01.02.00 Description
Stormwater Connector Pipe Screens (CPS) are used to prevent trash and debris from entering the stormwater system during dry weather and moderate storm flows by keeping the trash inside the catch basin. The CPS is a screen placed permanently or temporarily in a catch basin at the location of the outlet pipe. The screen separates trash and debris from stormwater treatment flows. Flows that exceed the treatment flow rate bypass over the top of the screen. When the outlet pipe is located below a curb opening the CPS features a lid to prevent debris from passing behind the screen and flowing directly to the outlet pipe. The CPS shall be designed to retain all trash larger than 5 mm (0.197 inches) in the catch basin.

01.03.00 Manufacturer
The manufacturer of the CPS shall be one that is regularly engaged in the engineering, design and production of systems developed for the treatment of stormwater runoff for at least (10) years, and which has a history of successful production, acceptable to the engineer of work. In accordance with the drawings, the CPS(s) shall be a screen device manufactured/distributed by Bio Clean Environmental Services, Inc., or assigned distributors or licensees. Bio Clean Environmental Services, Inc. can be reached at:

5796 Armada Drive, Suite 250
Carlsbad, CA 92008
Phone: (760) 433-7640
Fax: (760) 433-3176
www.biocleanenvironmental.net

01.04.00 Submittals

01.04.01 Submittal drawings will be provided with each order to the contractor and engineer of work.

01.04.02 Submittal drawings are to detail the CPS, its components and the sequence for installation, including:

- CPS configuration with primary dimensions
- Various CPS components
- Any accessory equipment

01.04.03 Inspection and maintenance documentation submitted upon request.

01.05.00 Work Included

01.05.01 Specification requirements for installation of CPS.

01.05.02 Manufacturer to supply CPS(s):

- Screen
- Mounting hardware
- Bypass lid with supports (when required)

PART 2 – COMPONENTS

02.01.01 The CPS shall have a sufficient structural integrity to withstand a lateral force of standing water within the catch basin area when the screen becomes 100% clogged. The CPS unit shall be bolted to the catch basin walls.

02.01.02 The CPS shall be configured with deflector plates or screens preventing trash from falling between the screen and connector pipe. The deflector plate shall be designed to withstand a vertical load.

02.01.03 The gap at the bottom, sides, and joints of the CPS unit shall not exceed 5 mm (0.197 inches).

02.01.04 The CPS shall include vertical structural stiffeners extending the full length of the screen in the form as bends in the screen itself, a bolting surface to fasten the CPS to the wall of the catch basin, and support for the upper portion of the CPS unit referred to as the "bypass."

02.01.05 All parts/components of the CPS unit must be sized to fit through the catch basin's manhole opening.

02.01.06 The CPS frame shall be fabricated from 304 stainless steel.

02.01.07 The CPS screen shall be fabricated from perforated 304 stainless steel. The screen shall have a minimum thickness of 16 gauge. The geometrical opening shape shall have a diameter of 5 mm (0.197 inches).

02.01.08 The screen material used shall have at least 45% open area.

02.01.09 Any edge of the CPS that is not flush with the wall or floor of the catch basin shall be smooth with no prongs or jagged edges.

02.01.10 The assembly bolts, screws, nuts, and washers shall be fabricated entirely from 316 stainless steel. The concrete anchor bolts shall use a wedge anchor, with Type 316 stainless steel threaded rods, nuts, and washers.

PART 3 – PERFORMANCE

03.01.00 General

03.01.01 Function - The CPS has no moving internal components and functions based on gravity flow, unless otherwise specified. Stormwater runoff enters the catch basin through a curb opening and flows toward the connector pipe. The CPS is placed to intercept flows prior to exiting the catch basin through the connector pipe. The CPS must be able to be removed through the catch basin opening. Stormwater flow up to the peak treatment rate is processed through the screen. Flows in excess of the peak treatment rate will overtop the screen in a bypass. The lid (when required) shall be place high enough above the screen to allow for full bypass flow.

03.01.02 Pollutants - The CPS will remove and retain trash and debris larger than 5 mm in diameter entering the catch basin during frequent storm events and specified flow rates.

03.01.03 Treatment Flow Rate - The CPS operates through gravity flow. The CPS is to be sized so the screen is capable of passing the calculated project specific water quality flow rate per local standards. All treatment flow rates must include a 50% screen clogging factor.

