City of Indianapolis Stormwater Quality Unit Selection Guide

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DEPARMENT OF PUBLIC WORKS

NEW STORMWATER PRODUCTS COMMITTEE

City of Indianapolis Stormwater Quality Unit Selection Guide

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Approved Rate Based Stormwater Quality Unit

For current Selection Guide, check:
https://www.indy.gov/activity/public-works-specifications-and-manuals

Performance Matrix for manufactured Stormwater Quality Unit (SQU) that are approved for use as post-construction water quality units in the City of Indianapolis and in compliance with the Stormwater Design and Construction Specifications Manual.

Only current NJDEP certified units listed below are considered "Approved". If NJDEP Certification lapses for an approved manufactured SQU listed below, it will no longer be considered an approved SQU for the City of Indianapolis regardless of being shown on the list below.

Approvals apply to units as documented by the data submitted for this certification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria.

Units are also reviewed by the City for serviceability based on their cleaning equipment. Currently, the smallest suction tube used by the City's contractor is a 6" diameter tube.

Units considered serviceable by the City are approved for use on City Projects and are noted in the table. All approved units may be used on privately owned projects.

Table 1. Approved Rate Based SQUs					
Manufactured SQU	**SQU System Model**	**Max Treatment Flow (cfs)**	**Max 10-yr On-Line Flow Rate (cfs)**	**Cleanout Depth (Inches)**	**Allowed for Use on City Projects**
StormTrap StormSettler	SSet-3	0.79	1.58	7	No*
	SSet-4	1.41	2.83	7	No*
	SSet-5	2.19	4.4	7	No*
	SSet-6	3.17	6.36	7	No
	SSet-7	4.3	8.6	7	No
	SSet-8	5.63	11.26	7	No
	SSet-10	8.78	17.56	7	No
	SSet-12	12.7	25.4	7	No
Upstream Technologies Inc. SAFL Baffle	60 x36	0.27	2.74	18	Yes*
	72 x 36	0.39	3.96	18	Yes*
	84 x 46	0.53	5.38	18	Yes*
	96 x 46	0.69	7.00	18	Yes*
	108 x 46	0.87	8.83	18	Yes*
	120 x 57	1.08	10.96	18	Yes*
Hydro-Shield Advance Plus	HSA-4P	1.49	3.28	9	No
	HSA-6P	3.35	7.37	9	Yes
	HSA-8P	5.95	13.09	9	Yes
ADS Arcadia	Arcadia ARC3	0.95	1.91	9	No
	Arcadia ARC4	1.68	3.37	9	Yes
	Arcadia ARC5	2.63	5.28	9	Yes
	Arcadia ARC6	3.78	7.58	9	Yes
	Arcadia ARC8	6.72	13.48	9	Yes
	Arcadia ARC10	10.50	21.06	9	Yes
3P Technik Filetrsysteme Gmbh HydroShark / Xerxes HydroChain Prime Separator System	HydroShark/HCPS 3	0.60	1.2	12	No
	HydroShark/HCPS 4	1.07	2.14	12	No
	HydroShark/HCPS 5	1.67	3.34	12	No
	HydroShark/HCPS 6	2.41	4.82	12	No
	HydroShark/HCPS 8	4.28	8.56	12	No
	HydroShark/HCPS 10	6.69	13.38	12	No

*- See Specific Design Requirements for Specified Unit

Specific Design and Installation Requirements for Approved SQUs

These products have been approved by the Department for use on private development with maximum treatment flow rates. Only specific approved products may be used on public projects.

Please note the following criteria related to the specific unit.

StormTrap StormSettler

The use of the units on City of Indianapolis projects is not approved at this time.

The access castings must be placed over the inlet to allow access for cleaning.

Each unit will require additional measures to address retention of floatables. Units will also require additional measures to retain oils/ organics when those contaminates are expected such as in "hot spot" areas. The O & M manual will need to address these additional measures. Units shall be installed in compliance with the current City of Indianapolis Stormwater Specifications Manual. The outer structure shall also comply with the current manual specifications.

This approval applies to units as documented by the data submitted for this recertification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria. This would include the square units which were listed but not tested or reviewed by NJCAT.

Units are approved for the 180º configuration, as verified by NJCAT. Grated inlets and multiple pipe side inlet configurations were not tested by the manufacturer.

The peak 10% exceedance (10-year) flow rate for on-line units may not exceed the maximum rate tested for scour.

Immediate cleaning after spills should also be addressed in the O & M manual as well as routine cleaning.

Upstream Technologies SAFL Baffle

Use of the SAFL Baffle on City projects is approved with the installation of two (2) manhole lids on each unit.

Each unit will require additional measures to address retention of floatables. Units will also require additional measures to retain oils/ organics when those contaminates are expected such as in "hot spot" areas. The O & M manual will need to address these additional measures.

