

## **APPENDIX E**

Provided by Josh Stackhouse on May 13, 2019

## Stormwater Treatment System Design Summary Kingstonian

Kingston, NY

Information provided by Paul Larios, EIT (Brinnier and Larios, PC)

### Site information:

Structure ID	WQF: 1-YR Storm Runoff Flow (cfs)	100-YR Peak Flow (cfs)
Unit 1	4.3	11.6
Unit 2	1.84	7.1

- Presiding agency = NYSDEC

### Assumptions:

- NYSDEC has adopted the NJCAT/NJDEP verified flow rates for the Vortechs and CDS systems. NYSDEC has effectively created three categories of treatment, new development (standalone), redevelopment and pretreatment. Specific approval and sizing criteria are applied to each category. Per the specifying engineer, this project falls under **Redevelopment**.

### Sizing Summary:

The Contech Vortechs® stormwater treatment system is a hydrodynamic separator designed to enhance gravitational separation of floating and settleable materials from stormwater flows. Stormwater flows enter the unit tangentially to the grit chamber, which promotes a gentle swirling motion. As stormwater circles within the grit chamber, pollutants migrate toward the center of the unit where velocities are the lowest. The majority of settleable solids are left behind as stormwater exits the swirl chamber. Stormwater flows then are directed below a floatables baffle wall, where buoyant debris and hydrocarbons are removed.

The CDS Stormwater Treatment System is a high-performance hydrodynamic separator. Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, preventing re-suspension and release of previously trapped pollutants.

Structure ID	System Model Size	NYSDEC Approved Flow Rates (cfs)
Unit 1 – CDS Option	CDS3535-7 (CDS-7) (2 Required)	2.85 ea.
Unit 1 - Vortechs option	Vortechs 7000	4.50
Unit 2	CDS3030-6 (CDS-6)	2.10

The following pages include the standard drawings of the systems.

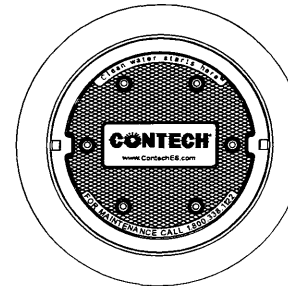
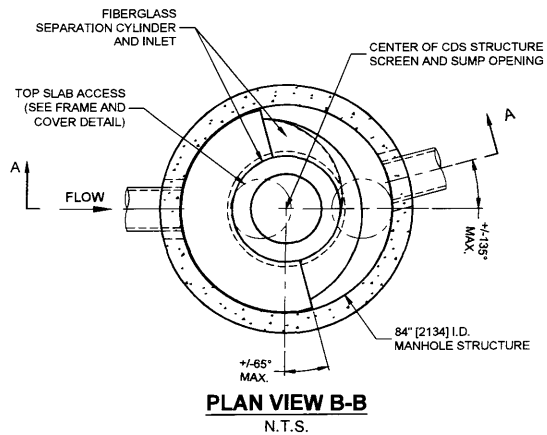
**Maintenance:**

Like any stormwater best management practice, the Vortechs and CDS systems requires regular inspection and maintenance to ensure optimal performance. Maintenance frequency will be driven by site conditions. Quarterly visual inspections are recommended, at which time the accumulation of pollutants can be determined. On average, both systems requires annual removal of accumulated pollutants.

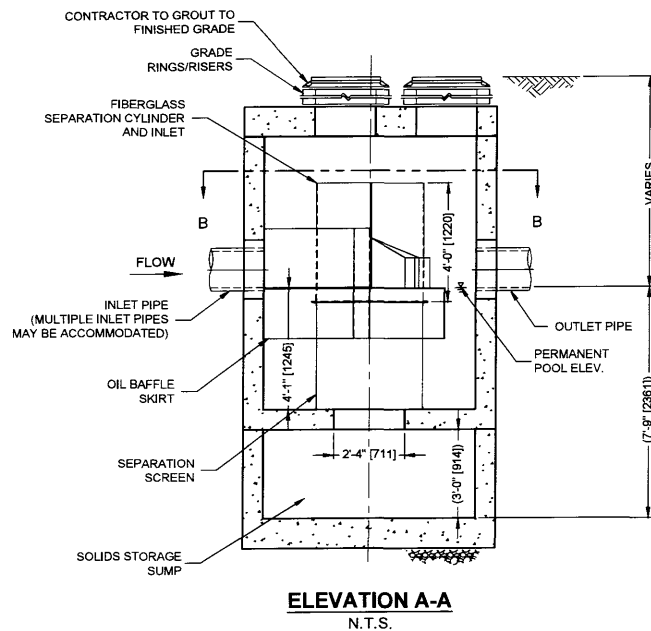
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### CDS-7-C (CDS3535) DESIGN NOTES

THE STANDARD CDS-7-C (CDS3535) CONFIGURATION IS SHOWN.