03.01.04 Bypass Flow Rate – The CPS is designed to fit within the catch basin in a way not to affect the existing hydraulics and treat or bypass all flows. The bypass must be sized with a surface area greater than the outlet pipe size, thus the CPS shall not be a critical point of flow restriction.

PART 4 - EXECUTION

04.01.00 General

The installation and use of the CPS shall conform to all applicable national, state, municipal and local specifications.

04.02.00 Installation

The contractor shall furnish all labor, equipment, materials and incidentals required to install the CPS device(s) and appurtenances in accordance with the drawings, installation manual, and these specifications, and be inspected and approved by the local governing agency. Any damage to catch basin and surrounding infrastructure caused by the installation of the CPS is the responsibility of the installation contractor.

04.02.01 CPS and all components or accessories shall be inserted through the catch basin and properly secured per manufactures installation manual and these specifications.

04.03.00 Shipping, Storage and Handling

04.03.01 Shipping – CPS shall be shipped to the contractor's address and is the responsibility of the contractor to transport the unit(s) to the exact site of installation.

04.03.02 Storage and Handling– The contractor shall exercise care in the storage and handling of the CPS(s) and its components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted, and unloading has commenced shall be born by the contractor. The CPS(s) and its components shall always be stored indoors and transported inside the original shipping container(s) until the CPS(s) are ready to be installed. The CPS shall always be handled with care and lifted according to OSHA and NIOSA lifting recommendations and/or contractor's workplace safety professional recommendations.

04.04.00 Maintenance and Inspection

04.04.01 Inspection – After installation, the contractor shall demonstrate that the CPS has been properly installed at the correct location(s), elevations, and with appropriate supports and fasteners. All components associated with the CPS and its installation shall be subject to inspection by the engineer of work, governing agency, and the manufacture at the place of installation. In addition, the contractor shall demonstrate that the CPS has been installed per the manufacturer's specifications and recommendations. CPS(s) shall be physically inspected regularly in accordance to owner's Stormwater Pollution Prevention Plans (SWPPP) and manufacture's recommendations. An inspection record shall be kept by the inspection operator. The record shall include the condition of the CPS and its appurtenances. The most current copy of the inspection record shall always be copied and placed in the owner's SWPPP.

04.04.02 Maintenance – The maintenance shall be performed by someone qualified. A Maintenance Manual is available upon request from the manufacturer. The

manual has detailed information regarding the maintenance of the CPS(s). A detailed Maintenance Record shall be kept by the maintenance operator. The Maintenance Record shall include any maintenance activities preformed, amount and description of debris collected, and the condition of the CPS. The most current copy of the Maintenance Record shall always be copied and placed in the owner's Stormwater Pollution Prevention Plan (SWPPP) per governing agency. Upon cleaning: no trash or debris shall be located in the catch basin, on top of the bypass lid, or between the screen; no vegetation shall block the catch basin opening or connector pipe; and no trash or debris shall be located within the catch basin opening.

04.04.03 Material Disposal - All debris, trash, organics, and sediments captured and removed from the CPS shall be transported and disposed of at an approved facility for disposal in accordance with local and state regulations. Please refer to state and local regulations for the proper disposal of toxic and non-toxic material.

PART 5 – QUALITY ASSURANCE

05.01.00 Warranty

The manufacturer shall guarantee the CPS against all manufacturing defects in materials and workmanship for a period of (3) years from the date of delivery to the contractor. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The CPS is limited to recommended application for which it was designed.

[End of This Section]

APPENDIX C

Bio Clean

A Forterra Company

Hydra CPS

A Stormwater Trash Capture Solution

INSTALLATION MANUAL

5796 Armada Drive Suite 250 | Carlsbad, CA 92008 | 855.566.3938

stormwater@forterrabp.com | biocleanenvironmental.com

INSTALLATION

Hydra CPS is designed to be installed inside each catch basin covering the outlet pipe within the acceptable perimeters. Hydra CPS requires entry into each catch basin for installing this product.

Please follow all guidelines for working and entering a catch basin per your State and Federal Guidelines. Bio Clean is not responsible for any injuries or damages that might occur during this installation process.