Concrete units shall be installed in compliance with the current City of Indianapolis Stormwater Specifications Manual. The outer structure shall also comply with the current manual specifications.

This approval applies to units as documented by the data submitted for this recertification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria. This would include the square units which were listed but not tested or reviewed by NJCAT

Units are approved for the 180º configuration, as verified by NJCAT. Grated inlets and multiple pipe side inlet configurations were not tested by the manufacturer.

The peak 10% exceedance (10-year) flow rate for on-line units may not exceed the maximum rate tested for scour.

Immediate cleaning after spills should also be addressed in the O & M manual as well as routine cleaning.

HydroShield Advance Plus

The use of the HSA-4P units on City of Indianapolis projects is not approved at this time. The HSA-6P and HAS-8P are approved for use on the City of Indianapolis projects.

The system may be used on private property. The use in areas where traffic loading may occur must be certified by a professional engineer. For private property applications, the engineer should address the maximum design loading anticipated.

Each unit will require additional measures to address retention of floatables. Units will also require additional measures to retain oils/ organics when those contaminates are expected such as in “hot spot” areas. The O & M manual will need to address these additional measures.

Concrete units shall be installed in compliance with the current City of Indianapolis Stormwater Specifications Manual. The outer structure shall also comply with the current manual specifications.

This approval applies to units as documented by the data submitted for this recertification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria. This would include the square units which were listed but not tested or reviewed by NJCAT

Units are approved for the 180º configuration, as verified by NJCAT. Grated inlets and multiple pipe side inlet configurations were not tested by the manufacturer.

The peak 10% exceedance (10-year) flow rate for on-line units may not exceed the maximum rate tested for scour.

The system may not be used in the public R/W unless approved by City of Indianapolis Department of Public Works (DPW) on a case-by-case basis by the DPW project engineer.

Immediate cleaning after spills should also be addressed in the O & M manual as well as routine cleaning.

HydroShark

The use of the units on City of Indianapolis projects is not approved at this time.

Concrete units shall be installed in compliance with the current City of Indianapolis Stormwater Specifications Manual. The outer structure shall also comply with the current manual specifications for concrete structures.

This approval applies to units as documented by the data submitted for this recertification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria. This would include the square units which were listed but not tested or reviewed by NJCAT.
The peak 10% exceedance (10-year) flow rate for on-line units may not exceed the maximum rate tested for scour.

Immediate cleaning after spills should also be addressed in the O & M manual as well as routine cleaning.

ADS Arcadia

The use of the units on City of Indianapolis projects is not approved at this time.

Each unit will require additional measures to address retention of floatables. Units will also require additional measures to retain oils/ organics when those contaminates are expected such as in “hot spot” areas. The O & M manual will need to address these additional measures.

Concrete units shall be installed in compliance with the current City of Indianapolis Stormwater Specifications Manual. The outer structure shall also comply with the current manual specifications.

This approval applies to units as documented by the data submitted for this recertification review. Changes in materials of construction, overall unit dimensions, or dimensions of the internal components shall invalidate this approval and require submittal for re-approval under current evaluation criteria. This would include the square units which were listed but not tested or reviewed by NJCAT

Units are approved for the 180º configuration, as verified by NJCAT. Grated inlets and multiple pipe side inlet configurations were not tested by the manufacturer.

The peak 10% exceedance (10-year) flow rate for on-line units may not exceed the maximum rate tested for scour.

Immediate cleaning after spills should also be addressed in the O & M manual as well as routine cleaning.

Design Treatment Flow Rate Determination for Stormwater Quality Flow Rate Determination

The design flow rate for manufactured stormwater quality units (SQUs) shall be determined using the SCS runoff methodology as outlined below.

1. Delineate the watershed basin(s) to be served by the proposed SQU(s). Tabulate the total impervious and pervious areas. Please note impervious and pervious area runoff rates MUST be calculated as separate basins. The sizing calculation assumes the impervious area is connected directly to the SQU and the Tc calculation must be adjusted for this assumption (i.e. no flow over grass) for the impervious basin. This can be accomplished by creating two basins, one with an area equivalent to the total impervious area and the other with an area equivalent to the total pervious area of the delineated watershed to be served by the SQU.
2. Determine the time-of-concentration (Tc) using the TR-55 methodology (Worksheet 3, Chapter 200 Appendix of the City of Indianapolis Stormwater Specifications Manual) for each basin. A minimum 5-minute Tc may be assumed for the impervious basin.
3. Calculate the curve numbers (CN) for each basin, using CN=98 for the impervious basin.
4. Determine the peak discharge from the 0.3-inch storm using the appropriate Huff, 50% rainfall distribution (Storm duration 0 up to and including 6 hrs – 1st Quartile, 6.1 to 12 hrs – 2nd Quartile, 12.1 to 24 hrs – 3rd Quartile. See Table below for Huff ordinates.). A single hydrograph for each basin should be determined and all basin hydrographs added to determine the peak flow. Storm durations of 15-, 30- and 45 minutes as well as 1-, 2-, 3- 6- 12- and 24- hours should be checked to determine the peak SQU flow.