**FRAME AND COVER**  
(DIAMETER VARIES)  
N.T.S.



**ELEVATION A-A**  
N.T.S.

#### SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)		*	
PEAK FLOW RATE (CFS OR L/s)		*	
RETURN PERIOD OF PEAK FLOW (YRS)		*	
SCREEN APERTURE (2400)		*	
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			
*			
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	*	*	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

#### GENERAL NOTES

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
- FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
- CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
- STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET HS20 (AASHTO M 306) AND BE CAST WITH THE CONTECH LOGO.
- IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

#### INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
- CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



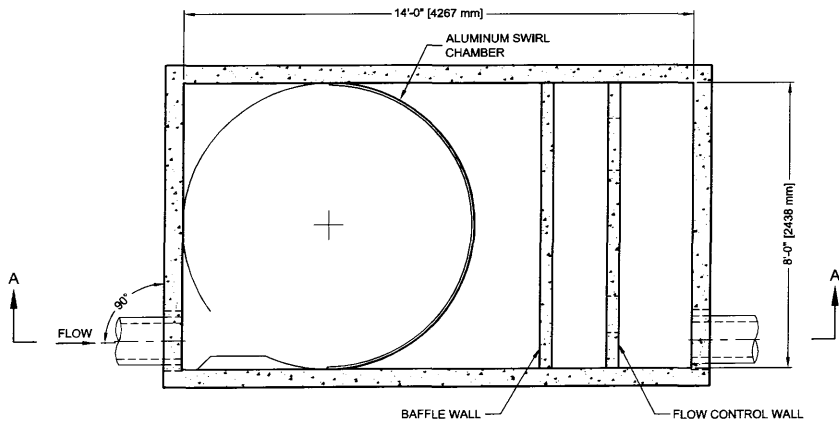
THE QUALITY OF OUR PRODUCTS IS GUARANTEED BY THE  
TECHNOLOGICAL ADVANCEMENT OF THE CONTECH  
SELECTED MATERIALS TO MEET YOUR REQUIREMENTS

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ENGINEERED SOLUTIONS LLC

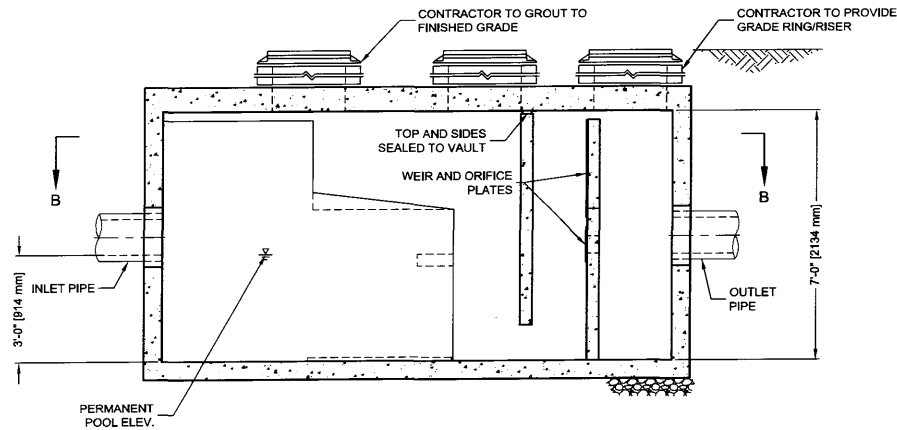
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CDS-7-C (CDS3535)  
ONLINE CDS  
STANDARD DETAIL

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**SECTION B-B**

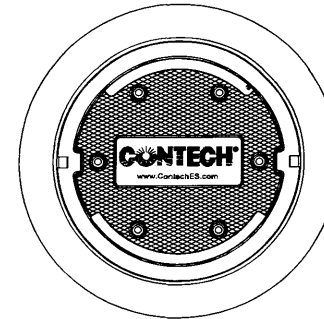


**SECTION A-A**

**VORTECHS 7000 DESIGN NOTES**

VORTECHS 7000 RATED TREATMENT CAPACITY IS 11 CFS, OR PER LOCAL REGULATIONS. IF THE SITE CONDITIONS EXCEED RATED TREATMENT CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD INLET/OUTLET CONFIGURATION IS SHOWN. FOR OTHER CONFIGURATION OPTIONS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)