Installer to determine which Hydra CPS model to install based on the following criteria:

1. Location of connector pipe inside the catch basin to determine the screen shape
2. Sizing of the Outlet Pipe for Connector Pipe Screen to Filter
3. Location of the curb opening to determine if a bypass lid is required
4. Treatment flow rate through the screen
5. Bypass requirements – typically over the screen

It is recommended that the catch basin be cleaned during time of install as the install can be used as opportunity to do so. Hydra CPS installation requires a debris free surface when installing to make sure that the CPS rests with no more than a 5MM gap on any of its edges.

Requirements:

The contractor shall furnish all labor, equipment, materials, and incidentals required to install the CPS and appurtenances in accordance with the contract documents. Any damage to the existing drainage structure (retrofit applications) or surrounding infrastructure that may need to be repaired to allow for proper installation of the CPS shall be considered incidental and to be paid for at no

cost to the client. Bio Clean does offer installation services in certain areas. Please contact Bio Clean for more information on pre-authorized 3rd party contractors that can provide install service in your area.

The manufacturer of the Hydra CPS does provide a warranty against defects in materials and workmanship for a period of 3 years from the date of acceptance by the Engineer. The Hydra CPS also carries a 2-year warranty on installation.

Components:

Tools:

- Marker – Sharpie
- Tape Measure
- Square – Straight Edge
- Hammer (recommend 2lbs sledge hammer)
- Level 24”
- RotoHammer w/ 3/8” x 6” concrete bit
- 9/16 wrench
- Impact Drill with 9/16 socket (not required)

Hardware:

- 3/8” x 2 ¾” Wedge Anchors
- 3/8” x 1 ½” Nuts & Bolt, Washers

Installation:

1. Carefully lower the Modular CPS unit through the manhole opening.
2. Position the Modular CPS so it is evenly spaced around the connector pipe, ensuring a minimum of 4” spacing away from any corners.
3. Mark the hole locations on the wall for the stainless anchor bolts.
4. Drill holes and hammer the bolts in place
5. Secure the Hydra CPS using stainless nuts.
6. If bypass lid is required, position the lid so that it is at the correct bypass height above the CPS.
7. Mark hole locations, drill holes, and hammer the bolts in place for the bypass lid.
8. Secure the bypass lid using stainless nuts.
9. If the bottom of the base exposes more than a 5 mm gap, then an additional face strip may be fastened to the base channel using stainless tek screws or rivets. This base face strip matches the length and contour of the base screen.

For Installation Support
Please Contact Us At:
760-433-7640
stormwater@forterrabpm.com

APPENDIX D

Bio Clean

A Forterra Company

Hydra CPS

A Stormwater Trash Capture Solution

OPERATION & MAINTENANCE MANUAL

5796 Armada Drive Suite 250 | Carlsbad, CA 92008 | 855.566.3938

stormwater@forterrabp.com | biocleanenvironmental.com

OPERATION & MAINTENANCE

CPS devices should be maintained by individuals who are trained in proper disposal procedures, confined space entry and traffic safety regulations. When servicing a Hydra CPS device be sure to follow all safety and traffic control protocols as well as wearing all proper personal protection equipment such as gloves, safety glasses, hard-hat, safety vest and work boots.

Visual Inspection

1. Begin by inspecting the inflow of the catch basin where the Hydra CPS device is located. Check for any obstructions to inflow of the CB unit. If any large obstructions are found, have them removed. Once the inflow inspection is completed, remove the man-hole cover for further inspection. (Note: Confined Space Entry Procedures may apply if trained personnel intend to enter the interior space of any Catch Basin. Please follow all applicable confined space entry procedures)

2. Remove the manhole cover and visually estimate the amount and types of debris found in the CB unit. Look for any visual signs of damage that may compromise the CB unit to function properly. Inspect for any standing water in the CB unit as well as for large amounts of sediment and debris surrounding the CPS device. If standing water and high sediment volume is found, remove water, sediment and debris by vacuum truck or by other debris removal methods.

Cleaning Procedures and Frequencies

1. Like all other storm water BMP's, Hydra CPS devices require periodic maintenance. Routine inspection and maintenance intervals for all CPS devices are typically twice per year for inspections and once per year for maintenance service. Hydra CPS devices may require more frequent maintenance service if the device is located in a high debris loading drainage area, such as certain downtown areas, retail/restaurant, or residential areas where a significant amount of vegetation/foliage is located. In such cases, Hydra CPS devices may require more frequent inspection and maintenance service, which could range from twice per year to monthly inspection and maintenance service, depending on pollutant load conditions.