Table IA. Huff Ordinates

Huff Rainfall Distribution Ordinates				
	Cumulative Percent of Storm Dept h			
Cumulative Percent of Storm Time	**1st Quartile (0 ≤ 6 hrs duration)**	**2nd Quartile (>6, ≤ 12 hrs duration)**	**3rd Quartile (>12, ≤ 24 hrs duration)**	**4th Quartile (>24 hrs duration)**
0	0.00	0.00	0.00	0.00
5	16	3	3	2
10	33	8	6	5
15	43	12	9	8
20	52	16	12	10
25	60	22	15	13
30	66	29	19	16
35	71	39	232	19
40	75	51	27	22
45	79	62	32	25
50	82	70	38	28
55	84	76	45	32
60	86	81	57	35
65	88	85	70	39
70	90	88	79	45
75	92	91	85	51
80	94	93	89	59
85	96	95	92	72
90	97	97	95	84
95	98	98	97	92
100	100.00	100.00	100.00	100.00

Source: Bulletin 71, "Rainfall Frequency Atlas of the Midwest", Floyd A. Huff and James A. Angel, 1992

O&M recommendations

- Using Sludge Judge®, Core Pro®, AccuSludge®, or equivalent to monitor sludge level and taking multiple readings.
- Inspections recommended three times during first two (2) years. City recommends a minimum inspection and cleaning frequency of one (1) year for all units to prevent solids from setting up. Four (4) time per year recommended if subject to spills or unstable surfaces.
- Visual observation for floatables with description of the additional measure to capture floatables and its location. Method of floatable removal should also be described. (Units will not capture floatables – see #3 and #4 below.)

O&M Manual Checklist

In addition to the requirements listed in Section 102.06 of the Stormwater Specifications Manual, the following notes / maintenance items should be included in the Operations and Maintenance Manual (O & M Manual):

____ 1 Graphical and written description of sediment measuring procedure. This should include the use of a dipstick tube equipped with a ball valve (e.g. Sludge Judge®).

____ 2 Oil and other floatable materials removal procedure during routine cleanout.

____ 3 The O & M Manual should specify if entry into the SQU should be considered an OSHA confined space and guidelines followed.

____ 4 Detail drawing of proposed SQU, including floating debris capture device where applicable, should be included.

____ 5 Note in the manual to clean unit immediately if there is a hydrocarbon spill (e.g. gasoline or oil).

____ 6 The use of adsorbents should be addressed as appropriate.

____ 7 A note should be provided indicating disposal of all sediment must be in accordance with all federal, state and local requirements and should NOT be dumped into the storm sewer or a sanitary sewer.

____ 8 Other specific requirements per the manufacturer's recommendations.

Plan Checklist

The following items should be specified on all plans referencing a SQU submitted for approval by the City of Indianapolis:

____ 1 The minimum cover requirement as specified by the Stormwater Specifications Manual should be shown on the details for all connecting pipes.

____ 2 A minimum 6” stone base should be shown on the detail.

____ 3 The backfill should be specified as required by the manufacturer.

____ 4 Detail drawing of each SQU model, including floating debris capture device as applicable, per the manufacturer should be included on plans.

____ 5 Detail of connecting structures and diversion for off-line configurations should be included.

____ 6 A minimum 24” access opening must be shown.

____ 7 All construction plans shall show the SQUs installed with one inlet and one outlet pipe approximately 180 degrees apart unless the design report includes documentation the unit was tested by NJCAT and certified by NJDEP for the proposed layout. The inclusion of surface inlets must also include the testing and certification documentation.

Technical Information Report/Drainage Report Checklist

The following requirements should be addressed in Technical Information Report/Drainage design reports:

____ 1 The design storm must not create a hydraulic tailwater condition on the SQU. A first flush hydraulic gradeline evaluation should be included in the report.

____ 2 The design storm should be the peak runoff for a 0.3-inch rainfall depth using the appropriate Huff, 50% rainfall distribution. The contributing watershed should be modeled with the pervious and impervious areas inputted as separate areas (i.e. not combined using a single curve number.)

____ 3 The 10-yr pipe capacity up- and downstream of all water quality structures should be documented with calculations to demonstrate the water surface for the 10-yr storm is below the crown of the pipe as required by the Stormwater Specifications Manual.

____ 4 Diversion structure design should be documented with calculations as appropriate.

____ 5 Buoyancy shall be addressed in the report.

____ 6 Traffic loading requirements should be addressed in the report.