**FRAME AND COVER  
(DIAMETER VARIES)  
N.T.S.**

**SITE SPECIFIC  
DATA REQUIREMENTS**

STRUCTURE ID	*		
WATER QUALITY FLOW RATE (CFS)	*		
PEAK FLOW RATE (CFS)	*		
RETURN PERIOD OF PEAK FLOW (YRS)	*		
<hr/>			
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
<hr/>			
RIM ELEVATION	*		
<hr/>			
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
*	*	*	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

**GENERAL NOTES**

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. [www.ContechES.com](http://www.ContechES.com)
4. VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. INLET PIPE(S) MUST BE PERPENDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

**INSTALLATION NOTES**

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



THIS PRODUCT MAY BE PROTECTED BY THE FOLLOWING  
U.S. PATENT: 5,759,415-RELATED FOREIGN PATENTS

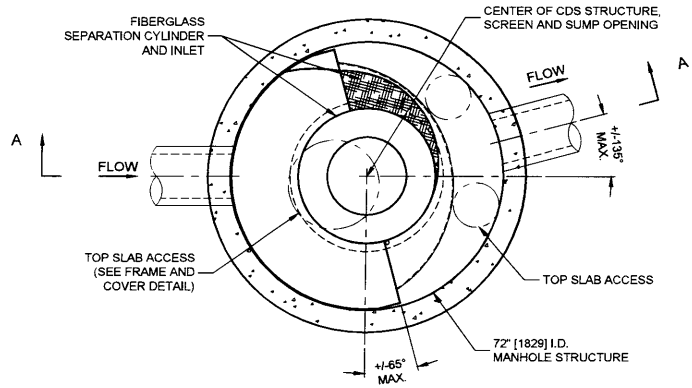


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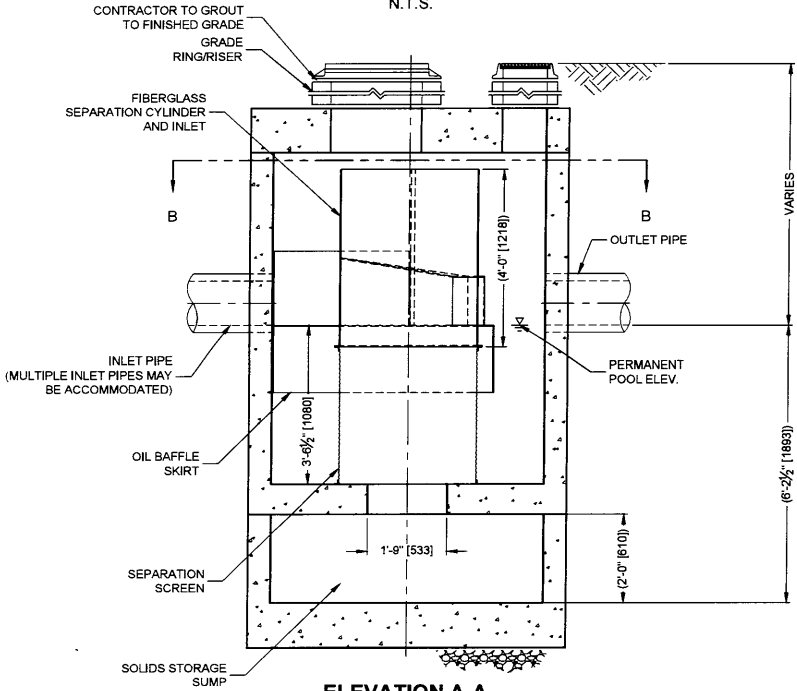
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800-338-1122 513-645-7000 513-645-7993 FAX

**VORTECHS 7000  
STANDARD DETAIL**

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**PLAN VIEW B-B**  
N.T.S.

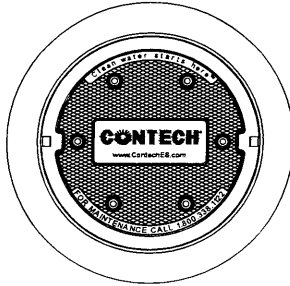


**ELEVATION A-A**  
N.T.S.



**CDS-6-C (CDS3030) DESIGN NOTES**

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N.T.S.

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SCREEN APERTURE (2400)			*
PIPE DATA	I.E.	MATERIAL	DIAMETER
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OUTLET PIPE	*	*	*
RIM ELEVATION			
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ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
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