2. To begin Hydra CPS cleaning procedures, conduct a visual inspection of the CPS device and the surrounding area to ensure a safe working environment. Setup appropriate barriers and signage as necessary to establish a work zone surrounding the catch basin. Once the work zone has been established, remove the manhole cover from the catch basin.

3. Once the manhole cover is removed from the basin the Hydra CPS is ready for servicing. All debris can be removed by either a vacuum truck or manually removing sediment and debris by hand.

4. Hydra CPS devices shall be cleaned using a pressure washer as may be necessary if any materials are found to cause occlusion or clogging of the screen.

Disposal

1. All trash and debris removed from the Hydra CPS unit shall be disposed of in accordance with local, state and federal regulation.

2. Solid waste disposal can be coordinated with local landfills. Liquids may need to be disposed of by wastewater treatment plant, municipal vacuum truck decant facility or approved facility.

For Maintenance Services or Information Please Contact Us At:
760-433-7640
Or Email:
info@biocleanenvironmental.com

APPENDIX E

Product Warranty

HYDRA CONNECTOR PIPE SCREEN (HYDRA CPS)

Bio Clean Environmental Services, Inc. products are engineered and manufactured with the intent to be considered as permanent infrastructure. Bio Clean Environmental Services, Inc. warranties its products to be free of manufacturer's defects for a period of 3 years from the date of purchase. If a warranty claim is made and determined to be valid, Bio Clean Environmental Services, Inc. will either repair or replace the product, at the discretion of Bio Clean Environmental Services, Inc. Warranty claims must be submitted, evaluated, and approved by Bio Clean Environmental Services, Inc. for the claim to be determined to be valid. All warranty work and/or corrective action must be authorized by Bio Clean Environmental Services, Inc. prior to beginning the work not covered by this warranty. There are no other warranties either expressed or implied other than what is specifically specified herein. Abusive treatment, neglect, or improper use of Bio Clean Environmental Services, Inc. products will not be covered by this warranty.

Bio Clean
A Forterra Company

855.566.3938
stormwater@forterrabp.com

APPENDIX F

MVCAC
Mosquito and Vector Control Association of California

One Capitol Mall, Suite 800 • Sacramento, CA 95814 • p: (916) 440-0826 • f: (916) 444-7462 • e: mvcac@mvcac.org

March 10, 2020

Bio Clean, A Forterra Company
6655 Wedgewood Rd, Suite 250
Maple Grove, Minnesota 55311
Via email Jacob.Forst@fortterabp.com

Dear Mr. Forst,

Thank you for the submission of the Bio Clean Connector Pipe Screen for review by the Mosquito and Vector Control Association of California pursuant to the SWRCB Trash Treatment Control Device Application Requirements. The Association has reviewed the conceptual drawings for the Bio Clean Connector Pipe Screen and verifies that provisions have been included in the design that allow for full visual access to all areas for presence of standing water, and when necessary, allows for treatments of mosquitoes.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the Bio Clean Connector Pipe Screen as presented, it does not affect the local mosquito control agency's rights and remedies under the State Mosquito Abatement and Vector Control District Law. For example, if the installed device or the associated stormwater system infrastructure becomes a mosquito breeding source, it may be determined by a local mosquito control agency to be a public nuisance in accordance with California Health and Safety Code sections 2060-2067.

"Public nuisance" means any of the following:

1. Any property, excluding water, that has been artificially altered from its natural condition so that it now supports the development, attraction, or harborage of vectors. The presence of vectors in their developmental stages on a property is prima facie evidence that the property is a public nuisance.
2. Any water that is a breeding place for vectors. The presence of vectors in their developmental stages in the water is prima facie evidence that the water is a public nuisance.
3. Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors. (Heal. & Saf. Code § 2002 (j).)

Declaration of a facility or property as a public nuisance may result in penalties as provided under the Health and Safety Code. Municipalities and the vendors they work with are encouraged to discuss the design, installation, and maintenance of stormwater trash capture devices with their local mosquito control agency to reduce the potential for disease transmission and public nuisance associated with mosquito production.

Sincerely,

Bob Achermann,
MVCAC Executive Director